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Brain Circulation at Industry-Level: Evidence from the Knowledge Services Industry in Sri Lanka

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Abstract

Brain circulation is critically important in the globalized and knowledge-based economy as returning skilled migrants are recognized as knowledge transmitters between the center and the periphery. The present study analyzed the factors that promoted brain circulation within Knowledge Services Industry (KSI) in Sri Lanka by employing firsthand data collected from the returned skilled migrants in the industry. A significant flow of brain circulation, largely driven by pull factors, was observed. The econometric analyzes of the determinants of brain circulation at the pre-growth stage (before-2009) and the post-growth stage of KSI were significantly different for the skilled employees and entrepreneurs. Entrepreneurs, who have been motivated by the growing investment opportunities in the global knowledge services industry, have returned in the pre-growth stage. In contrast, employees have returned following the growth trajectory of the industry. Moreover, temporal nature of brain circulation is kept but does not apply commonly to both skilled employees and entrepreneurs. Entrepreneurs are less likely to return permanently compared to the skilled employees since the location has not been an obstacle for their investment activities. Therefore, developing countries should promote both permanent returnees- reverse brain drain- as well as the temporary returnees-diaspora- to achieve a beneficial brain circulation.

Keywords: Brain Circulation, Discrete Choice Models, Returned Entrepreneurs, Knowledge Services Industry, Sri Lanka

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1. Introduction

Developing countries have experienced a massive depletion of its stock of human capital due to skilled migration. According to the neoclassical arguments, domestic unfavorable conditions (push factors) and international favorable conditions (pull factors) are the main causes of such skilled migration-brain drain (Castles & Millar, 2003). However, with the revolutionary advancements in the information technology services and transportation, some of these countries have successfully transformed brain drain into brain circulation. The brain circulation is critically important in the globalized and knowledge-based economy as returned skilled migrants transfer technical knowledge, business contacts, information about new markets and emerging opportunities to the periphery (Saxenian, 2002, 2006). For instance, brain circulation in Taiwan has contributed to upgrading the local capabilities, and to move up through the global value chain of Information and Communication Technology (ICT) industry (Saxenian & Shu, 2001; Saxenian, 2002). A decade old brain circulation literature is not rich enough to explain the most of important aspects of this vital process. In particular, meso-level (at industry or regional level) determinants that influence the brain circulation need to be explored (Iredale, Guo, & Rozario, 2003).

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The study intended to analyze the determinants of brain circulation within the context of Knowledge Services Industry (KSI) in Sri Lanka. The KSI is defined as a combination of Information Technology (IT) services firms, Information Technology enabled Services firms (ITeS) such as Business Process Outsourcing/Knowledge Process Outsourcing (BPO/KPO) and IT training institutes (Board of Investment Sri Lanka [BOISL], 2013). In the last decade, the industry achieved a rapid growth and became a popular destination for BPO/KPO in the world. For instances, exports of ICT services in Sri Lanka has increased from US\$ million 118 in 2003 to US\$ million 673 in 2012- an increase of nearly 500 percent (World Development Indicators [WDI], 2014). Moreover, employment in the industry, which stood at 15586 in 2003, increased to 65518 in 2012 (Information and Communication Technology Agency of Sri Lanka [ICTA], 2010, 2013). Further, business start-ups within the industry have increased by over 220 percent during the same period. The rapid growth of the KSI has attracted a large number of skilled migrants by converting brain drain into a brain circulation at industry-level. However, a similar flow of skilled migrants has not been observed in other industries in the island nation. Sri Lanka is recognized as a skilled labor exporting country. In 2000, the emigration rate of tertiary educated as a percentage of the tertiary educated population in the country was 28.2 (WDI, 2014), which was the third highest rate in Asia. Moreover, Sri Lanka has a very high expatriation rate of health professionals to the OECD countries compared to other countries in the region (Dumont & Zurn, 2007). For instances, there were only 800 specialist doctors and 0.589 physicians per 1000 people to serve the 20 million population in 2006. Further, over 50 percent of the Chartered Management Accountants (UK-qualification) was working abroad in 2008 (Jayawardhana & Jaythilaka, 2009). Therefore, in general, Sri Lanka is suffering from the brain drain while KSI is experiencing a beneficial brain circulation. Therefore, the KSI in Sri Lanka is a unique case to discuss the industry-specific nature of the brain circulation. Thus, the present study seeks to answer the question "what factors promoted the brain circulation; returning of employees and entrepreneurs, within the KSI of Sri Lanka?" The rest of this paper is structured as follows. A review of brain circulation is presented in Section 2 and followed by a detailed account of the research methodology in Section 3. Determinants of brain circulation, in particular within the KSI of Sri Lanka, are analyzed in Section 4. In addition, Section 4 analyzes the characteristics of returnees with special reference to the temporary nature of brain circulation. Finally, conclusions are presented in Section 5.

2. A Review of Literature

2.1. Evolution of Brain Circulation

At the beginning of the debate on skilled migration and its impact on developing countries, theoretical justifications favored the process claiming that it enhances overall welfare of the world (for example, Grubel & Scott, 1966; Berry & Soligo, 1969). However, the pioneering work by Bhagwati and Hamada (1974) highlighted that the sending country could experience a welfare loss due to strong positive externalities in some professions. The general conclusions were; first, brain drain widens the gap between the North and the South making rich country richer at the expense of poor countries, and second, it leads to an overall human capital reduction in the sending country. According to Hua (2011), the third wave of the debate emerged with contradictory findings to the second wave. Potential skilled migrants invest in higher education under imperfect information about the labor market in developed countries and uncertainty in migration. The process of private investments in higher education, therefore, creates winners and losers. Winners become a part of brain drain while losers contribute to human capital accumulation in the developing country (Stark, Helmenstein, & Prskawetz, 1997; Docquier, Faye, & Pestieau, 2008). The fourth wave of the debate is moving to a new direction claiming that brain drain is transforming into a brain circulation. The proponents of brain circulation claim that, contrast to the permanent and unidirectional flow of traditional brain drain, the modern flow of skilled migration is characterized by more temporal and multidirectional flows of skilled migrants, which benefit both sending and the receiving countries (Wickramasekara, 2003; Morano Foadi, 2006; Saxenian, 2006). However, opponents of the argument claim that brain drain is still increasing (Finn, 2003; Docquier & Rapoport, 2012). Therefore, contrast to the temporary flow of brain circulation, "permanent types of skilled migration need to be placed in the context" (Harvey, 2009, 493). According to Johnson and Regets (1998), brain circulation involves initial migration and subsequent return migration to the home country after studied or worked abroad. Saxenian defined brain circulation as "returning of skilled people, who have studied or worked abroad to pursue promising opportunities in the home country" (Saxenian, 2005, 36). Blitz (2005), in contrast, has emphasized the temporal nature of brain circulation in his definition.

Accordingly, brain circulation is a process of “temporary skilled migration that enables intellectual resources to be shared across states rather than be permanently transferred” (Blitz, 2005, 363).

In all the three definitions, brain circulation mainly refers to the skilled migrants, intellectuals or, in the most lenient terms, people who possess tertiary educational qualifications or equivalent qualifications. Then, “return” is a necessary condition in all the three definitions. However, it may or may not be permanent (Blitz, 2005; Saxenian, 2005; Morano Foadi, 2006). Although many countries prefer a permanent reverse flow of skilled migrants -the so-called “reverse brain drain”-, they can equally rely on temporarily returning intellectuals-the diaspora- in the development process. Therefore, I define brain circulation as a process of returning skilled migrants either temporarily or permanently to pursue employment or investment opportunities in the home country.

2.2. What Factors Motivate the Brain Circulation?

In terms of economic incentives, the wage rate is an influential determinant that could convert brain drain into a brain circulation (Mayr & Peri, 2008). Migrants will return if the wage rate is enough to compensate the forgone opportunities in the host country. Moreover, professional opportunities are one of the main motivational factors that promote the returning of highly skilled migrants (Harvey, 2009). In particular, young professionals are keen on the future prospects and potential career opportunities in an industry. Growing industries, in particular, with high exposure into the international market, can cater to such needs of the returning skilled migrants. Culture, lifestyle and family considerations influence the returning decision of skilled migrants, to a lesser extent (Harvey, 2009). Moreover, noneconomic factors such as patriotic feeling towards the home country, social ties to the home country and lack of assimilation into the host country (Gmelch, 1983; Harvey, 2009) also influence on returning decision of the migrants. Although some scholars argue that such non-economic factors and cultural ties to the home country outweighed the opportunity cost of returning, which is the sacrificed lucrative life in the host country, the same have not been observed in poorer nations where returnees cannot find employment opportunities and comfortable standard of living (Gmelch, 1980). Therefore, it is reasonable to argue that when skilled migrants make their returning decision, socio-cultural factors are secondary and conditional upon the economic incentives. Macroeconomic factors such as availability of educated workforce in the home country (Johnson, 2002; Saxenian, 2006), globalized economy with stronger economic growth, political stability, economic development and openness (Saxenian, 2006; Iredala et al., 2003) are necessary to promote brain circulation in developing countries. Brain circulation in Taiwan, China, and South Korea, to a large extent, was a policy driven process in which the government initiatives played a significant role (Yoon, 1992; O’Neil, 2003). Nonetheless, the same policy mix has failed in other parts of the world, for instance in Jamaica, making it skeptical to attribute the success of brain circulation to the policy interventions *per se*.

In addition, it is generally accepted that the rapidly growing industries in the home country are necessary to encourage the reverse flow of skilled migration as growing industries generate professional opportunities and premium wage for the educated. However, business start-ups and subsequent rapid growth of Taiwan’s ICT industry were significantly influenced by the returned entrepreneurs-The New Argonauts- who had the cultural identities as Taiwanese and close links with the technological centers such as Silicon Valley (Saxenian, 2006, 124). In terms of the quality of returning skilled migrants, Stark et al. (1997) argued that low-ability immigrant employees receive a lower-wage in the developed country. Therefore, these low-ability skilled migrants will return at the early stage of industry growth. The literature does not distinguish the different characteristics of returned entrepreneurs and returned employees. A notable exemption is Iredala et al. (2003) that distinguished the determinants of the returned skilled migrants and returned business migrants in four Asia Pacific countries. Yet, the findings have been over generalized using a diverse, but small samples, which include returned migrants from all the three economic sectors; agriculture, industry and services, and from both public and private sectors. Finally, in contrast to the country-specific nature of brain drain, brain circulation has emerged as an industry-specific process. The same country might experience a multidirectional flow of human capital depending on the competitiveness of the industries. For instance, Canada is experiencing a beneficial brain circulation within the IT industry while losing its best brain in other disciplines to the USA (Schmitt & Soubeyran, 2006). Therefore, industry-specific determinants of brain circulation are useful than the macro-level and micro-level determinants to validate the brain circulation thesis.

3. Methodology

Lack of data on skilled migrants and limitations associated with the primary data collection, in particular, in industry-specific studies, has discouraged the application of quantitative approach to the brain circulation literature. Most of the previous studies are based on anecdotal evidences and qualitative case studies of successful returnees.

I employed mixed method approach to answering the research question. However, the present paper discusses only the quantitative pillar of the study.

3.1. Data

A survey of returned skilled migrants was employed as the main research method. The field survey was conducted from late-July to mid-October, 2013 within the KSI of Sri Lanka. Following the suggestion in the literature, I defined a returnee as a skilled migrant if the returnee holds tertiary or equivalent educational achievements (Koser & Salt, 1997) and have stayed abroad more than one year (UN, 2011). Further, the returnee was identified as an skilled employee if he/she is an employee; including working directors, of a firm operating within the KSI of Sri Lanka and, as an entrepreneur if she/he is an own account worker, proprietor, partner or director of a firm incorporated or operating within the KSI of Sri Lanka.

3.2. Survey of Returned Skilled Migrants

A comprehensive list of Returned Skilled Employees (RSE) or Returned Entrepreneurs (RE) was not available either with government agencies or any industry organizations. Countries usually collect information on returning aliens, but data on returning nationals have not properly compiled making returning the most difficult part to quantify in the migration cycle (Gmelch, 1980). Thus, it is common to use a non-probabilistic sampling such as snowballing techniques to select respondents, even in quantitative settings, when a sample framework is not available (Karunaratne & Gibson, 2014). However, this process underestimates the generalization of the findings due to possible sampling bias in sample building. Therefore, in order to avoid similar sampling bias in the sample, first, a randomized technique was applied to select knowledge services firms within the KSI of Sri Lanka. In this stage, I collected members' list from three main institutions, namely, Sri Lanka Association of Software and Services Companies (SLASSCOM), Export Development Board of Sri Lanka (EDB) and Board of Investment of Sri Lanka (BOI). In addition, few firms were identified from other sources such as the registered firms under the Concept Nursery program attached to the Sri Lanka Institute of Information Technology (SLIIT). The combined list contained the details of 290 firms. Second, survey questionnaires were distributed to all skilled returnees within the selected firms. However, the process was challenging as most of the professionals were busy with their work schedules and, in particular, entrepreneurs were busy with their overseas business trips. Nevertheless, it helps to find a somewhat random sample of returned skilled migrants within the industry in the absent of population details.

This survey was conducted using a self-administrated standardized questionnaire. The reason for not scrutinizing the most popular online surveys was to make it anonymous and, thereby, achieve a high response rate. Returning decision of migrants should be influenced by several factors. Blitz (2005), in his study on Spanish medical professionals, presented a single question to determine factors that motivate the returning decision. Gmelch (1980) has correctly pointed out that there are several issues in using a single question to find the underlying factors behind returning decision. Instead, he has emphasized the benefits of offering a set of potential motivational factors that influenced the move and asking the returnee to select them on a five-point Likert scale framework. Therefore, I offered 11 options based on the literature review that could potentially influence the returning decision of the respondents. In a five-point Likert scale framework, respondents tend to choose a moderate or neutral option due to several reasons (Garland, 1991). Therefore, I removed the midpoint and offered the four-point Likert scale framework to find the degree of influence of each factor on the returning decision. The questionnaires were distributed to the qualified candidate via a representative of the firm and avoided personal contacts with the respondents. In most of the cases, either Chief Executive Officer or Human Resources Manager of the firm assisted to reach the potential respondents. After a few days, the completed questionnaires were collected through the representative of the firm. Prior to the mass data collection, a pilot study was conducted within the industry and also the questionnaire was discussed with industry professionals and academics. During the mass data collection, I manage to survey a representative sample of returned skilled migrants within the industry. Around 80 of 290 firms were contacted. However, only 56 firms agreed to cooperate with the survey. In total, 232 returned skilled migrants were found in those 56 firms. Some of the qualified RSE and RE were away from the country during the survey period, and some others were not willing to participate in the survey. Therefore, questionnaires were distributed among 205 returned skilled migrants that comprise of 30 RE and 175 RSE. In response, 131 completed questionnaires were collected with a 64% response rate that consists of 22 RE (response rate 73%) and 109 RSE (response rate 62%).

The response rate I achieved is considerably higher than that have been reported in similar studies. In the data validation process, few questionnaires were removed as some respondents had not provided some necessary information.

3.3. Hypotheses and Model Specification

Hypothesis 1

Besides several other factors, lack of career progress or employment opportunities within the stagnated economy is a main determinant of brain drain. Therefore, it is rational to assume that the brain circulation can be promoted if any industry can generate employment opportunities that match with the demands of the skilled migrants. Saxenian (2006) argues that the growing industries are necessary to bring these skilled migrants back. In other words, the availability of career opportunities is a key determinant that influences the returning decision of skilled migrants. However, those who intend to become entrepreneurs should be more concerned about growing investment opportunities than career opportunities. Therefore, factors that determine the returning decision of an entrepreneur should be different from an employee. More specifically, *Industry growth is a significant factor that motivates employees to make the returning decision, but not necessarily a significant factor for entrepreneurs.* Three decades-long civil war, which made Sri Lanka a hidden gem in the KPO/BPO (A.T.Kerney, 2012), came to an end in the mid-2009. Moreover, post-war GDP growth of the country was remarkable with an average of 7.1% per year. These macro factors had a positive impact on brain circulation, but industry-specific factors were more prominent as such brain circulation has not been observed in any other industries in Sri Lanka. The KSI was not well-known before 2007 but has achieved a rapid growth since then. This growth is remarkable as it achieved before the end of civil war and despite the fragile economic condition in its major export destinations, in 2008 and 2009. Moreover, in 2007, Sri Lanka was ranked in the 29 place of the A.T. Kerney global outsourcing report and advanced to 16th place in 2009 making Sri Lanka more prominent in the global knowledge services industry. Therefore, given a time-lag in making the returning decision, it is rational to attribute the flow of skilled people after 2009 to industry growth while giving due recognition to other macro-level determinants such as peace and stability. In line with the above arguments, I presume that factors determine the returning decision of the skilled migrants might not be the same for before-2009 and after-2009. Accordingly, choosing 2009 as the critical year, a binary variable has introduced as the dependent variable of the model. The value of the dependent variable takes one if the respondent returned before 2009 and zero otherwise.

$$\text{Yearofreturn}(\text{before_2009} = 1) = f(DF_i, HC_i, SF_i, \text{ent}_i) \text{-----} (1)$$

Several explanatory variables were considered for model specification. As I explained earlier, the growth of the KSI has been observable since 2009. Therefore, the probability of skilled employees returning after 2009 should be significantly different from that of the returning entrepreneurs because growing employment opportunities, premium wage, and career progress are the main motives of the employees whereas entrepreneurs concern about investment opportunities, profitability, business environment and other related factors in the home country. Thus, I tested the significance of the entrepreneur (*ent*) variable, which is a dummy variable taking one if the returnee is an entrepreneur, and zero otherwise. Besides being an entrepreneur/employee, several other factors, in particular, demographic characteristics determine the returning decision. Therefore, the variable demographic factors (DF) such as age, gender, civil status and nationality of the respondents were included. Moreover, educational level and working experience of the respondents were included as human capital (HC) indicators. In addition, having a school age children at the time of returning was included as a controlling variable for social factors (SF).

Hypothesis 2

As explained by Saxenian (2006, 5), technology, product and market tend to redefine continuously, and the product cycle tends to take less than nine months. Therefore, returned entrepreneurs need to maintain a close connection with the technology hubs such as Silicon Valley to be on the technology frontier. Meantime, rapid developments in global communications technology, which enables online real-time human interactions via advanced technology features such as web 0.2, have created a virtual office atmosphere in which location does not play a crucial role. Nonetheless, some scholars criticize the contextual validity of the brain circulation due to its temporal nature (Harvey, 2009). Therefore, the second hypothesis looks into the returning decision of the respondents; whether it is permanent or temporal. More precisely, *Returning decision of entrepreneurs is more temporal than that of the employees. Therefore, the temporal nature of brain circulation is more applicable to entrepreneurs than the employees.*

A regression model was developed to test the above hypothesis. Accordingly, the model analyzes the determinants of returning decision of the skilled returnees employing the following model specification,

$$RD(\text{Permanent} = 1) = f(DF_i, HC_i, SF_i, ent_i) \text{-----} (2)$$

Where, RD is a dummy variable, which takes one if the returning decision of the respondent is permanent, and zero if it is otherwise. Entrepreneurs are less likely to return permanently compared to employees; therefore, I expect a negative sign for the ent variable. Moreover, the same set of control variables in Model 1 was applied in Model 2 with some modifications. However, Model 2 does not capture the timing of returning. Therefore, I employed a non-parametric application with minimum assumptions on the distribution of the hazard rate - the Kaplan-Meier survival estimate - to analyze the relationship between RD and the timing of the returning by status of the returnee; RSE or RE.

4. Findings and Discussions

Entrepreneurs and skilled employees respond differently to the market signals. However, the brain circulation thesis commonly refers to both entrepreneurs and employees by neglecting these differences. For instance, Saxenian mainly refers to the entrepreneurs, the New Argonauts, whereas others focus on employees or professionals in a particular industry (for instances, Blitz, 2005). Therefore, this paper highlights these differences throughout the analysis by providing comparative figures of RSE and RE.

4.1. Background of the Returned Skilled Migrants

Background details of the returned skilled migrants together with comparative figures for RSE and RE are presented in Table 1. Numbers in column two indicate each subcategory as a percentage of the total respondents. For instance, the age of the respondents were classified into three levels; less than 35, 35 to 44 and 45 or above. Column two shows the percentages of three categories as a percentage of the total respondents. Accordingly, 56 percent of the total respondents are less than 35 years of age, and 30 percent are in the range of 35-44. Only 14 percent of the respondents are in the age group of 45 or above. The numbers in column three and four show the percentage of RE/RSE as a percentage of numbers in each subsection of the column two. Accordingly, 91 percent of the respondents in the age category of less than 35 are RSE, and the rest of 9 percent of respondents are RE. Similarly, out of 30 percent of respondents in the age group 35-44, 82 percent are RSE and 18 percent are RE. Moreover, 61 percent of the respondents in the age group of above 45 are RE. All the other subcategories in Table 1 should be understood in a similar manner. According to Table 1, more than 50 percent of the respondents are very young. Most of them have returned after higher education as the fresh graduates with few years of working experiences abroad. A majority of the returned skilled migrants in the age group of 45 or above has become entrepreneurs. Many returnees are married and returned together with their families. If the intention of returning is temporal, the skilled migrants will not return with their families. Therefore, this indicates a permanent returning plan of the respondents. As attested by Saxenian (2006), globally, KSI is inheritably featured by gender bias. The same situation is observable even within the specialization of students in the engineering field and the KSI in Sri Lanka. According to the secondary data sources, more than 80 percent of the total employees in the industry are male. Therefore, 85 percent of male respondents in the sample do not indicate any sampling bias but do reflect the persisting gender bias within the industry. The striking figure is the share of non-residing Sri Lankan entrepreneurs within the industry. About 16 percent of the returned skilled migrants possess either foreign citizenship or dual citizenship and most of them, about 60 percent, have started their own businesses. Some of the foreign nationality holders emphasized their interest in receiving the status of dual citizenship, but strict control over the procedure has made it difficult to acquiring it. The ethnic Sinhalese represents nearly 75 percent of the total population of Sri Lanka. Therefore, 85 percent of Sinhalese in the sample does not reflect any sampling bias.

Table 1: Background Details of the Returned Skilled Migrants, RE and RSE

Description	Returned skilled migrants (as a % of total respondents)	RE*	RSE*
Age			
Less than 35	56	09	91
35 to 44	30	18	82
45 and over	14	61	39
Civil Status			
Unmarried	34	12	88
Other	66	23	77
Gender			
Male	85	20	80
Female	15	16	84
Nationality			
Sri Lankan	84	11	89
Nonresident Sri Lankan	03	75	25
Dual Citizen	13	56	44
Ethnicity			
Sinhalese	85	15	85
Other	14	39	61
Education			
Diploma/Professional Qualification	13	12	88
Bachelor's degree	46	14	86
Master's degree	36	16	84
Doctorate	05	83	17
Purpose of initial migration			
Higher education	52	25	75
Employment	36	02	98
Permanent residency	06	38	62
Family reunion	06	25	75

Source: Survey of returned skilled migrants (2013), Author.

Notes: * as a percentage of the number in column 2. Among the 126 respondents, RSE and RE were 104 and 22, respectively.

In the context of Sri Lanka, many skilled migrants initially migrate for higher education and later settle in the educated countries (IOM, 2009). Among the respondents, over 50 percent have migrated for higher education while 30 percent have migrated for employment. Until recently, most migrants did not return to their home countries after completing their higher studies or at the end of employment contracts in developed countries. However, the trend has changed, at least within the KSI, and most of the highly educated migrants are now returning to capitalize growing employment and entrepreneurial opportunities within the industry. An important finding is that some permanent type of migrants, which is about 12 percent of the respondents, also has returned. These permanent migrants were the people who had left the country to accept permanent residency in a host country or had united with their families abroad. Around 87 percent of the respondents possess at least bachelor's degrees, and the rest have professional or diploma degrees.

It should be noted that within some disciplines of KSI, for instance, in Accountancy and Financial Services, professional qualification have a higher recognition than the bachelor's degrees.

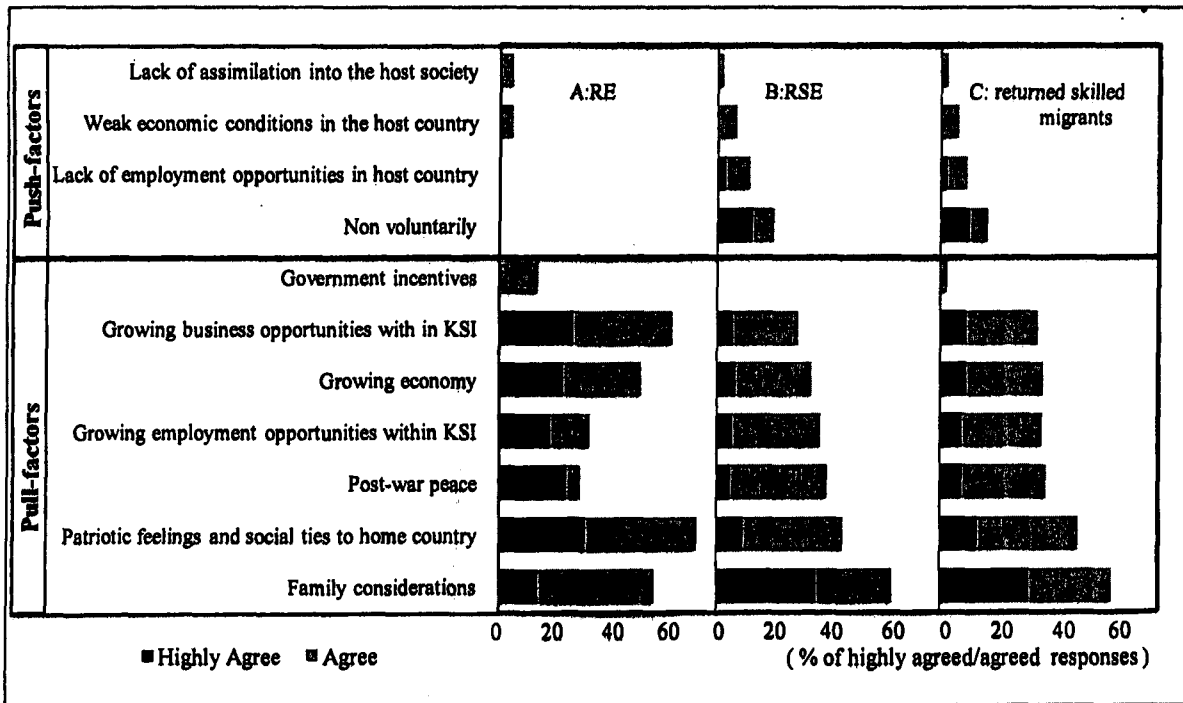
In the meantime, most of the respondents possess both professional and academic qualifications. Moreover, more than 40 percent of the respondents hold postgraduate degrees, including about six percent of doctorates. The average overseas working experience is about four years for all the respondents, and it is five years when no-experience category is excluded. The technical knowledge, in particular, in information technology services, may become obsolete because technology redefines very rapidly due to the shorter production cycle. Therefore, if someone has four to five years of experiences on average on the latest technology means significant years of industry experiences. Although it agrees that pull factors outweigh in the process of brain drain, lack of opportunities for educated and stagnated professional opportunities also are significant determinants of skilled migration. The positive thing here within the KSI is the returning of highly educated and experienced skilled migrants in the recent years. If the industry is stagnated and thereby does not produce enough professional opportunities, skilled migrants will not return. Therefore, the large proportion of highly educated and experienced returnees within the sample provides strong evidences of brain circulation within the KSI.

4.2. Factors Motivated Returning to Sri Lanka

Main determinants of brain circulation can be discussed in broader terms as pull and push factors. The framework is very much popular in the skilled migration literature. Therefore, within the framework, I offered a combination of push and pull factors in order to understand the determinants of brain circulation. The push factors have highlighted negative aspects of the host country; weak economic conditions, lack of employment opportunities, and assimilation problems of the migrants. Further, I classified non-voluntarily returning as a push factor. The seven pull factors represent social, cultural, political and economic aspects in Sri Lanka that pull back these returnees. The 11 factors and the influence of each factor on returning decision of skilled migrants are summarized in Figure 1. It shows the percentage of respondents agreed or fully agreed on each statement on pull factors (four) and push factors (seven). The three panels, A, B, and C, exhibit the responses of RE, RSE, and returned skilled migrants, respectively. The pull factors have largely driven the current flow of brain circulation in the KSI in Sri Lanka. Yet, to a lesser extent, push factors have influenced in the returning decision of skilled employees. A majority of the respondents has disagreed that they returned because of negative aspects of the host country. However, around 20 percent of them have agreed that the returning decision was not voluntarily such as inability to extend visa, etc. Most of the skilled migrants in Sri Lanka start their journey as student migrants for tertiary education. However, visa restrictions in countries such as UK and language barriers in countries such as Japan have made it difficult for them to extend the visa after the graduation. Very few respondents have had assimilation issues into the host country conditions. For instance, one respondent² stated that he did not have a social life as he experienced in Sri Lanka during his overseas stay. Although he had an affluent life with a well-paid job in an IT company and materialistic life, he has failed to adjust the culture in the host country. However, returnees with such assimilation issues were rare among the sample respondents.

² A returned entrepreneur from Australia

Figure 1: Influence of Push-Factors and Pull-Factors on Brain Circulation



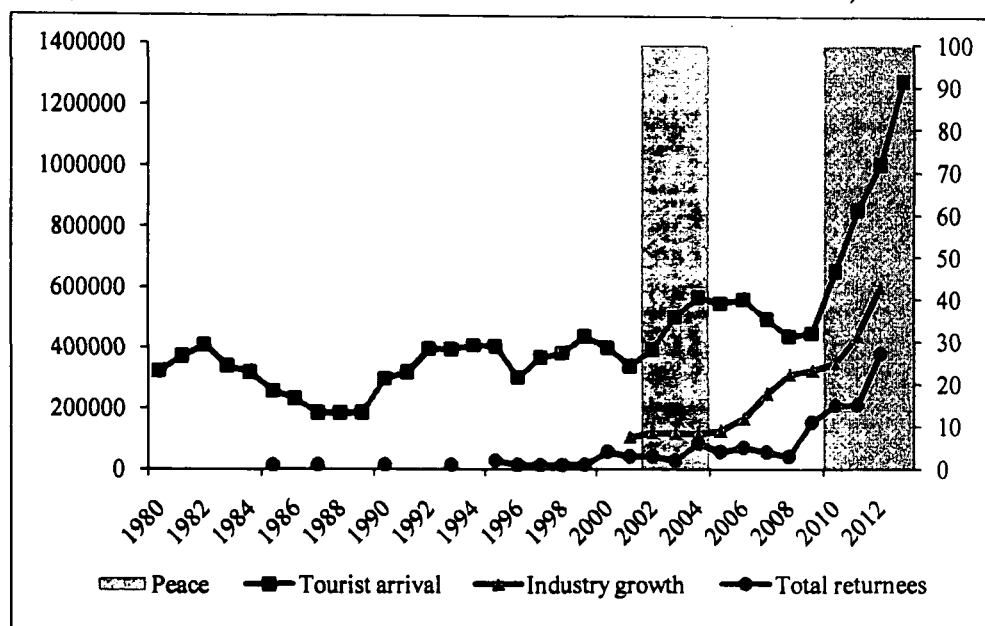
Source: Survey of returned skilled migrants (2013), Author.

Note: The horizontal axis indicates the parentage of positive responses for each question.

Among the pull factors, most agreed options were socio-cultural determinants and post-war peace. Around 40 percent of the respondents have agreed that economic growth, in general, and growth of KSI, in particular, influenced their returning decision. However, the pattern of reasoning has drastically changed for RSM and RE. Family considerations have been the most agreed motivational factor for employees but for the entrepreneurs, it has been the patriotic feelings and social ties to the home country. More than 60 percent of the RE agreed that growing business opportunities within the KSI motivated them to return to Sri Lanka and then followed by the economic growth, growing employment opportunities within the industry and, government incentives to run businesses in Sri Lanka. In most of the return migration studies, patriotic feelings such as love of homeland have cited as the main motivational factor in the decision to return (Gmelch, 1980). However, Gmelch has further stressed that this is less often in the case of many developing countries as the economic cost of returning outweigh the socio-economic and cultural advantages in the home country. Accordingly, if the developing countries are capable of providing little incentives, at least, match cost and benefits of returning, these patriotically motivated migrants will be returned. Therefore, it is worth understanding that the social and psychological factors usually supplementary to the economic factors. In order to highlights industry-level factors of brain circulation, special attention should be placed on post-war peace in Sri Lanka. Figure 2 is useful to understand the complicated influence of post-war peace on the returning decision of the skilled migrants. The figure indicates the tourist arrivals from 1980 to 2012, ICT services exports as a proxy for the industry growth from 2002 to 2012 and the returning year of the survey respondents. As it is clearly observable, after 2009, i.e. the post-war period, all the variables have shown a rapid growth. However, it is important to explore the period from 2002 to 2005 in which Sri Lanka had a peaceful environment due to ceasefire agreement between the government and the terrorist groups to understand how returnees were responsive to the peaceful environment. The peaceful environment in Sri Lanka is clearly reflected in the tourist arrival, which has shown a rapid increase during the same period. In that period, however, KSI was at the initial stage and, its growth was not observable. Thus, there was no significant return flow of skilled migrants although the country was stable and peaceful. Moreover, the war ended in the middle of 2009. Nonetheless, a significant increase in returning of skilled migrants is already visible from the beginning of 2008.ⁱⁱ

In addition, a similar increasing trend of returning skilled migrants could not be observable in any other industries in the island nation. Accordingly, I argue that the current return flow of skilled migrants is motivated by the industry growth within the KSI and not by the post-war peace.

Figure 2: Growth of the KSI, Peace and Brain Circulation in Sri Lanka; 1980-2013



Source: WDI, 2014; Survey of returned skilled migrants (2013) Author.

Note: Industry growth and tourist arrival referred to the primary axis. Due to lack of data on total returnees in the industry, I employed survey respondents as a proxy variable to show the total returnees, which refers to the secondary axis. The shaded areas indicate peaceful years in Sri Lanka.

I further analyzed the factors that influenced returning decision of the RSE and RE using econometric models. The estimated coefficients of Model 1 and 2 represent marginal effects, which refer to a change in the probability of the dependent variables for a tiny change in a continuous variable and a discrete change in a dummy variable. Moreover, robust standard errors were employed to determine the significant variables. The Hosmer and Lemeshow's goodness of fit test did not reject the specification of the models as the reported p -values of the test were greater than the alpha value 0.05. Further, summary statistics of the variables used in Model 1 and Model 2 are presented in Table 4. The output of Model 1 is presented in Table 2. Here, I would like to focus on three important characteristics of the returnees. First, demographic factors of the respondents are significantly different for the skilled migrants, who returned before-2009 and after-2009. The gender bias in the KSI is a well-known fact. Although gender dimension is not the main focus of the study, positive and marginally significant coefficient of the *gender* variable says that male returnees have a higher probability to return before-2009. Skilled migration in Sri Lanka is characterized by its ethnic diversity. Therefore, highly significant and positive coefficient of the *ethnicity* variable indicates that the probability of returning before-2009 is higher for ethnic minorities than the majority Sinhalese. In other words, post-war industry growth in KSI has promoted Sinhalese returnees than other ethnic minorities. Civil status also has a significant impact on the probability of returning before-2009. However, it does not have a practical explanation as it is included as a control variable for demographic factors. Second, human capital indicators provide strong evidence to claim that KSI is benefiting from brain circulation in the recent years. Positive and significant coefficient of the *non-degree holder* variable indicates that returnees who possess professional and technical qualification (non-degree tertiary qualifications) have a higher probability to return before-2009 compare to the base category postgraduate degree holders. However, there is no such a difference between bachelor's degree holders and postgraduate degree holders as evidenced by the insignificant coefficient of the *Maximum bachelor's degree* variable.

The local education in Sri Lanka up to the undergraduate level is well-established and good at producing high caliber graduates. However, many Sri Lankans still rely on advanced countries such as UK, USA, and Japan for postgraduate studies.

Therefore, returning of postgraduate degree holder's after-2009 is a clear indication of the successful brain circulation as highly educated employees; masters or Ph.D. holders from advanced countries have shown a growing confidence on the KSI in Sri Lanka. Moreover, a significant flow of employees with foreign working experiences have returned after-2009. The negative and highly significant coefficient of the *working_experience_abroad* variable supports the above claim. Finally, the entrepreneur variable is highly significant and has a positive sign. This indicates a positive relationship between being an entrepreneur and returning *before-2009*. Therefore, it is reasonable to argue that entrepreneurs have returned before the industry achieves the takeoff. On the other hand, a significant flow of employees has returned since 2009 as the industry growth is observable. The exact probabilities of return before 2009, which evaluated at the mean values of the other controlling and explanatory variables, for RE and RSE were 0.71 and 0.29, respectively. Therefore, findings of Model 1 confirm that the entrepreneurs are keen on the growing investment opportunities that are easy to materialize at the initial or early stage of the industry growth. In a theoretical model, Stark et al. (1997) proposed that a proportion of skilled migrants, who are not competitive in the host countries, tend to return home country at the early stage of the industry growth. The empirical findings of the present study partially support such arguments as highly educated and experienced skilled migrants have returned at the latter stage of the industry growth. However, in contrast to the prediction of the theoretical model, highly educated and experienced entrepreneurs have returned at the early stage of the industry growth. Therefore, what Stark et al. have predicted can be applied to returning skilled employees. However, the same cannot be applied to the returning entrepreneurs.

Table 2: Regression Results on the Determinants of Returning Before-2009

If returned before-2009=1, zero otherwise.	Probabilities of returning before-2009
Controlling and explanatory variables	
Age	-0.004 (-0.322)
Age square	-0.0002 (-0.330)
Gender	0.226* (1.646)
Ethnicity	0.487*** (2.918)
Civil status	-0.343*** (-3.022)
Nationality	-0.011 (-0.0735)
Non-degree holders	0.297* (1.748)
Maximum bachelor's degree	0.186 (1.464)
Working experience abroad	-0.474*** (-3.179)
Having a school-aged children at the time of returning	-0.0228 (-0.179)
Returnee's status by 2009	0.558*** (3.194)
Observations	125
Pseudo R2	0.31
Probability > chi2	0.00
Hosmer and Lemeshow's goodness of fit test	0.40

Source: Authors calculations based Survey of returned skilled migrants (2013).

Note: Robust z-statistics in parentheses and *** p<0.01, ** p<0.05, * p<0.1

4.3. Temporal nature of Brain Circulation

Some scholars criticize the current flow of brain circulation due to its temporal nature (Harvey, 2009). However, according to the survey findings, more than 80 percent of the returnees had a specific plan to settle permanently in Sri Lanka. This is contradictory to the arguments of the temporal nature of the brain circulation. The temporal nature is kept but does not apply commonly to both RSE and RE. As I have presumed in the second hypothesis, entrepreneurs are less likely to return permanently as they need to maintain a close connection with the technology centers such as Silicon Valley (Saxenian, 2006).

Table 3: Regression Results on the Determinants of Returning Permanently

Dependent variable takes 1 if the intended stay of the returnee is permanent and zero otherwise	Probabilities of returning permanently
Controlling and explanatory variables	
Age	0.008 (1.491)
Age square	-0.0006 (-1.628)
Gender	-0.063 (-0.785)
Civil status	-0.030 (-0.362)
Nationality	0.011 (0.102)
Non-degree holders	-0.062 (-0.513)
Maximum bachelor's degree	-0.070 (-1.043)
Working experience in a OECD country	-0.017* (-1.776)
Having school-age children at the time of returning	0.165** (2.510)
Returnee's status	-0.180* (-1.668)
Observations	125
Pseudo R2	0.145
Probability > chi2	0.014
Wald and Lemeshow's goodness of fit test	0.737

Source: Authors calculations based Survey of returned skilled migrants (2013).

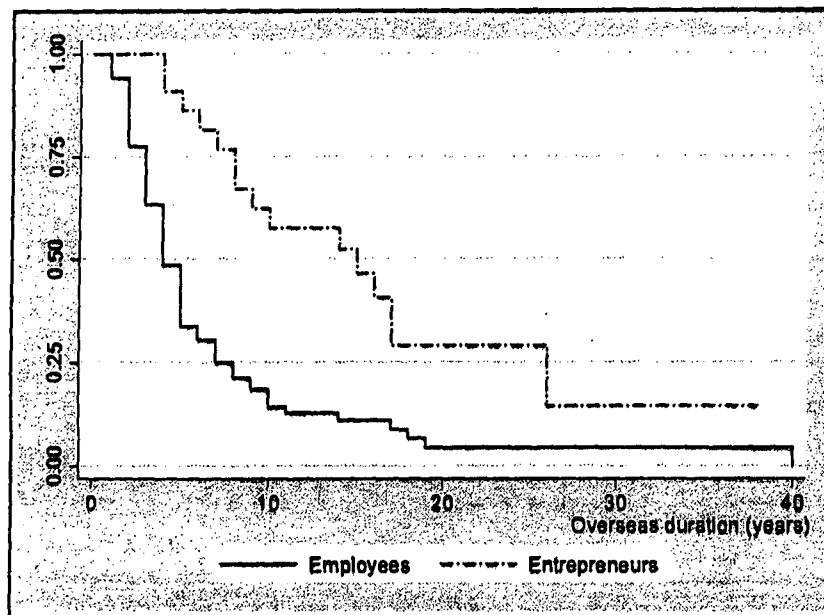
Note: Robust z-statistics in parentheses and *** p<0.01, ** p<0.05, * p<0.1

The output of Model 2 is presented in Table 3. None of the DF was significant determinants of the intended stay of the returnees. However, given the fact that 86 percent of the respondents are less than 44 years of age in the sample and over 80 percent are permanent returnees, the process should be identified as a "Salmon run" where middle-aged skilled migrants have returned to settle permanently in the country. None of the other demographic factors; gender, nationality or civil status, have critically differentiated the permanent and temporary returnees. Among the human capital indicators in Model 2, only the coefficient of *working experience in an OECD country* has a negative and significant impact on the dependent variable. Accordingly, returnees who have worked in an OECD country are less likely to return permanently compared to the returnees who do not possess that experience. The reality is that those who are working in the Middle East countries usually do not intend to settle permanently whereas those who are working in developed countries such as in USA and UK are more likely to settle permanently. Further, skilled migrants might have a motive to re-migrate if he/she has returned prior to finishing the postgraduate studies.

Thus, those who have completed their postgraduate studies might want to settle permanently than those who are still in the middle of their education spectrum. Nonetheless, there were no such differences among the education categories in the model.

The coefficient of the *school-age children at the time of returning* has shown a positive and highly significant effect on the dependent variable suggesting that the returnees who had school-age children at the time of returning tend to be permanent returnees too. Most of the parents prefer to educate their children in Sri Lanka, in particular, during their teenage. There are two reasons for this choice. First, it enables children to be natured with the Sri Lankan identity. Second, most of the migrants in Western countries are afraid to raise their children in independent and individualistic western culture. In addition, qualitative data also reveals that the prime motive of some of the returnees is related to such family issues. The coefficient of the *returnee's status* variable is negative and highly significant. This indicates that, after controlling for other factors, entrepreneurs tend to return temporarily compared to the skilled employees. Precisely, when evaluated at the mean values of the other independent variables, the probability of returning permanently is 0.68 for RE, and it is 0.85 for RSE. Therefore, it is conclusive, and I failed to reject the second hypothesis that the temporal nature of the brain circulation is more applicable to the entrepreneurs. The above model does not account for the timing of the returning. Therefore, I analyzed overseas duration of the returnees using the survival analyzes. I considered the overseas duration of the respondents who returned permanently to Sri Lanka as the duration variable. Accordingly, there are different spell times for the respondent who returned permanently, in different years, and censored for those who returned temporarily. Simply, the temporary returnees have regarded as non-returnees. Figure 3 shows the Kaplan-Meier survival estimate of the returnees by their status; employee or entrepreneur. The two data series show the probabilities of stay abroad after certain years of overseas duration. For instance, the probability of stay abroad after ten years of overseas duration is less than .25 for RSM but over 0.50 for RE.

Figure 3: Relationship between Probability of Permanently Returning and Overseas Duration



Source: Survey of returned skilled migrants (2013), Author.

Accordingly, entrepreneurs are less likely to return permanently after a certain number of years compared to the skilled employees. Therefore, it has further confirmed that the temporal nature of the brain circulation is more applicable to entrepreneurs than to employees. Furthermore, these entrepreneurs tend to travel frequently back and forth between technology centers and Sri Lanka. According to the survey data, mean traveling time per year was six times for an entrepreneur. The location has not been an obstacle since physical movements between the center and the periphery, and stay virtually in the periphery has become economic and convenient thanks to the advancement of transportation and communication technologies.

5. Conclusions

The present paper analyzed the determinants of brain circulation and characteristics of the returnees with special reference to the returned entrepreneurs and returned skilled employees. The Knowledge Services Industry (KSI) in Sri Lanka was explored as a success story of the industry-specific nature of brain circulation using firsthand data that collected through a survey of returned skilled migrants within the industry. Several conclusions can be drawn based on the findings. First, a significant brain circulation has occurred within the KSI of Sri Lanka, in particular, since 2009. Therefore, the present study provides further empirical evidences to support the brain circulation thesis proposed by Saxenian and others. In the context of Sri Lanka, the pull factors such as post-war peace, economic stability, the growth of the KSI have significantly influenced the returning decision of the skilled migrant. Therefore, as Iredala et al. (2003) and Saxenian (2006) argued, macroeconomic stability is important to promote the brain circulation in developing countries. However, in addition to the peace and stability, the growth of the KSI has been a critical success factor of brain circulation in Sri Lanka. Therefore, I argue that the macroeconomic factors are necessary but not sufficient to promote the brain circulation in developing countries. Therefore, promoting knowledge-based industries in developing countries is encouraged to achieve a sustainable return flow of skilled migrants. Second, the present study has highlighted the ways in which skilled employees and entrepreneurs respond to the growth of a particular industry. Skilled employees have returned when the growth of KSI is observable, in particular, since 2009. Therefore, it is agreeable that the rapidly growing industries in the home country are necessary to encourage the reverse flow of skilled employees as growing industries generate professional opportunities and premium wage for the returning skilled employees. Moreover, as predicted by Starc et al. (1997), highly educated and experienced returnees have returned at the latter stage of the industry growth. However, in contrast to the prediction of Starc et al. (1997), most of the highly educated and experienced entrepreneurs have returned before the industry achieved its takeoff in 2009. And, also, in the absent of macroeconomic pre-conditions such as peace and stability in the country.

Therefore, as returned entrepreneurs in Taiwan contributed to establishing the ICT industry (Saxenian & Shu, 2001), returned entrepreneurs has established the KSI in Sri Lanka. The factors such as industry growth, professional opportunities, and premium wages have not been the primary concerns of these returned entrepreneurs. Instead, they have been motivated by the growing investment opportunities in the global BPO/KPO industry for a skilled base country like Sri Lanka. Finally, as Harvey (2009) argued, the temporal nature of brain circulation is kept but does not apply commonly to both skilled employees and entrepreneurs. Entrepreneurs are less likely to return permanently compared to the skilled employees since the location has not been an obstacle for their investment activities. Physical movements between the center and the periphery, and stay virtually in the periphery have become economic and convenient thanks to the advancement of transportation and communication technologies. Therefore, developing countries should promote both permanent returnees- reverse brain drain- as well as the temporary returnees-diaspora- to achieve a beneficial brain circulation.

Table 4: Summary Statistics and Descriptions of the Variables in Model 1 and 2

Description of the Variables	Summary Statistics		
	n	Mean	Std. Dev.
Dependent variable			
If returned before 2009=1, zero otherwise	125	0.34	0.48
If returned permanently=1, zero otherwise	125	0.82	0.39
Controlling and explanatory variables: Model 1			
Age	125	30.24	6.81
Age square	125	960.50	492.60
Demeaned age (Age - Mean age)	125	0.00	6.81
Demeaned age square	125	46.04	120.51
Gender (Dummy variable: Male=1)	125	0.85	0.36
Ethnicity (Dummy variable: Non-Sinhalese=1)	125	0.14	0.34
Civil status (Dummy variable: Unmarried=1)	125	0.34	0.47
Nationality (Dummy variable: Sri Lankan=1)	125	0.83	0.38
Non-degree holders (Education dummy: Yes=1)	125	0.16	0.37
Max. bachelor's degree (Education dummy: Yes=1)	125	0.52	0.50
Max. postgraduate degree (Base category of education dummies)	125	0.32	0.47
Working experience abroad (Dummy variable: yes=1)	125	0.75	0.43
Having a school age children at the time of returning (DV: Yes=1)	125	0.22	0.41
Returnee's status by 2009 (Dummy variable: Entrepreneur=1)	125	0.14	0.34
Controlling and explanatory variables: Model 2			
Age	125	35.31	8.57
Age square	125	1,319.78	679.79
Demeaned age (Age-Mean age)	125	0.11	8.57
Demeaned age square	125	72.85	120.36
Gender (Dummy variable: Male=1)	125	0.85	0.36
Civil status (Dummy variable: Unmarried=1)	125	0.34	0.47
Nationality (Dummy variable: Sri Lankan=1)	125	0.83	0.38
Non-degree holders (Education dummy: Yes=1)	125	0.14	0.34
Max. bachelor's degree (Education dummy: Yes=1)	125	0.46	0.50
Max. postgraduate degree (Base category of education dummies)	125	0.41	0.49
Working experience in a OECD country (Years of experience)	125	3.15	4.11
Having a school age children at the time of returning (DV: Yes=1)	125	0.22	0.41
Returnee's status by 2013 (Dummy variable: Entrepreneur=1)	125	0.18	0.38

Notes: Model 1 has employed the relevant information at the time of the respondent returning to Sri Lanka whereas Model 2 has employed the relevant formation at the time of the survey, , if not specifically mentioned. In order to avoid the negative consequences of multicollinearity between age and its square term, I included demeaned data (variable centering) in the models. Demean age was calculated by $\bar{x} - x_i$.

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...ance, Sri Lanka ranked in the 16th place of *A.T. Kearney's Global Services Location Index (GSLI) in 2014* (A.T. Kearney,

... there were 11 terrorist attacks in various location of the Colombo District, which is the commercial city of Sri Lanka
... the KSI is concentrated.