

The Impact of Investment in Human Capital on the Exports of Goods and Services

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Abstract:

With the growth of services economy worldwide, it has become essential for policymakers to comprehend the export competitiveness of nations to identify offshore export locations or alternatively offer their own sites as an exporting location. Human capital investment is considered as a key component in attracting foreign countries for outsourcing purposes. Earlier studies have shown mixed role of human capital investment on off shoring activities. This study assesses the effects of control variables (business environment, wages and IT infrastructure) and human capital investment on export of goods and services from the selected Asian outsourcing countries. Panel Estimated Generalized Least Square (EGLS) technique is used with country weights to specifically overcome the problem of autocorrelation. Empirical findings show that investment in human capital is significant for both goods and services exports. We found a large impact of human capital investment on exports of goods and services in selected Asian countries as compared to selected developed countries. Empirical findings further suggest that human capital is more essential for export of goods than export of services. From these findings, the study draws important implications for policymaking in countries who intend to offer themselves as an attractive location for exporting and for those who intend to locate their production activities overseas.

Keywords: Services Sector Exports, Human Capital, Outsourcing.

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1. INTRODUCTION

Companies have long strived with how they can use their relative advantage to enhance their global market share and incomes. Since the 1950s companies started to find new ways for taking the advantage of the economies-of-scale and broadening of production base to protect their export incomes. This made “diversification” a widely held industrialization approach. But with increased competition later, it became difficult for companies to handle the management structure due to the diversification strategy. To overcome this problem, many large companies began to consider the ‘outsourcing’ option to enhance their competitiveness. While shifting attention to their central process, companies passed non-core procedures, to be managed by third parties. Until the 1990s, outsourcing was not widely practiced. But in the late 1990s, as cost saving became part of business strategy for companies, they began to focus on outsourcing option. They started to outsource such functions which were necessary to run a business but not related to central business activities.

Coase (1937) was first who developed the economics of outsourcing. He raised the question that what established the boundaries for a firm? Through internal as well as external cost comparison a firm can decide whether to produce things internally or externally. Coase had laid the foundation of modern transaction cost economics by creating the transaction cost calculation.

In the 1990s, outsourcing became a buzzword and was considered as a useful addition to the business world. Since the firm production chain is broken into various sequence tasks, by focusing on each task firms can enhance its efficiency. Through outsourcing, significant proportion of management control is transferred to suppliers. That involves the risk of diminishing control over the supply chain. This risk can be reduced by establishing the coordination between buyers and sellers.

Due to outsourcing many low skilled jobs in the manufacturing industries are transferred from developed countries to developing countries. While the services sector in developed countries was considered less vulnerable to this replacement because it was thought that their better skilled and educated workers would protect local service industry

from foreign competition. This perception was based on high investment in human capital in developed countries. But this notion was challenged by China and other Asian countries in the 1990s when they emerged as most preferred outsourcing locations [Contractor and Mudambi (2008)].

This paradigm shift in production and trade pattern has been made possible by the changes in business environment including the revolution in information and communication technologies. Such changes have enabled countries to transmit goods and services exports cheaply and fast.

If the distance becomes less important because of low transmission cost then it is expected that exports will originate from a large numbers of countries. But the available evidence does not support this assertion. Exports tend to be concentrated in a few countries. What this suggests is that there are many other factors other than transmission and transaction costs, which explain the global export pattern and its intensity. In this context, availability and the quality of the factors of production, including skilled and educated labour force, the quality of infrastructure and business environment may play an important role to change the level of exports in a positive way.

From the above perspective, this paper attempts to answer the following questions; to what degree the differences in the human capital investment through countries shake the goods and services exports? In this regard, are there any differences between the developed and the developing countries? How is the infrastructure and business environment affecting the export of goods and services? Does human capital investment impact on export of services differ from export of goods?

Researchers have diverse opinions concerning the importance of difference between services and goods. Some of them highlighted the exclusive characteristics of services, inseparability¹ and intangibility, which make them different from goods. Such differences require a modification in the models of international trade that focus on goods instead of services. Nevertheless, some researchers claim that the variance between services and goods is not very obvious. They argue that services

¹ For certain types of services a close interaction between consumer and producer is required, that is, they have to be at the same location for the provision of the services. This gives rise to inseparability characteristics.

are intangible but some of them require close interaction between consumer and service provider. Such arguments for and against the distinctive natures of services are prevailing in literature. This motivates us to run tests separately for exports in goods and services. In the context of outsourcing, this study aims to examine the influence the of human capital investment on the goods exports and services for emerging Asia vs. developed countries.

In this paper, we attempt to investigate the role of the human capital investment in enhancing location attractiveness for outsourcing location. In addition, the study also examines the role of information and communication technology and other factors (business environment, wages) in determining the desirability of a country for subcontracting of services and goods. Good IT infrastructure has become an essential instrument for countries to compete in the international market. Similarly, sound business environment is crucial for attracting outsourcing activities. As far as wages are concerned, foreign countries look at the wage cost in the host country while making the outsourcing decision. The output of this study is expected to benefit the countries that are competing with each other to obtain off shoring contracts and attracting foreign direct investment.

The rest of the paper is separated into five sections. Section 2 provides an overview of outsourcing activities in selected Asian countries. Theoretical framework is discussed in Section 3. Section 4 provides empirical models used in this paper. Results are discussed in Section 5. Finally, Section 6 accomplishes the paper and delivers the policy implications.

2. CONCEPTUALIZING OUTSOURCING FOR ASIAN COUNTRIES

The concept of outsourcing was developed in U.S. in the 1970s. At that time, many manufacturing firms sent their raw material to developing countries due to low labour cost. Initially, payroll outsourcing was done but in the late 1980s outsourcing was moved from payroll to HR function to manufacturing and eventually to IT outsourcing.

Although, literacy rate is 99 percent in USA, conducting a sourcing project in USA is very expensive as compared to other outsourcing countries, e.g., salary of a web developer in India is 70 percent less than that of an American counterpart. Same is true for Canada, which is one of the major outsourcing countries. Its prime area of outsourcing is IT as the country is taking the benefit of better infrastructure and educated labour force.

Nowadays software development is growing in Canada. Therefore, in order to hire senior software developers, government has to pay them higher wages. New Zealand is also considered as an important place for outsourcing. Despite large human capital stock, wages are high in the country so companies consider other destinations for outsourcing. UK is also considered as a hub of IT and BPO outsourcing. Although UK has a large pool of educated labour force and better IT infrastructure, yet wages are high in UK just like other developed countries.

Despite the above mentioned developments, outsourcing was not considered as a popular business strategy until 1989 but in the 1990s, cost saving became a crucial element for companies, so they started considering the outsourcing option. At that time, companies outsourced those activities that were not related to their core business activities. Kodak, for instance, was the first American company which outsourced its IT system in 1989. After this revolutionary step, many companies decided to outsource their business activities on the basis of cost effectiveness rather than focusing on whether activity is core or not.

Because of competitive advantage, lower costs, access to technology, access to exports and availability of the resources for the core business activities, developed countries consider the option of outsourcing to developing countries. Asia is considered as a hub of outsourcing because of its cheap labour and large pool of educated labour force. Some of the major outsourcing countries are examined below: Kearney (2014) has identified following Asian countries as top outsourcing locations; India, China, Malaysia, Thailand, Philippines and Pakistan.

2.1. Determinants of Outsourcing in Asian Countries

At present companies consider the option of outsourcing to improve their current conditions. All over the world it is considered as the latest trend in a modern economy. All the major cooperation considers the option of outsourcing for maintaining their competitiveness because it enhances the efficiency, accountability and service quality. There are many factors which affect the outsourcing decision such as wages, IT infrastructure, business environment of a country and most importantly education and skill level of workers. A good combination of all these factors exists in Asia which makes it a desirable place for outsourcing.

Educated labour force with lower cost is a major factor that makes the Asian countries such as China and India a preferred place for outsourcing. In order to attract foreign companies for outsourcing, these countries heavily invested in human capital. World Bank (2013) reported an overall upward trend in the average years of schooling in the selected Asian countries for the period 2000 to 2012.

Besides human capital stock, a country's IT infrastructure is a major factor, which foreign companies take into their consideration when they are searching for outsourcing location.

In this context, Asian countries show a sharp growth in IT infrastructure. Sound and safe business environment is the top priority of foreign companies while deciding to outsource in foreign destinations. Country's business environment is important both for services and goods exports. In this study we used private credit access as a proxy of business environment and competitiveness of the country in international markets. Estimates based on the World Bank (2013) shows an upward trend in access to private credit in selected Asian countries, which indicates improved competitiveness and in turn outsourcing activities are increasing.

Wages plays an important role when outsourcing and exports are taken into account. Initially, lower wage location countries are attractive for potential outsourcers but this is only a short term phenomena. But in the long run, for a state to be an important exporter, wage gap is not a necessary condition. Wage trends indicate a rise in annual wages in all selected Asian countries but this rise is slow and gradual [ILO (2014)].

2.2. Outsourcing Scenario in Selected Asian Countries

China

Since China is the most populated country, its population would offer competitive advantage against the other major players in outsourcing industry. China's five major cities provide a huge amount of sourcing services; Shanghai, Beijing and Chengdu are providing services such as testing and research, business analysis and development of product. Shenzhen is known for software application, development and maintenance, and Guangzhou specializes in engineering services.

Finance, services, manufacturing and health care are included in China's primary specialization. China has advantages over other Asian countries in case of manufacturing because of its experience in manufacturing and its knowledge of delivering the products that follow to the demanding standards, which are required by western legislation and consumers. China has cheap labour as compared to its competitors especially India, where wage inflation makes it more difficult to strive on the base of prices. In order to get business from western companies, government has given priority to English language in schools and universities. Its literacy rate is 93.3 percent. Opening up of the Chinese economy to the world is the turning point that caused changes in the business world as well as the outsourcing industry.

India

In 1994, the Indian government announced a policy in which it liberalized its telecom sector. In 1999, more changes were introduced in this policy, such as ending of state monopoly on global calling facilities. First outsourced service was the medical transcription and Business Process Outsourcing (BPO) started at the end of the 1990s. Now India is the one of the leading outsourcing locations. America and Europe are the largest customers of Indian outsourcing industry which are of 60 and 31 percent of IT and BPO exports, respectively. BPO & IT services outsourcing first started during 1980s and this industry grew rapidly in the 1990s. According to NASSCOM² (2014) BPO and IT exports employed

² National Association of Software and Services Companies is a trade association of information technology business process outsourcing industry.

about 2.2 million people in 2009. BPO is the fastest growing fragment of Information Technology Enabled Services industry in India. The reasons for this growth are low cost, economies of scale, risk mitigation, etc. For BPO, India is considered as the most preferred place and the reasons for this boom in BPO industry are cheap labour and large pool of English speaking and skilled professionals.

Philippines

Although India is the front runner in the BPO industry, it has a rival now. Philippines is considered as a leading nation in the BPO industry, both in call service and non-voice sector. On the other hand, in IT service market (web designing, maintenance, etc.), it is an emerging player. Outsourcing begun in the 1990s, but it witnessed growth during the 2000s. Initially, the attention was paid to the low value added BPO services and on call centers, but later it was shifted towards web designing, animation legal services and other shared services. Manila was considered as the best place for outsourcing earlier, but now other cities such as Pasig and Cebu are also considered for outsourcing purpose. For BPO services, Philippines is the destination of choice, mainly voice-based outsourcing services. According to BPAP (Business Processing Association of the Philippines), IT-BPO industry produced a revenue of \$13 billion in 2012, whereas it was \$11 billion in 2011. The reason for the increase in revenue is that Philippines remained a USA colony; therefore its culture is similar to that of the USA. Adult literacy rate is 93% in Philippines and almost 55% of total population speaks English. So the literate and English speaking population is the major fascination for outsourcing companies.

Malaysia

Government support industry expertise and oil and gas logistics were the factors which helped in the development of the outsourcing industry of Malaysia. As Malaysia is multi-sectorial and multilingual country, many companies get attracted to doing outsourcing. Major developments have been made in the industry sector. It includes the inclusion of five Malaysian outsourcing companies in the Global Services 100 list, capability-driven valuation of IT/ IT enabled service

providers all over the world. Because of good infrastructure and multilingual skills of the workers, Information Technology Outsourcing (ITO) is growing in Malaysia. Moreover, Malaysia is benefiting from its educated labour force, strategic location and global integration. Malaysia gives high priority to education and formal training. According to UNESCO Annual Report (2009), literacy rate is 91% in Malaysia. Educated labour force of Malaysia is a major attraction for outsourcers. To upgrade Malaysia into high income, information based economy by 2020; main focus is on the Shared Services and Outsourcing (SSO) industry. Many factors such as government incentives, good infrastructure, skilled labour force, ICT resources, sound business environment ensure companies receive support and help in thriving in this sector.

Thailand

Although Thailand is known largely for tourism and automobile industries, but now it has been a dominant player in IT industry as well. The country has the potential in three major outsourcing activities such as BPO; Voice and ITO. But current outsourcing activities are concentrated in ITO. Thailand launched its first information technology policy in 1996; named as IT 2000. The purpose of this policy was building good infrastructure and good governance, increasing the literate workplace and building knowledge based economy in 5 key areas: E-Commerce, E-Industry, E-Education, E-Society and E-Industry. Although, Thailand is performing well in outsourcing industry, but it has not reached its full potential level yet.

There are certain challenges which the Thai economy is facing such as provision of good infrastructure, especially ICT, augments the use of the English language which helps in attracting foreign companies, political instability, etc. According to *United Nations Educational, Scientific and Cultural Organization* (UNESCO) Annual Report (2009), only 10% of the total 506,000 graduates from universities can speak the English which is relatively low as compared to Philippines. Consequently, the government is now trying to improve its quality of education to attract foreign investors. For becoming the major outsourcing destination, Thai government is taking some steps such as improving

infrastructure and level of education in the country, making long term plans and improving business environment.

Pakistan

Pakistan is working to become a dominant player in outsourcing industry by focusing on intellectual property rights enforcement, area expertise, etc. Due to its geographical location, expanding transportation and communication network and improving business environment, it is an attractive destination for many investors. Recently, many IT companies have invested billions of dollars here such as Etisalat UAE telecom Provider Company, Google, City bank, bank of America, etc. Microsoft, Cisco and IBM are also expanding their operations in the country. In order to attract foreign investment; Pakistan is also investing in human capital, e.g., education in order to strengthen its IT industry.

UNESCO Annual Report (2009) stated that currently only 2.6% of GDP is allocated to education sector, which is far low as compared to countries such as USA (where 8% of GDP is allocated to the education sector). The Pakistan Software Export Board has created IT parks. IT workforce with good command on English language is a real attraction for foreign companies. Besides this a good telecommunication infrastructure, securing intellectual property rights and tax exemptions are other factors that help in attracting foreign investors.

All in all, the Asian economies have become the hub of outsourcing because of their cheap labour, raw material and large size market. As compared to American/European workers, living standard of Asian workers is low as companies pay lower wages to them than American or European workers get, so it is cost effective for the outsourcing companies. Apart from cost saving, foreign companies get access to experts and professionals through outsourcing. On the other hand, outsourcing is generating many job opportunities for Asian countries.

3. THEORETICAL FRAMEWORK

In this section, the use of generalized version of Dixit and Woodland (1982) model for analysis of the association between the human capital and export is discussed. Basically this model established

the link between factor endowment and international trade. There are certain assumptions of Dixit and Woodland's model such as; all countries use the same technology in production and there is constant return to scale, collective inclinations are homothetic and alike, there exist n inputs and m products, and there is a set of production possibilities in productive sector which can be symbolized by $Y(v)$, where v is the vector of inputs $v = (v_1, \dots, v_n)$ and $Y(v)$ is the set of all possible production vectors.

Now domestic product is maximized by production sector and can be written as:

$$G(p, v) = \max_y \{p \cdot y \mid y \in Y(v)\}, p \geq 0, v \geq 0 \quad \dots (1)$$

Since, $G(p, v)$ is the production function & $G(p, v) \geq 0$ $p = (p_1, \dots, p_n)$ is the price vector of m products to represent the small open and price taking economy. Where, the function $G(p, v)$ is homogenous, continuous and concave in v for fixed p . By assuming G is differentiable, we can obtain supply function:

$$y_j(p, v) = \partial G(p, v) / \partial p_j \quad \dots (2)$$

or $y(p, v) = G_p(p, v)$ and equilibrium factor price such as:

$$w_i(p, v) = \partial G(p, v) / \partial v_i \text{ or } w(p, v) = G_p(p, v) \quad \dots (3)$$

It is a very general model of production sector which pursues constant return to scale. Now on the demand side which can be explained as expenditure side, there is:

$$E(p, u) = \min_c \{p \cdot c \mid U(c) \geq u\}, p \geq 0, u \geq 0 \quad \dots (4)$$

$E(p, u)$ is representing the demand and $E_u \geq 0$. U is direct utility and c shows the aggregate consumption with $C = \sum_{i=1}^m C_i$. The expenditure function is homogenous, continuous and concave in p for fixed u . By assuming it is differentiable, then compensated demand function can be driven from its partial derivative.

$$C_j(p, u) = \partial E(p, u) / \partial P_j (j = 1, \dots, m) \quad \dots (5)$$

or $c(p, u) = E_p(p, u)$, where U will increase as E . By assuming that all income will be spent then we get a solution,

$$S(p, v, u) \equiv G(p, v) - E(p, u) = 0 \quad \dots (6)$$

Solution of Equ. (5) represents an indirect utility. Since, it generated maximum possible utility of a given country, with an endowment of factor v , considering a price level p (During optimal arrangements of its production system and pattern of trade). Thus, it increases the utility, which can be stated as:

$$u = u(p, v) \quad \dots (7)$$

Now combing Eqs. (2), (5) and (7), we can write net exports as production surplus after domestic production ($x = y - c$). They can be explained by price (p) and factor of production vector (v). So, we have

$$X(p, v) = Sp[p, v, u(p, v)] \quad \dots (8)$$

Woodland (1980), Dixit and Norman (1980) and Chipman (1979) explain more detail about properties of these functions.

Consider 2 states where factor endowment varies to some magnitude. "Country A" has a factor endowment which is equal to v , and another country has factor endowment, which is equal to $v^* = k.v$, since, k is a positive scalar quantity. According to Heckscher-Ohlin-Samuelson (HOS) theorem, this difference allows the endowment impact on trade to be a relative function, relative to the amount of factors used in the production of goods. Variation in country A's exports can be captured as:

$$dx^s = x^v dv \text{ or } dx/dv = X \quad \dots (9)$$

Above equation states that the link between factor endowment and trade of goods can be determined by the dependence of dx^s in relation to dv . Heavy export of any good j shows the intensive use of factor i ,

when $\partial x_j / \partial v_i$ is positive. This shows the Rybczynski theorem effect, since it was dedicated towards production.

In this study general model is used for examining factors that affect a country's trade flows. The model used physical capital (K), labour force (L) and human capital (H) which is measured through education level. Human capital is used in the addition to the factors that were used by Dixit and Woodland in their model. Now suppose, $v = (K, H, L)$ & the level of production can be maximized; Hence, Equ. (9) can be written as:

$$DX = x_v d(K, H, L) \quad \dots (10)$$

where,

$$xv = \partial x / \partial v_i * v_i / x$$

According to equation (8) due to changes in factor endowment, value of exports changes. It can be written in linear equation form as:

$$dX = x_k dK + x_h dH + x_l dL \quad \dots (11)$$

Equation (10) can be rewritten to show the country's flow of exports as:

$$X_{it} = \alpha + \beta K_{it} + \phi H_{it} + \phi L_{it} + \mu_{it} \quad \dots (12)$$

$$\mu = \mu_i + \eta_{it}$$

where,

- X_{it} = vector of exports from a certain country during time period t,
 - K = physical capital,
 - L = labour force,
 - H = human capital measured through education level of workers
- $\alpha, \beta, \phi, \phi$ are parameters, μ_i is fixed unobservable affect and η_{it} are dynamic shocks.

The regression model can be written in general form:

$$X_{it} = \sum_{j=1}^k \beta Z^j_{it} + u_i \quad \dots (13)$$

where,

Z'_{it} = set of all explanatory variables³

X_{it} = export vector

Equ. (13) states that export of a country depends upon a set of explanatory variables (physical capital, labour force and human capital) and some other factors which cannot be observed easily. Some dynamic shocks also affect exports. Even though human capital plays a dynamic role in enhancing a country's attractiveness by way of outsourcing location and boosting exports of goods and services, there are some other factors that can play an important role. Country's IT infrastructure such as telephone lines, Internet users, prevalent business environment, ease of access to credit and wages are important factors that can influence a country's desirability as outsourcing location and export of services and goods.

4. METHODOLOGY AND SOURCE OF DATA

The data being used in our research include Asian countries (India, China, Pakistan, Thailand, Philippines, and Malaysia) and developed countries (Canada, United States, *New Zealand* and United Kingdom) for the period 2000-2012. By following Dixit and Woodland (1982), we argue that model in Eqs. (14) and (15) will help to find out the effect of human capital on services and exports of goods.

$$X_{goods} = \beta_0 + \beta_1sch + \beta_2tel + \beta_3wg + \beta_4pc + \varepsilon_t \quad \dots (14)$$

$$X_{services} = \beta_0 + \beta_1sch + \beta_2tel + \beta_3wg + \beta_4pc + \varepsilon_t \quad \dots (15)$$

where, X_{goods} represents manufacturing exports, $X_{services}$ represents commercial services exports, sch shows average year schooling, tel shows total telephone lines (per100 people), pc stands for the private credit as a percentage of the GDP, wg represents urban area wages and ε_t is the error term.

³ Z'_{it} shows set of explanatory & control variables. It can also be witnessed in the studies of Fraqa and Bacha (2012), Fafchamps (2008) and Tandrayen (2004).

Different proxies are used in the literature for measuring human capital. In this study, public spending on education and average years of schooling are alternatively used in the estimation. In order to measure IT infrastructure total telephone lines (per 100 people) were used. Following Anagaw, *et al.* (2001), private credit as the percentage of GDP is used by way of a substitution for business environment. Since the data on urban area wages are not available, therefore, real annual wage (per hour) is used. Sources of data are International Labour Organization (ILO), World development indicators, the statistics prepared by Barro and Lee (for human capital) and United Nation Development Program.

In determining the impact human capital has on exports of goods and services, it is necessary to quantify the human capital. The human capital can be measured through health and education indicators [Wolf (2000) and Barro and Lee (2001)]. In this study, average year of schooling is used for measuring this indicator.

4.1. Control Variables

In addition to human capital investment, other country specific control variables are also introduced in the analysis such as IT infrastructure, prevailing wage rate in a country and business environment of a country.

IT infrastructure: ICT is used for measuring country's IT infrastructure. Information and communication technology (ICT) is very important to support trade and market creation for a nation. François and Manchin (2006) studied the impact of infrastructure on trade cost and flows. They concluded that in developing countries, infrastructure is the main determinant of trade cost. These countries are not able to produce and compete in international export market because of the lack of infrastructure.

Wages: Wages play an important role when outsourcing and exports are taken into account. Initially, lower wage location countries are attractive for potential outsourcers but this is only a short term phenomena. But in the long run, wage gap is not a necessary condition. Farrell, *et al.* (2005) showed that incursion of service off shoring in has accelerated wages in Indian cities dramatically. Secondly, across countries, higher product-

ivity is generally associated with higher wages and on the other hand lower wages reflect low workers' productivity.

Private credit: Private credit is used as a proxy of business environment prevailing in a country. Country's business environment is important for both services and goods exports. In order to attract foreign companies for outsourcing purposes, sound business environment is one of the crucial requirements. When a foreigner company looks for an outsourcing location, it gives priority to such location where safe and sound business environment holds which in turn boosts the exports of host countries. Ghani and Clemes (2013) evaluated the impact of business environment on trade of goods and services and they found a significant impact.

5. RESULTS AND DISCUSSION

This section includes the discussion of empirical findings of the study. Hence, the total pooled observations in our balanced panel were 72.

5.1. Empirical Findings

5.1.1. Unit Root Test

In order to check the stationarity of data, the cross-section independence assumption is analyzed first and then the test is carried on for error cross-sectional dependence (CD) according to Pesaran (2004). This examination is based on average pair-wise correlation coefficients of OLS residuals from individuals' regressions, i.e., for each cross-section [see, Pesaran (2004); Baltagi (2008)]. Since this test is robust with unbalanced panels and with one, multiple structural breaks in the slope coefficients and also in case of the error variances of individual regressions.

This "CD test" procedure, is such that if the data set contains N units, then test estimates $N*(N-1)$ correlations between country $i=1$ and all other $(N-1)$ countries. In our case in the first step we capture the residuals. Then CD test is applied on the residuals captured from the fixed effects regressions. Null hypothesis of this cross-section independence is

sturdily prohibited in Tables 5.1 and 5.2 for both Asian and developed Countries.

Table 5.1. Cross-section Correlation Test before estimation for Asian Countries

| CD test | p-value | Average correlation coefficient | Absolute correlation coefficient |
|---------|---------|---------------------------------|----------------------------------|
| -2.70 | 0.011 | -0.133 | 0.579 |

Null hypothesis : cross-sections are independent.

Table 5.2. Cross-section Correlation Test before estimation for Developed Countries

| CD test | p-value | Average correlation coefficient | Absolute correlation coefficient |
|---------|---------|---------------------------------|----------------------------------|
| -3.01 | 0.056 | -0.219 | 0.701 |

Null hypothesis: cross-sections are independent.

Now we know that there is cross-section dependence in our data and the “1st generation” panel unit root tests are invalid as they reject the null hypothesis of a unit root excessively. Therefore, we have applied Cross-sectional Augmented Dickey-fuller “CADF” test, suggested by Pesaran (2004). This test is created on the mean of individual ADF t-statistics of each cross-section unit. In this case, the need of cross-sectional is removed by augmenting the ADF regression by mean of lagged cross-sections of the individual series (thus called “CADF” statistics).

The unit root test of Pesaran panel indicates that series are stationary at level.

Table 5.3. Cross-sectional ADF test for Asian Countries

| Variable | Levels | |
|----------------------------------|-----------|---------|
| | Z [t-bar] | p-value |
| Manufacturing exports | 1.952 | 0.0000 |
| Public Spending | -0.234 | 0.0000 |
| Schooling | -1.708 | 0.0070 |
| Private Credit Access (% of GDP) | -4.0071 | 0.0000 |
| Wages | -3.0121 | 0.0000 |
| Telephone lines | -2.1100 | 0.0033 |
| Commercial services exports | -3.6791 | 0.0001 |

Null hypothesis: variables are non-stationary.

Table 5.4: Cross-sectional ADF test for Developed Countries

| Variable | Levels | |
|----------------------------------|-----------|---------|
| | Z [t-bar] | p-value |
| Manufacturing exports | -3.90371 | 0.0004 |
| Public Spending | -3.20512 | 0.0011 |
| Schooling | -2.9300 | 0.0000 |
| Private Credit Access (% of GDP) | -2.11301 | 0.0051 |
| Wages | -1.0012 | 0.0031 |
| Telephone lines | -5.20021 | 0.0000 |
| Commercial services exports | -2.7315 | 0.0031 |

Null hypothesis: variables are non-stationary.

The unit root test of Pesaran panel indicates that series are stationary at level.

5.2. Generalized least square and Robustness Checks

We estimate the empirical equation by means of the Common Constant method. We tried various alternatives depending on variable combination, econometric methods and data sources. But Panel Estimated Generalized Least Square (EGLS) is applied to estimate equation with country weights and correction of standard errors for the problem of autocorrelation and heteroscedasticity.

We also tried both fixed and random effects models but results were not consistent as our data set is small. Fixed effects model generates dummies equal to cross sections in the study. Here the order of cointegration is not same so we take the difference of the variables. In this way we lose observation and degree of freedom problem occurs. Since number of observations was less in this study so we cannot use random effect method. Pooled least square is the best method to apply if t-statistics, standard errors and probability are reliable enough to explain results according to theory. It should also satisfy BLUE (best linear unbiased estimates) properties. If it does not fully satisfy these properties then GLS (cross section) is used to tackle that problem. GLS is used for finding out the unknown parameters in linear regression model. As in our regression model we found some degree of correlation between error

terms. Weighted least squares and ordinary least squares statistically give insufficient and misleading inferences.

5.3. Estimation results for the Asian countries

It is established in the literature that the human capital investment is extra significant for commercial services exports than manufactured goods exports. But overall results do not give any indication, such that the human capital investment is extra significant for services than goods exports. The Human Capital is used as proxy for average years of schooling and alternatively by community spending on education. This variable is sturdily important for Asian countries in case of exports of goods as well as services when average year of schooling is used as a proxy (also see Appendix Tables 1 and 2 for empirical results of public spending in case of developing and developed countries).

Coefficients of schooling in case of manufacturing and commercial services exports shows that one year increase in schooling, increases the exports of manufacturing by 51%⁴ and exports of commercial services by 29%. An *increase* in education leads to attain more skilled labor force. As a result skill-intensive *exports rise*; making growth and exports. These results corroborate with the findings of Olney (2013), Banjeree (2001), Chaung (2000) and Black and Lynch (1996).

Control Variables

For measuring ICT in these countries total telephone lines (per 100 people) are used as a proxy. The results of telephone users reported in Tables 5.5 and 5.6 show that one percent increase in ICT increases the exports of goods by 3% and export of services by 2%. These results are consistent with the study of Ghalandari (2013) and Ahmad, *et al.* (2011).

For measuring country business environment we used private credit access as a proxy. This variable is significant both for exports of goods and services. The results reported in the Tables 5.5 and 5.6 show that one percent increase in private access, increases exports by 5% in

⁴ Conversion to elasticity is made by using the formula given in Gujrati (2004). All further percentage conversions are based on this formula.

case of goods and 3% in case of services. The study by Anagaw and Demissie (2001) also showed significance of private credit access. Study of Gani and Clemes (2013) also confirmed these findings.

Table 5.5. Estimated Generalized Least Square: Manufacturing Exports

| Dependent variable: LOG(Manufacturing Exports) | | | | |
|--|--------------|----------------------|------------------|----------|
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample: 2000-2012 | | Periods Included: 13 | Cross sections:6 | |
| Total balanced panel observations: 72 | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | P-Value |
| Sch | 0.0516 | 0.0063 | 4.9869 | 0.0370* |
| TP | 0.0316 | 0.0028 | 2.6394 | 0.0482* |
| Wg | 0.0179 | 0.0007 | 2.5074 | 0.0633** |
| D(Pc) | 0.0571 | 0.0027 | 4.0720 | 0.0371* |
| C | 3.9285 | 0.0413 | 4.2031 | 0.0813** |
| R-squared | 0.6301 | F-statistics | 13.7447 | |

Note: *and** show statistical significance at 5% and 10% level.

Empirical findings further show that one percent increase in wages increases exports goods by 17% and export of services by 13% (Tables 5.5 and 5.6). In order to cope with intense international competition, exporting firms need skilled workers so for hiring such workers firms have to pay high wages to them [Munch and Skaksen (2008)]. Muller and Nordman (2014) also confirmed these findings. Initially lower wage location countries are attractive for potential outsourcers but this is only a short term phenomena. But in the long run, for a nation-state to be an important exporter, wage gap is not a necessary condition. Farrell, *et al.* (2005) showed that due to off shoring wages has accelerated in India's major cities. Secondly, across countries higher productivity is generally associated with higher wages while lower wages reflect low productivity by workers.

Table 5.6. Estimated Generalized Least Square:
Commercial Services Exports

| Dependent variable: LOG(Commercial Services Exports) | | | | |
|--|----------------------|-------------------|-------------|----------|
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample:2000-2012 | Periods Included: 13 | Cross sections: 6 | | |
| Total balanced panel observations: 72 | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | P-Value |
| Sch | 0.0291 | 0.0033 | 5.1159 | 0.0403* |
| Tp | 0.0208 | 0.0038 | 3.1981 | 0.0239* |
| Wg | 0.0139 | 6.58E-05 | 2.6244 | 0.0907** |
| D(pc) | 0.0331 | 0.0027 | 4.4769 | 0.0102* |
| C | 0.0217 | 0.0696 | 4.3604 | 0.0605** |
| R-squared | 0.7064 | F-statistics | 37.0619 | |

Note: *and ** show statistical significance at 5% and 10% levels, respectively.

5.4. A Comparison of Human Capital in Developed and Asian Countries

Some scholars argue that the human capital investment produces desirable results in emerging countries because these countries use education for catching up with the developed countries. They improve their educational attainment level, which increases their productivity and in turn boost up their exports. While other argue that rich nations continue with investment in education, which enhances the workers’ productivity and this will invalidate the wage gap between developed and developing nations. So there is no consensus among the experts on this issue. It is still an untested area that whether the human capital investment is more essential to goods export and services for developing countries than developed countries.

Table 5.7 provides the comparison of the effects of human capital for exports from developed and Asian nations. Results show that human capital investment has a strong and significant impact in case of emerging Asia. But in case of developed countries it does not give a significant outcome. The reason is that increased human capital stock is positively related with exports to a certain level after which it exhibits “diminishing return” effect as developed countries keep on increasing human capital

investment. That is, human capital increases exports but at a diminishing rate.

While comparing the Asian and developed countries, we can notice that human capital measure is significant and positive in all selected Asian nations for both services and goods. On the other hand, it is positive and significant in case of manufacturing exports but insignificant for the exports of services in developed countries. It is an *ex post* hypothesis which means that increasing the human capital is absolutely correlated with the export of goods as well as services but up to a certain limit. Beyond that point human capital measure is plateaued out. Since, in developed countries average years of schooling are high therefore, the impact of this variable on exports reached to the point of diminishing marginal return. Results show that a one year increase in schooling increases the exports of goods by 0.4%, while exports of services increase by 0.1%. Studies by Olayemi (2012) and Wolff (2000) confirm these findings. To reaffirm this notion that human capital investment is important for developing countries, pooled regression with regional dummy is estimated. Results from this implementation are reported in Appendix Table I, which does confirm this notion.

Control variables

ICT is positively associated with both the export of goods as well as services in both regions. In developed countries, one percent increase in telephone users increases the export of goods by 2.8% and export of services by 1.4%. In case of emerging Asia one percent increase in ICT increases the exports of goods by 0.6% and export of services by 0.5%. Studies of Ghalandri (2013) and Ahmad, *et al.* (2011) confirm these findings. Private credit access, which is used as a proxy of business environment, is positively related with the exports of goods and services in the full panel. This confirms the belief that export performance of a country is positively related with the business environment of a country. Results reported in Table 5.7 reveal that 1 percent increase in private credit access increases the export of goods by 1.4% and export of services by 1.2% in developed countries. In emerging Asian countries 1 percent increase in private access, increases exports of goods by 0.8% in

case of goods and 1.2% in case of services. Studies of Gani and Clemes (2013) and Angaw and Demissie (2001) corroborate these findings.

Wages have a positive relationship with the exports of goods as well as services. Low wages and salaries are an important component in attracting foreign countries for outsourcing purposes. But this is only a short-term portent. In the long-run, firms have to pay higher wages in order to hire more educated and skilled workers. Therefore, over a period of time, wage gap is an inadequate complaint for a nation to endure a significant player in outsourcing business, just as the marginal productivity theory also states that high wages are linked with high productivity, i.e., high wages encourage workers to enhance their productivity.

China also reports the shortage of skilled labour so their rates are increasing in many cities. Farrell, *et al.* (2005) also showed that due to outsourcing wages increase in many Indian cities dramatically. Mincer (1991), Gupta (2000) and Jones (2001) also argued that according to marginal productivity theory, lower wages are associated with low productivity across countries.

Akerlof's Gift Exchange Model (1984) also presented same argument that when firms pay high wages to the workers, they feel obliged with reimbursing in the form of gift of advanced effort level. So, conferring to this theory, loyalty of the workers is exchanged for high wages and this loyalty is resulted in high productivity. In developed countries 1 percent increase in wages caused 1.4% increase in export of goods and 1.3% increase in export of services. Empirical findings further show that a 1 percent increase in wages increases exports goods by 0.2% and export of services by 0.03% in emerging Asian countries. Farrell, *et al.* (2005), Muller and Nordman (2014) also confirmed these findings.

4. CONCLUSION AND POLICY IMPLICATIONS

6.1. Conclusion

Empirical analysis shows that human capital is positively related with the export of goods and services in Asian countries. The analysis further shows that as stock of human capital rises it enhances the

country's attractiveness as a location for outsourcing, which in turn increases the export of goods and services.

While making decision about outsourcing the developed countries look at the ICT infrastructure of the host country. Empirical findings of this study show that the ICT is absolutely and significantly linked with the export of the goods and services. Lack of soft infra-structure is a major cause for increase in trade cost in many developing countries, which in turn affect their competitive strength. Foreign companies while making decisions to outsource, particularly take into consideration the availability of modern ICT infrastructure in the out-sourcing location.

Country's business environment is another important factor for export growth. We found that sound business environment attracts the foreign companies to outsource in emerging Asia. Low labour cost in Asian countries is a major attraction for countries/regions like US and EU for outsourcing. In addition, Asian countries provide low office cost occupancy, which is a real lure for companies from developed countries.

Low labour cost is a short term phenomena. However with increased demand for skilled labour, firms eventually have to pay high wages. Indian experience shows that because of off-shoring, wages in India's big cities have accelerated dramatically. This provides an opportunity to other countries in the region to offer outsourcing services to benefit from the rising wages in major Asian locations of outsourcing.

6.2. Policy Implications

In order to attract developed countries to developing countries' destinations, the study calls upon Asian developing countries to pay special attention to make their industries (manufacturing and services) more cost effective. In addition, special attention needs to be paid to further enhance the quality of their human capital stock, to improve efficiency of soft and hard infrastructures and to improve business environment by curtailing cost of doing business.

In particular, we suggest the following:

1. Asian countries should expand their human capital stock to reap the benefits of outsourcing. They should further reduce their border restrictions to attract more outsourcing from developed countries.
2. Countries like Pakistan and Thailand should take steps to provide sound business environment to attract outsourcing from developed countries.
3. As wage inflation is on the rise in China and India; other promising destinations such as Thailand, Pakistan and Philippines need to take advantage of the rising wage cost in established destinations of outsourcing.
4. As export of goods and services are highly dependent on an efficient and cost effective system of movement of inputs, energy and communication network, therefore Asian countries need to further improve the efficiency of their soft and hard infrastructures.

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 Table 5.7: A Comparison of Human Capital between Developed and Asian Countries

| Emerging Asia | | | | | | | Developed Countries | | | | | | |
|---------------|-------------|---------|---------|-------------|---------|---------|---------------------|-------------|---------|---------|-------------|---------|---------|
| Goods | | | | Services | | | Goods | | | | Services | | |
| Variable | Coefficient | t-value | p-value | Coefficient | t-value | p-value | Variable | Coefficient | t-value | p-value | Coefficient | t-value | p-value |
| Sch | 0.095508 | 14.99 | 0.0000 | 0.0510 | 15.16 | 0.0000 | Sch | 0.0350 | 3.53 | 0.0009 | 0.0104 | 1.03 | 0.3070 |
| TP | 0.06107 | 21.64 | 0.0000 | 0.0508 | 13.20 | 0.0000 | TP | 0.0523 | 11.01 | 0.0000 | 0.0269 | 6.57 | 0.0000 |
| D(Pc) | 0.01137 | 4.07 | 0.0001 | 0.01753 | 6.48 | 0.0000 | D(Pc) | 0.0089 | 5.83 | 0.0000 | 0.0078 | 4.49 | 0.0000 |
| Wg | 0.000931 | 20.51 | 0.0000 | 0.00017 | 2.62 | 0.0107 | D(Wg) | 0.0814 | 6.25 | 0.0000 | 0.0743 | 5.00 | 0.0000 |

APPENDICES

Appendix Table 1: Developing Countries: Public Spending on Education

| Dependent variable: LOG(Manufacturing Exports) | | | | |
|--|--------------|---------------------|------------------|--------|
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample:2000-2012 | | Periods Included:13 | Cross-sections:6 | |
| Total (balanced) observation | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | Prob. |
| ns: 72 | | | | |
| C | 5.046736 | 0.214746 | 23.50091 | 0.0000 |
| Log(Spending) | 0.559602 | 0.024255 | 23.07132 | 0.0000 |
| Tp | 0.038850 | 0.002755 | 14.10314 | 0.0000 |
| Wg | 0.000309 | 6.16E-05 | 5.019673 | 0.0000 |
| D(pc) | 0.003290 | 0.001187 | 2.772627 | 0.0072 |
| R-squared | 0.989062 | F-statistics | 1514.651 | 0.0000 |
| Dependent variable: LOG(Commercial Services Exports) | | | | |
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample:2000-2012 | | Periods Included:13 | Cross-sections:6 | |
| Total (balanced) observations: 72 | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | Prob. |
| C | 0.087542 | 0.192695 | 0.454304 | 0.6511 |
| Log(Spending) | 1.009532 | 0.020197 | 49.98526 | 0.0000 |
| Tp | 0.001792 | 0.001136 | 1.577155 | 0.1195 |
| Wg | 0.000226 | 3.36E-05 | 6.736890 | 0.0000 |
| D(pc) | 0.001100 | 0.001045 | 1.052769 | 0.2962 |
| R-squared | 0.982839 | F-statistics | 959.2781 | 0.0000 |

Appendix Table 2: Developed Countries: Public Spending on Education

| Dependent variable: LOG(Manufacturing Exports) | | | | |
|--|--------------|---------------------|------------------|--------|
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample:2000-2012 | | Periods Included:13 | Cross-sections:6 | |
| Total (balanced) observations: 72 | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | Prob. |
| C | -1.231602 | 0.344261 | -3.57752 | 0.0008 |
| Log(Spending) | 0.901410 | 0.036459 | 24.7239 | 0.0000 |
| TP | 0.030408 | 0.002262 | 13.44131 | 0.0000 |
| D(Wg) | 0.055111 | 0.007032 | 7.836681 | 0.0000 |
| D(pc) | 0.000590 | 0.000529 | 1.115196 | 0.2704 |
| R-squared | 0.971466 | F-statistics | 400.04 | 0.0000 |

| Dependent variable: LOG(Commercial Services Exports) | | | | |
|--|--------------|---------------------|------------------|--------|
| Method: Panel EGLS (Cross-section SUR) | | | | |
| Sample:2000-2012 | | Periods Included:13 | Cross-sections:6 | |
| Total (balanced) observations: 72 | | | | |
| Variable | Co-efficient | Std. Error | t-statistic | Prob. |
| C | 1.186708 | 0.156725 | 7.57192 | 0.0000 |
| Log(Spending) | 0.814374 | 0.016843 | 48.35138 | 0.0000 |
| TP | 0.003800 | 0.000474 | 8.015498 | 0.0000 |
| D(Wg) | 0.030011 | 0.002112 | 14.21237 | 0.0000 |
| D(pc) | 0.000714 | 0.000151 | 4.735355 | 0.0000 |
| R-squared | 0.993842 | F-statistics | 1896.35 | 0.0000 |

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