The Relationship of Health-Related Factors to Labor Productivity of the ASEAN-5

Rollen D. Santiago
University of Santo Tomas

Elijah Joseph C. Tubayan*
University of Santo Tomas

Review of Integrative Business & Economics Research

ABSTRACT

Labor productivity is tantamount to the total output produced per worker, which reflects how the labor force efficiently contributes to the country's economy, specifically in the ASEAN-5. Ill-health is a major hazard to the productivity of the workers, hence increases the gap between the potential output per worker and the actual output per worker. The paper analyzes different health variables that contributes to the productivity of the labor force. The study proves that that the top five ASEAN countries have heterogeneous quality of service between public and private hospitals, and that the physician and bed density plays a major role in labor productivity.

Keywords: Health determinants, ASEAN-5, labor productivity, labor force.

1. INTRODUCTION

A nation's health is one of the most important resource it has for it as it is a determinant of economic growth and development. According to World Health Organization (WHO), a healthy population produces more output for they have lesser sick days, and longer working hours. The population's workforce are the movers and shakers of the country's economy, and output is dependent on how much the worker produces efficiently. The efficiency of these workers are highly affected by internal and external forces, such as poor health, therefore they must be protected from it. Developed nations like the United States (US) and the United Kingdom (UK), have a great valuation on health because their priority in government spending is skewed to social security and public health. It is evident in their fully-established national health care system, wherein universal coverage is achieved. In 2014, the US spent almost 27% on health of their total government budget, according to the Office of Management and Budget (OMB). On the other hand, the UK spent 19%, according to the UK Treasury. This is eyed by almost all developing countries in the world, so it is important to understand the economic impact it brings to the society; and also historically speaking, improvements on health will increase the pace of economic growth in a significant amount, according to Arora (2011). In the Southeast Asian picture, five largest economies from the Association of Southeast Asian Nations (ASEAN), are expected to be the key driver of growth among the Southeast Asian countries, and the Pacific. The emerging markets Indonesia, Malaysia, Philippines, Singapore and Thailand, dubbed as ASEAN-5, aims for

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

development through an inclusive society where the welfare and the livelihood of its citizens are promoted.

The researchers chose the ASEAN-5 as the scope of the study, because the objective is to highlight economic changes, leading towards the recent unification of the ASEAN member-states. Focusing on societal development, the ASEAN envisages human development through the ASEAN integration. The researchers believe that these improvements, is better seen in the largest economies in the ASEAN member-states. The emergence of technology has made a great impact on providing efficient public and private health service delivery. Secondly, the share of the private sector on health has seen rapidly increasing. In the aspect of the human capital, workers are becoming increasingly mobile in both domestic and international aspects in the Southeast Asian region, as stated by Bonu, et al. (2009). Free labor movement is just one of the human development policies in the ASEAN integration to improve the skills and capabilities of their workforce. But the researchers believe that human development is insured if the country invests in the most vital component of human capital - health.

This paper will identify the connection between health related factors on labor productivity that will answer the questions: Does determinants of health influence the productivity of labor? What are the implications of health-related variables to the economy? The results to these questions will be featured in a comparative study between the ASEAN-5. The researchers will identify the significance, and the different magnitudes of the outcomes among the selected countries, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand.

2. REVIEW OF RELATED LITERATURE

Labor Productivity

Labor is crucial in the production process. A well-functioning worker wears great bearing to yield an amount of output. Based on the study of Qaisar and Foreman¬-Peck (2007), the labor force is almost entirely the driver of the country's ability to supplement its national output growth. Several studies were conducted to examine the relationship between health and labor productivity. Mitchell and Bates (2011) studied productivity loss by comparing the productivity of healthy workers with unhealthy workers. Through the analysis, it was found that presenteeism and absenteeism are positively related to health conditions and lower level of health conditions is also significantly associated to lower levels of productivity in the macroeconomic level. Chansarn (2011) studied the relationship of labor productivity and economic growth on Thailand and Singapore. Result shows that labor productivity is a key factor to economic growth and that both countries should promote human capital formation through health promotions in order to enhance labor productivity that will lead to higher economic growth and a better standard of living. In the case of Brazil, Bonelli (2002) studied that productivity change has been a major source of GDP growth in Brazil since the 1940. Although there was slow GDP growth in the 1990's, 40% of the GDP increase

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

in the succeeding years was associated with labor productivity. In his model, he measured productivity through per capita GDP.

Labor productivity is not measured by the aggregate number of workers, or the aggregate number of work hours in an economy; as it is just tantamount to the labor supply. What productivity implies is the efficiency of a standard unit of input to produce a certain unit of output (Simtowe, et al., 2011). According to Attar, Gupta and Desai (2013), a more precise measure of productivity is showed in the following ways: (1) Output produced per work hour and (2) Output per worker. This paper will follow the likes of Umoru & Yaqub, and Eneri (2013) in measuring the standard for labor productivity, which is the total GDP divided by the working population. In Jorgenson's study (1991), he concluded that productivity of labor input is very significant in being the driving force behind the expansion of the U.S. economy back in the 1980's. In a recent study by Acemoglu and Johnson (2007), increases GDP per working age population is a product of a worker at a well state, or productive state. Dollard and Neser (2013) stated that a healthy workforce is likely to have a significant impact on national life expectancy and national productivity estimated in terms of GDP. In Thailand and Singapore, Chansarn (2011) stated that the countries need to promote human capital formation through education, training, and health promotion in order to enhance their stock of human capital, and improve labor productivity, which would lead to higher economic growth and a better standard of living for the people. An analysis by Sabhani, Wahab and Neumann (2014), Bloom, Canning (2005), states that unhealthy or workers in the pain state has lower productivity because (1) on the job productivity decreases due to pain or injury during work (2) productivity loss due to absenteeism (3) replacement of a new worker with less competence. It is evident that health is a major factor for an individual's productivity. Contoyannis and Forster (1999) even quoted, "A healthier nation is a wealthier nation"

Mortality Rate

In Babatunde's (2009) economic growth equation, real income per capita is assumed to depend on investment, life expectancy at birth, child mortality, total death rates, and health expenditure. As a result, the death rate is a significant variable that can decelerate economic growth. A 1% increase in death rate was found to decrease growth by 2.53%. Infant or child mortality was the selected measure to determine population health. Several criticisms about infant mortality rate (IMR) were forwarded. In Reidpath, Allotley's study (2002), IMR is a suitable choice of measurement of public health due to the fact that it could contain the concentration of health resource allocation. However, that kind of measurement may not be relevant in this study because it does not cover the age of the work force. Show, et al. (2002) stated that the output of the health systems is expressed either by longevity indicators such as life expectancy (life expectancy at birth, life expectancy at 65 years, healthy life expectancy) for total population and/or by gender, or by mortality indicators (mortality rate, infant mortality rate). The same variables were also used in the research of Mushtaq, et al. (2013). The said indicators are considered good determinants for measuring the health status of a population Nicolini (2004) studied about the impacts of adult mortality rate to production of acre.

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

The study shows that adult mortality has a strong influence on the production of acres. Jamison (2013) used mortality rate as a measure of outcomes that includes ages 15¬60, or the ages of the labor force. In the model of Bhargava, et al. (2001), adult mortality rates showed significant effects on economic growth rates. In their model, for every 1% change in adult mortality rate, there was an 0.05% increase in growth rate. However, it was not consistent with the developed countries. In this study, the researchers will also utilize adult mortality rate as one of the independent variables.

Physician Density

Guagliardo, et al. (2004) measured the accessibility of physicians, as an indicator for the quality of health. Léonard, et al. (2009), with a substantial heterogeneity in study design and modeling, observed that there is a consistent positive association between physician density and healthcare consumption. The study of Rosenthal (2004) asserted that there are detrimental effects on the quality of health when there are shortages of medical practitioners. The researcher demonstrated that a higher physician per population density is negatively related to health and health care. General physician supply has a statistically significant effect in Pierard's (2014) regression model. He said that an additional physician per 1000 population will result to a 5¬-20% probability of higher reports of excellent health. Babatunde (2009), in his analysis of the status of health capital in Nigeria, stated that there is a positive relationship between the number of doctors per capita and life expectancy. He used life expectancy to indicate population health in Nigeria. He proved that a one percent increase in the ratio of doctor per population tends to raise life expectancy by 0.062%. The same observation appears on the regression analysis made by Mohan (2010) where health employment was strongly significant. The researcher affirmed that the role of the medical personnel is really crucial in terms of availing health care services. The increase in life expectancy is noted to be faster as the number of doctor increases. It is clear that the more doctors are available, the more number of lives that are saved. Chen, et al. (2014) presented that when the case volume of the physician was higher, the probability of death was lower. Results of the researchers' study also showed that the length of stay and in-¬hospital death rate was lower when the physician case volume was higher.

Also on the case of Nigeria, Eneji, et al. (2013) stated that there should be an effort to train more physicians based on its significance on life expectancy. Nigeria suffered, as more medical professionals, doctors, and pharmacists leave the country while its citizens were denied of sufficient health care services. He recommended that incentives should be provided to attract people to take up the medical profession so that the people would avail of greater medical service. Vujucic, et al. (2011) also highlighted on the importance of access to the physicians. He studied the effects of physician shortage in rural Vietnam and recommended that physicians should move from urban to rural areas. The study stated that better health will arise when there are enough medical professionals to cater to the population sample.

Bed Density

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Mushtaq et al. (2013) stated that health investment must be made for the purposes of development in both private and public hospitals. The researchers stated medical institutions should spend on health facilities. Specifically the number of beds should be increased so that the people will be provided of proper health service. In the state of Indonesia, Awosefo et al. (2012) said that the people suffer from a poor quality of health system. Hospital beds for a number of populations were too low, leaving individuals with ill health and gross inefficiencies. Kroneman & Siegers (2004) indicated that admission rates and average lengths of stay reflected the effectiveness of the hospital beds. Looking at the bed's effects to productivity, Ruchlin & Leveson (2008) asserted that productivity and bed supply were statistically significant at 0.05 level. The researchers confirmed that bed supply is positively related to productivity.

Ratio of Public to Private Hospitals

The prevalence of hospitals or healthcare facilities is an indicator of the access and utilization of medication for the society. Lavado, et al. (2011) said that the greater the number of hospitals are, the greater number of people will be catered to. Private hospitals offer more quality and specialization of disease treatment, and cater more to the upper socioeconomic structure. It plays a crucial role in the hospital system, as almost half of the population goes to private facilities for their health care needs, and their share of the total number of hospitals accounts for more than 50 percent (DOH, 2009). The patients in private hospitals spend twice bigger than that of the patients confined in public hospitals in Lavado's study. In Irfan & Ijaz' (2011) analysis, private hospitals have better infrastructure relative to public hospitals. Private hospitals aim to give a high standard of quality for the people, based on the observations made in the study. The performance of private hospitals provide more assurance of better treatment, and provide better satisfaction that that in the public sector. (Zamil & Areigat, 2012). The result is reflected from the satisfaction of the patients, based on the SERVQUAL survey. The SERVQUAL measures the perception and satisfaction of the patients regarding the quality of the public and private hospitals. It is the only significant source to identify the distinct performance of the two sectors. Babakus & Mangold (1992), used it to empirically estimate the best suitable hospital environment for the patients. Andaleeb (2002) said that knowledge, specialization and sense of assurance were present in private hospitals. Chiang (2008) implied that private hospitals play an important role in the society since they perform better compared to public hospitals.

The study of Johnson & Yousapronpaiboon (2013), Adesanya (2012), and Andaleeb (2002), suggests that public hospitals render poor service quality, wherein remain less responsive in addressing the medical needs of the population. However, due to the fact that public hospitals render free¬ of¬ charge service, it implies that public hospitals can still cater to the majority in poverty¬ struck countries. Yesilada & Direktor (2010) presented that public hospitals have lack of machineries, outdated medical equipment, and poor condition of physical facilities. These limitations exist due to the fact that public hospitals are nonprofit.

Government Expenditure

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

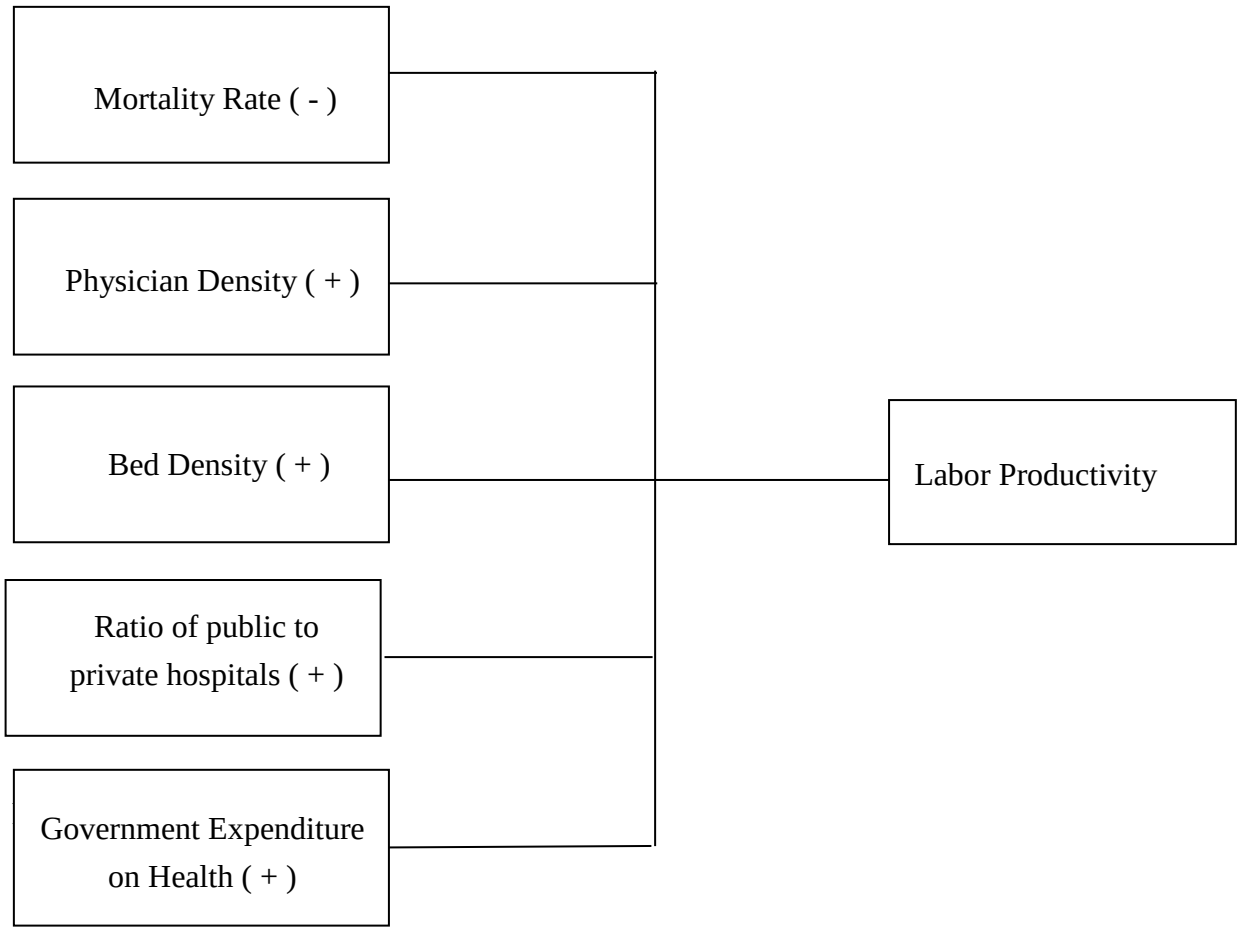
A very important component of economic development of a country is its people's state of health. Eneji, et al. (2013), Devarajan and Vinay (1993), and Abu and Abdullah (2010) used panel data in analyzing the link between health expenditure and labor productivity. By using time series data, hey found out that increase in government expenditure on health sector consequently increase level of human capital development which ultimately leads to a productive economy. A similar result was presented in the study of Nurudeen and Usman (2010). They estimated that a 1 percentage increase in expenditure on health leads to a 0.06 percentage increase in economic growth in the succeeding year. Their policy recommendations stated that the government should raise its expenditure in the development of the health sector since it would enhance labor productivity and growth. Jen, et al. (2010), studied the relationship between health expenditures and health outcomes. They utilized the total health expenditure, a sum of general government expenditure on health and private expenditure on health in a given year, to identify health outcomes through life expectancy. Balan, et al. (2014) also claimed that health expenditure regression coefficients and life expectancy are positive. Rivera (2004) also concluded there is a significant positive relationship between the two variables for all the selected countries in their study. Rechel et al. (2009), Arora (2001) recommended that health expenditures must be increased such that more people will be able to get good healthcare services. However in this study, other alternatives of health outcomes will be utilized instead of life expectancy. According to Guisan and Arranz (2003), a lower share in public health expenditure shows the implication of citizens having poor health services and concluded that expenditure on medical care is important and shows an increasing share in total individual consumption, with economic development, as the demand for those goods and service usually contributes to a higher quality of life and welfare. However, Babatunde (2009) argued that there is an insignificant effect of health expenditure on growth because it is hinged on the small share of health expenditure as a ratio of total government expenditure.

Synthesis

In summary, the review of related literature shows that there are several health related variables that influence labor productivity. The researchers will use Adult Mortality rate (ages 15 to 65) as the proxy for the health status. The researchers believe that it is the most suitable measure relative to infant mortality rate and life expectancy, as to what other literature have presented. Infant mortality rate may not be appropriate since it only measures the probability of dying of infants from ages 0¬5. It has the same problem with life expectancy; it measures the survival rate of an individual from birth and does not cover the working population of ages 15¬ to 65. Bed density (bed supply per 1000 population) will be used to measure the hospital's capability to admit a specific number of patients. Parallel with other studies, the researchers will identify the competency of the medical professionals that will help improve the health of the working population. It will be measured by the number of physicians per 1000 population. According to related literature, there are different impacts to the population's health from the public and private sector hospitals. The researchers will identify this impact by using the ratio between public and private hospitals. Government expenditure on health will be used to know if immense government funding to health will amplify labor productivity.

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

3. RESEARCH FRAMEWORK



3.1 HYPOTHESES:

H1: Increase in mortality rate decreases labor productivity (-¬)
H2: Higher number of medical professionals increases labor productivity (+)
H3: Higher number of bed increases labor productivity (+)
H4: Higher ratio of public hospitals to private hospitals leads to higher labor productivity (+)
H5: Increase in Government Expenditure on health raises labor productivity (+)

4. METHODOLOGY

The purpose of this paper is to capture the effects of health on labor productivity. The researchers will conduct an observational study on the behavior of the different productivity levels of Singapore, Malaysia, Philippines, Indonesia, Thailand, or the ASEAN¬5, arising from selected health indicators. In this paper, the researchers will use panel data to evaluate the relationship between the selected variables. Macro-¬level quantitative data from secondary sources will be used for this study. Among which includes the The World Bank, World Health Organization (WHO), Ministry of Health

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

(MOH) Singapore, Malaysia, Indonesia, Thailand, Department of Health (DOH) Philippines. The scope of the study covers the period from 1995-¬2012. The research time frame of the study is in the most recent decade, allowing significant predictions of the following years for the purposes of economic policy recommendations for the selected countries.

The explanatory variables that this study uses are as such: physician density, bed density, ratio of public to private hospital, adult mortality rate and government health expenditure. The enumerated health¬-related controlled variables will be used to estimate labor productivity, as the regressand. The researchers will employ a multi-regression model in the paper.

The physician density dictates the availability of medical professionals to cater to those who are in need of medical attention. Bed density shows the accommodation capacity of the hospitals to admit the sick population. The ratio of public to private hospitals presents the number of private hospitals there are for a fixed number of public hospitals. The researchers use adult mortality rate as a proxy for health status of the working population. Government health expenditure will be measured by the percentage spent on health from the government's expenditure. Labor productivity on the on the other hand, is the measurement of the efficiency of workers in a time frame. It will be determined by the GDP divided by the number of persons employed at constant 1990 Purchasing Power Parity, in US Dollars.

The regression model is as follows:

$$LP = \beta_0 + \beta_1 \log MOR_{it} + \beta_2 \log PHY_{it} + \beta_3 \log BED_{it} + \beta_4 \log HOS_{it} + \beta_5 \log GOV_{it} + \varepsilon$$

(Eq.1)

The denotations are as follows: MOR stands for Mortality rate, PHY is physician density, BED is bed density, HOS is ratio of public to private hospitals, GOV is the government expenditure on health. Each explanatory variable is at a log function since they are of ratio and percentage measurements.

5. EMPIRICAL RESULTS AND DISCUSSION

It is begun by studying the five cross-sections and subjecting them to a panel estimated generalized least squares model, to test the initial validity of the panel data. The total balanced panel exhibited 90 observations MORT, being the mortality rate, BED being the bed density, PHY being the physician density, GOV being the government expenditure on health, and RATIO being the ratio of public to private hospitals. The objective of the paper is to identify how the determinants of health affect labor productivity among the ASEAN countries. The researchers incorporated explanatory variables that are believed to be relevant, and also acknowledging variables from other literature.

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

To control for the country-specific effects of the endogenous variables, the model employed a panel data regression with random-effects or fixed-effects. The explanatory variables included in our model are: MORT, BED, PHY, GOV, and RATIO. Unfortunately, all the five variables cannot be estimated at once in the random effects model since the number of cross-sections should strictly be greater than the number of coefficients. The researchers excluded the variable RATIO in the meantime, to qualify the model for the random-effects estimation. The results are shown in Table 1.1. The researchers conducted the random-effects model for the sake of testing the appropriateness of the estimation through the Hausman test.

Table 1.1

R-Sqrd	Durbin-W
0.962238	0.256644

Table 1.2

R-Sqrd	Durbin-W
0.986137	0.791316

In the Hausman test, the p-value is less than 0.05. Hence, the researchers reject the null hypothesis that the unique errors are not correlated with the regressors. Therefore, the Hausman test tells that the fixed-effects is more appropriate. The researchers refer to Table 1.2 as the main regression model from hereon. The fixed-effects model removes the time-invariant characteristics, so that the net impact of the independent variables to the dependent variable would be seen, without the bias of country differences. It is now assumed that the political and health systems of the cross-sections are the same. It shows the result of the regression that the constant term is positive, which meets the appropriate expectation. It appears that the variables mortality rate, bed density, and physician density are significant at 95% confidence, except for government expenditure and ratio of public to private hospitals.

Despite having significant variables, and appropriate estimate, the results do not seem as authentic as it should. In Table 1.2, the goodness of fit of the variables are strong at 0.98, and the Durbin-Watson statistic is very low at 0.79. The results is quite peculiar as the variables with a strong r-squared has an extremely low Durbin-Watson statistic. The estimates implies that the model have a spurious regression. The problem exists in either fixed or random effects. The researchers tested the pooled OLS model; however, the same error on the Durbin-Watson prevails in the pooled model. The researchers attempted to cure the errors by opting for a first-order autoregressive model, but the results still are problematic since the r-squared increased to an even higher level, at 0.99. The researchers then investigated the fixed effects model, to verify whether it is truly valid through the Histogram-Normality Test. The researchers deduce that even if it is subjected to the fixed-effects model with the assumption that all countries are homogenous and normally distributed, the results show otherwise. The Jarque-Bera probability shows that the cross-sections are not independent with each other. Ideally, our objective is to find out how the cross-sections behave towards the endogenous variables, assuming that the countries have homogenous unobservable characteristics, and react the same way with the dependent variables. Hence, the bundling up together

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

of countries in the panel data regression becomes invalid. Due to this event, the researchers will estimate the cross-sections individually, with the same variables.

Tables 2.1 to 2.5 shows the final output of the individual regression results per cross-sections. However, the result of this reduced the number of observations from 90 to 18 due to the errors on our original panel data model. This is the limitation of our study wherein our revised model can only cater 18 samples due to the unavailability of data exceeding 18 years.

In the revised model, it is evidently shown that the individual regressions have significant constants. However, the significance and the coefficients of the independent variables in the regression differ between the countries. But this time, the goodness of fit and the Durbin-Watson indicates that the model is appropriate and that it no autocorellation between the variables. The r-squared in the countries are strong in the range of 0.88 to 0.96, and the Durbin-Watson statistics are well within also within the required range. However, the dataset of Singapore has the most disturbances between estimations. It has a relatively weak r-squared and a low Durbin-Watson, and two multicollinear variables.

The researchers have subjected it to tests for multicollinearity, specification, normality, and heteroskedasticity, as shown in the Appendices. In the test for multicollinearity (Appendix B), the researchers checked the Variance Inflation Factors (VIF) of the countries. In the regression results, there is a high frequency of appearance of mortality rate among the regressions, and shows values greater than 10 in the centered VIF. To cure the model, the researchers omitted MORT in the model of the Philippines and Thailand, removed PHY in the model of Malaysia, and Indonesia, and removed PHY and BED in the model of Singapore.

In the test for specification, the researches employed the Ramsey RESET test (Appendix C), wherein all values are greater than alpha. The results of the tests implies that there is no mis-specification in the different models, and that no relevant variables are excluded, given that some variables have been removed in the multicollinearity test.

The researchers then verify the models whether if the cross-sections are independent, or not. Appendix D shows the Histogram-Normality tests of the five observed countries. The results consistently show that the residuals are normally distributed, as the Jarque-Bera statistics are above alpha. Appendix E on the other hand, shows homoscedasticity, and constant variances among the regressors.

Table 2.1 exhibits estimations of mortality rate from the 5 cross sections. BED, PHY and GOV may be its direct determinants of MORT from data in the Philippines and Thailand; therefore, cause multicollinearity. Another reason of it being multicollinear, is that it is just a proxy variable for health status, which is also reflected by the other explanatory variables.

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Table 2.1

	Coeff.	Prob.	R-squared	Durbin-W
Indonesia	-77.09313	0.0004	0.914883	2.174289
Malaysia	-179.9464	0.0018	0.930767	1.854633
Singapore	-503.0478	0.0000	0.832998	1.258560

MORT, is found to be negatively correlated with the dependent variable. At 0.05 percent level, the estimated coefficient of mortality rate is consistent with the hypothesis, as well as past empirical researches (Babatunde, 2009, Bhargava, et al, 2010, Lacheheb, 2014). This empirically fortifies the intuition that when a person is ill, he/she will relatively be unproductive. It serves as a proxy variable for the indicator of health status in the country. Health status affects labor force since there will be healthier people who are physically and cognitively advantaged, hence a higher output in their respective workplaces. Several factors connected to health status that may be accounted for are: poor quality of environment, poor living conditions, and limitations to access of healthcare benefits (Eneji, et al, 2013).

Table 2.2

	Coeff.	Prob.	R-squared	Durbin-W
Thailand	10585.73	0.0124	0.931995	2.06673

Table 2.2 suggests statistical significance of PHY at 0.05 level. It explains that increases in number of physicians is tantamount to better health access for individuals as it shortens waiting times, and increases the scope of population it can cater to (Mohan & Mirmirani, 2008).

Table 2.3

	Coeff.	Prob.	R-squared	Durbin-W
Indonesia	4646.166	0.0124	0.914883	2.174289

As presented in Table 2.3, Indonesia garners a significant positive relationship of BED and labor productivity. Consistent with the hypothesis that increases in the number of beds will increase accessibility of the patients, and can admit more while there would be lesser congestion in hospitals. (Mushtaq et al, 2013; Awosefo et al, 2012; Ruchlin & Leveson, 2008; Kroneman & Siegers, 2004)

Table 2.4

	Coeff.	Prob.	R-squared	Durbin-W
Philippines	261.5679	0.0011	0.958490	2.560317
Thailand	402.2799	0.0003	0.931995	2.060773

The results shown in Table 2.4 coincides with the hypothesis that public investments on health will increase labor productivity. Increases in government expenditure increases

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

the scale of the medical services offered in different health sectors, which is also supported by the findings in different literatures (Rivera, 2004).

However, in the status-quo, the percentage share of government expenditure on health in other countries is not that high anyway. In developing countries like the Philippines, high poverty levels is a factor on health and labor productivity. The researchers characterize that absolute poverty, and low income levels makes the poor more vulnerable to diseases like dengue, malnutrition, and stroke, due to their poor living conditions. This puts them on a downward spiral of having more diseases and being more entrenched in poverty (Baltagi & Moscone, 2010). The researchers deduce that even if the poverty-struck population gets health benefits, they still cannot bridge the structural limitation of not having jobs to be productive. It only helps them in their subsistent way of living, extending their lives by a day, and extending their idleness in society. Also, the amount of health benefit given to high income groups are not triggers that will push the labor productivity up, but still serves the purpose of prevention, and protection of health. This justifies the reason on why GOV made a relatively small impact on labor productivity in the Philippines (Eneji, et al, 2013).

Table 2.5

	Coeff.	Prob.	R-squared	Durbin-W
Philippines	-3722.360	0.0000	0.958490	2.560317
Malaysia	19749.59	0.0046	0.930767	1.854633
Indonesia	3478.075	0.0030	0.914883	2.174289

What Table 2.5 shows is that only Philippines, Malaysia and Indonesia are the only variables that exhibit a statistical significance. To explain how the researchers measured these results, is that the country is identified whether it is dominated by either public or private hospitals. The data of Malaysia indicate that private hospitals dominate the public hospital in number. The regression result show that the higher private hospitals, the higher labor productivity with a coefficient of 19749. It tells us they have the greatest effect on labor productivity compared to public hospitals. Moreover, this implies that, compared to the Philippines, Malaysia's government hospitals perform better in treating the public. This is perhaps Malaysia's public hospitals also offer specialization in the treatment of diseases, and gives a better healthcare standard that caters to a bulk of population that rids them of ill-health.

6. RECOMMENDATION

Relatively less developed countries like Philippines, and Thailand have negative outcomes on health, even when the number of public hospitals increase. This does not mean that the state should totally lay over medical services to the private sector, or else the cost of treatment will increase and will no longer be pro-poor. The researchers recommend that the budget in health should be spent multi-laterally between private and public hospitals. Concretely speaking, aside from the government just spending more to increase the number of beds, the government should also engage in public-private partnerships (PPP) to modernize public hospitals so that the quality of equipment,

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

facilities, and service would be ultimately improved (Nikjoo, et al, 2012). In relation to the ASEAN integration, the researchers would capitalize on the liberalization of foreign investment. This means that there would be lesser barriers for investment that gives greater incentive for the investors to develop the hospitals, and lead to better health treatment in the said countries. The public-private partnership would be feasible since government subsidy will balance out the costs for the public. Moreover, the researchers would recommend extending the study in assessing the magnitude of effect of PPP's in the field of health.

On the other hand, Indonesia having publicly dominated hospitals should continue on its operations as it shows a positive outcome on labor productivity. It implies good quality of service, which less developed public hospitals should also attain. Philippines and Thailand should share technology and information with developed public hospitals like in Indonesia in order to pattern its road to development. With free trade, they could engage in efficient bilateral trades with Indonesia, or other ASEAN countries, as they get high quality equipment from those countries who are able to supply them.

The researchers also recommend that the government should invest on infrastructure and technology in the health sector, to further multiply or supplement the effects that the doctors and medical services give to the people, and lessen mortality rate. Also, since there are medical services that some countries could not provide due to lack of technology, people opt to travel overseas to seek medical attention. But even when free movement along the ASEAN countries exist to permit and ease this scenario, it may still be inefficient for the patients. This is because even when other nations are open for them, they still face costs of travel, and costs of time. Hence, the researchers suggest that the states should not tolerate this scenario, but they should opt to invest to bring in technology that exists in other countries, to hasten the treatment of the patients. This would save the time of the patients, and it would also save money from the hospitals, since they could have access to these kinds of technology with free trade.

Even if the researchers dropped PHY in some of the regression models, it should not just easily be ignored. The availability of medical professionals is very crucial, as shown in the estimations, as it has a great significant effect to labor productivity. The researchers believe that the states should promote the influx of physicians in their country. The researchers recommend that the states should provide incentives to those who practice medical care, in the form of tax cuts in the tuition fees of those who pursue the medical track, and also provide greater scholarship programs to those schools who are centers of excellence in the field of medicine. Moreover, the researchers assert that the ASEAN member states should capitalize the free movement of labor to promote greater movement of physicians between states. The researchers recommend that the ASEAN should have a unified professional license to the medical professionals who wish to practice abroad. However, the license should permit the physicians who have quality standards of skill. This unified license would be an incentive since it eases the requirements needed to practice medicine in different countries, and also it would be less costly. The underlying value in the recommendation shows the standardization of the quality of medical services offered through technology and quality service.

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

In line with this, the researchers would also recommend to tap on the field of pharmaceuticals, or the supply, and types of drugs and medicine offered in the country, as investigated by Shaw et al (2005). Here the researchers could identify how the availability of medicinal drugs could be a factor in labor productivity, as there may be a significant difference between the people who are forced to buy substandard drugs, and the people who enjoy a variety of branded drugs. (Eneji, et al., 2013).

Since healthcare in an institution responsible for the reparation and sustainability of an individual, it may have positive outcomes on productivity. However, it does not necessarily mean that it produces productive, and innovative individuals. The researchers recommend that the government should still provide opportunities for the people that will incentivize them to be more productive. Be it jobs, employment benefits or conditional cash transfers (CCT's).

In relation to this, the researchers believe that the scope of our model can be amplified if the micro level would also be investigated. The researchers recommend to look upon the role of income, out-of-pocket expenditures, and nutrition that may capture the direct or indirect effect to labor productivity. These variables may also show their access to medical care, and how those limitations do collateral damage to their current state. The researchers recommend future studies to reconcile macro and micro evidences, which may have significance on other factors that may either offset or supplement the increase of labor productivity. For example in another model, life expectancy may influence savings and capital accumulation, and the expected returns to and investment in education. It is also important that researchers to study the factors that significantly differ within different cross-sections, and to be able to fully understand further the underlying entanglements of health to labor productivity.

7. CONCLUSION

Healthcare should definitely be a top priority for the ASEAN countries, as it supports the people's welfare, and will provide a more productive breed of workers that will drive the countries' output up. The researchers deduce that good accessibility, quality, and sustainability of health services have a huge contribution to the nation's output per worker. The health sector is very delicate; it has immense repercussions to households and individuals. It should never be neglected, as it has great impact in economic development. The health factor indubitably provides the sustainability of productivity in a certain nation. However, the researchers also acknowledge different factors such as technology, infrastructure, education, and capital stock that also drive productivity upward. The states should still continue to pursue the universal access to healthcare, implementation of health policies, and promotion of healthy well-being, in their respective Millenium Development Goals (MDG's).

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

APPENDIX

Appendix A

The researchers constructed a panel of countries observed in 18 years (1995-2012). The data that the group gathered is as follows:

Year	Country	Mort	Phy	Bed	Gov	Ratio	Lp
1995	Philippines	229.3601	0.9496	1.053325	7.4227982	2.938053	6201
1996	Philippines	228.1058	1.23	1.0444375	7.799195	2.913793	6199
1997	Philippines	226.8515	1.24	1.03555	8.0401783	2.877049	6724
1998	Philippines	225.671	1.02167	1.026662	7.91177	2.813559	6618
1999	Philippines	224.491	0.80333	1.017775	7.85188	2.836066	6569
2000	Philippines	223.311	0.585	1.008887	8.42391	2.798319	6931
2001	Philippines	222.1311	0.8675	1	7.2084915	2.735537	6715
2002	Philippines	220.951	1.15	0.5	5.94065	2.704	6747
2003	Philippines	219.84	1.1515	0.5	7.07563	2.688	6952
2004	Philippines	218.729	1.153	0.5	7.4566373	2.717742	7188
2005	Philippines	217.618	1.09975	0.5	8.85415	2.689394	7398
2006	Philippines	216.507	1.0465	0.5	8.7195	2.723881	7677
2007	Philippines	215.396	0.99325	0.5	8.20543	2.578947	7958
2008	Philippines	213.102	0.94	0.5	7.36702	2.548148	8163
2009	Philippines	210.808	1.2	0.5	8.74272	2.518248	8024
2010	Philippines	208.515	1.2	0.75	9.30692	2.503597	8401
2011	Philippines	206.2208	1.2	1	10.209759	2.475177	8457
2012	Philippines	203.927	1.2	1	10.2995	2.461538	8667
1995	Malaysia	147.2651	0.478	2.03	4.8559782	0.563452	18473
1996	Malaysia	144.2651	0.496	2.01	4.855978	0.546798	18496
1997	Malaysia	144.7033	0.658	1.96799999	4.7006025	0.506849	19457
1998	Malaysia	142.1415	0.6705	1.926	4.73869	0.513889	17960
1999	Malaysia	139.807	0.683	1.884	4.94532	0.506667	18549
2000	Malaysia	137.473	0.701	1.842	5.25378	0.508929	19253
2001	Malaysia	135.139	0.706	1.8	5.3697222	0.513393	19171
2002	Malaysia	132.8043	0.71	1.8	5.2029	0.549763	19811
2003	Malaysia	130.47	0.7485	1.8	5.92483	0.534247	20263
2004	Malaysia	129.687	0.787	1.8	6.3651722	0.545872	21400
2005	Malaysia	128.122	0.8255	1.8	5.3225	0.54955	22394
2006	Malaysia	127.339	0.864	1.9	5.87803	0.573991	23118
2007	Malaysia	126.557	0.9025	1.76	5.64193	0.666667	23962
2008	Malaysia	124.247	0.941	1.71	5.15273	0.62201	24826
2009	Malaysia	121.937	1.0695	1.8	5.89012	0.62201	23920
2010	Malaysia	119.627	1.198	1.8	6.7473	0.603687	23728
2011	Malaysia	117.3177	1.2	1.79	6.358865	0.615561	24226
2012	Malaysia	115.008	1.2	1.9	5.70728	0.627273	24857

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

1995	Singapore	89.4012	1.275358	2.97857852	9.292819	1.2	38368
1996	Singapore	86.4023	1.269785	2.90625766	7.862365	0.923077	35563
1997	Singapore	83.4025	1.293994	2.97049526	9.597883	0.846154	36741
1998	Singapore	81.3234	1.310858	2.90003056	9.90314	0.916667	34966
1999	Singapore	79.2443	1.347665	2.96612524	9.38852	1	37212
2000	Singapore	77.1652	1.384592	2.9434693	7.08328	0.933333	41245
2001	Singapore	75.0861	1.431126	2.88448526	4.6521094	0.933333	37667
2002	Singapore	73.007	1.443726	2.81441571	6.41483	0.8125	40028
2003	Singapore	71.2018	1.529114	2.8803344	9.05767	0.8125	42148
2004	Singapore	69.3966	1.576991	2.87609007	7.4379028	0.8125	45392
2005	Singapore	67.5914	1.581884	2.77743917	7.88854	0.8125	48122
2006	Singapore	65.7862	1.574726	2.61893943	7.86132	0.875	47345
2007	Singapore	63.981	1.609205	2.51645382	7.85737	0.875	49069
2008	Singapore	62.719	1.620242	2.39285862	8.57194	0.933333	45955
2009	Singapore	61.457	1.668738	2.31855	10.1987	0.933333	44756
2010	Singapore	60.195	1.778715	2.24968976	9.75112	1	48981
2011	Singapore	58.933	1.860833	2.19804387	10.015557	1	49704
2012	Singapore	57.671	1.736503	2.23119494	11.0989	0.9375	49719
1995	Thailand	194.4063	0.238	1.99	10.771081	2.327731	12549
1996	Thailand	197.6769	0.269	2.04250002	11.2965	2.344056	13221
1997	Thailand	200.9475	0.272	2.09500003	10.885866	2.360335	12814
1998	Thailand	199.763	0.291	2.1475	9.15776	2.322404	12000
1999	Thailand	198.578	0.291	2.2	7.77372	2.286096	12312
2000	Thailand	197.393	0.285	2.2	11.0038	2.482066	12608
2001	Thailand	196.2075	0.294	2.2	10.418443	2.708978	12707
2002	Thailand	195.23	0.271	2.2	9.76903	2.749216	13104
2003	Thailand	189.8	0.277	2.1875	12.9832	2.646617	13724
2004	Thailand	184.5781	0.298	2.175	12.370784	2.560694	14215
2005	Thailand	179.356	0.293	2.1625	12.3596	2.590116	14591
2006	Thailand	174.134	0.313	2.15	13.7381	2.590116	15122
2007	Thailand	168.912	0.334	2.1375	14.4675	2.610465	15690
2008	Thailand	167.036	0.316	2.125	15.8206	2.717718	15611
2009	Thailand	165.16	0.3545	2.1125	14.6957	2.798137	15157
2010	Thailand	163.284	0.393	2.1	13.9333	2.81677	16152
2011	Thailand	161.4083	0.393	2.1	15.345994	2.699405	15988
2012	Thailand	159.533	0.4	2.1	16.74	2.677419	16764
1995	Indonesia	207.8754	0.160333	0.64507499	4.7543107	1.583587	8205
1996	Indonesia	203.5352	0.160667	0.63380624	4.707567	1.561194	8270
1997	Indonesia	199.195	0.161	0.62535468	3.8870012	1.487179	8688
1998	Indonesia	195.281	0.161333	0.64923645	3.92654	1.446281	7353
1999	Indonesia	191.368	0.161667	0.67311823	3.74362	1.144788	7315

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

2000	Indonesia	187.454	0.162	0.697	4.46984	1.081818	7588
2001	Indonesia	183.5406	0.151333	0.6122	4.6463429	1.031034	7780
2002	Indonesia	179.627	0.144222	0.6171	4.73399	1.008264	8056
2003	Indonesia	176.103	0.13	0.6117	5.43017	1	8335
2004	Indonesia	172.5782	0.13	0.6092	5.0243968	1.006441	8670
2005	Indonesia	169.054	0.13	0.6249	4.37243	1.025559	9142
2006	Indonesia	165.529	0.13	0.6227	5.5678	1.025078	9491
2007	Indonesia	162.005	0.288	0.6325	5.81394	1.023006	9642
2008	Indonesia	159.309	0.288	0.6544	5.04943	1.037147	9960
2009	Indonesia	156.614	0.288	0.7074	6.09762	0.983073	10186
2010	Indonesia	153.918	0.288	0.6997	6.80411	0.947494	10474
2011	Indonesia	151.2222	0.246	0.71	6.2225321	0.826804	11002
2012	Indonesia	148.527	0.204	0.95	6.63034	0.641732	11461

Table 1.1 Random Effects

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	33563.01	1425.087	23.55155	0.0000
MORT	-168.9906	6.236721	-27.09607	0.0000
BED	3003.711	395.9736	7.585635	0.0000
PHY	6765.162	423.0391	15.99181	0.0000
GOV	199.0744	74.34132	2.677843	0.0089

Weighted Statistics

R-squared	0.962238	Mean dependent var	18937.57
Adjusted R-squared	0.960461	S.D. dependent var	13314.05
S.E. of regression	2647.423	Sum squared resid	5.96E+08
F-statistic	541.4847	Durbin-Watson stat	0.256644
Prob(F-statistic)	0.000000		

Table 1.2 Fixed Effects

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	34884.32	5301.194	6.580465	0.0000

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

MORT	-107.8053	25.15663	-4.285364	0.0001
BED	-3960.884	1106.399	-3.579977	0.0006
PHY	6099.509	1577.990	3.865366	0.0002
GOV	-162.9669	178.5350	-0.912801	0.3641
RATIO	2441.918	1333.255	1.831546	0.0707

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.986137	Mean dependent var	18937.57
Adjusted R-squared	0.984578	S.D. dependent var	13314.05
S.E. of regression	1653.427	Akaike info criterion	17.76353
Sum squared resid	2.19E+08	Schwarz criterion	18.04128
Log likelihood	-789.3587	Hannan-Quinn criter.	17.87553
F-statistic	632.3174	Durbin-Watson stat	0.791316
Prob(F-statistic)	0.000000		

Table 1.3 Pooled OLS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50613.33	3750.212	13.49613	0.0000
MORT	-267.1372	20.31038	-13.15274	0.0000
BED	2208.115	563.6536	3.917504	0.0002
PHY	3603.795	830.1424	4.341177	0.0000
GOV	-702.0903	197.5132	-3.554650	0.0006
RATIO	5837.180	1095.401	5.328807	0.0000

R-squared	0.971778	Mean dependent var	18937.57
Adjusted R-squared	0.970098	S.D. dependent var	13314.05
S.E. of regression	2302.274	Akaike info criterion	18.38552
Sum squared resid	4.45E+08	Schwarz criterion	18.55218
Log likelihood	-821.3485	Hannan-Quinn criter.	18.45273
F-statistic	578.4869	Durbin-Watson stat	0.420529
Prob(F-statistic)	0.000000		

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Table 1.4 Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	130.763539	4	0.0000

Table 1.5 Fixed Effects Autoregressive Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	33686.29	10512.38	3.204440	0.0020
MORT	-127.6050	62.38920	-2.045306	0.0444
BED	842.9626	1758.645	0.479325	0.6331
PHY	1545.347	1730.119	0.893202	0.3746
GOV	35.44216	140.5706	0.252131	0.8016
RATIO	1611.736	2047.467	0.787185	0.4337
AR(1)	0.843445	0.070809	11.91162	0.0000

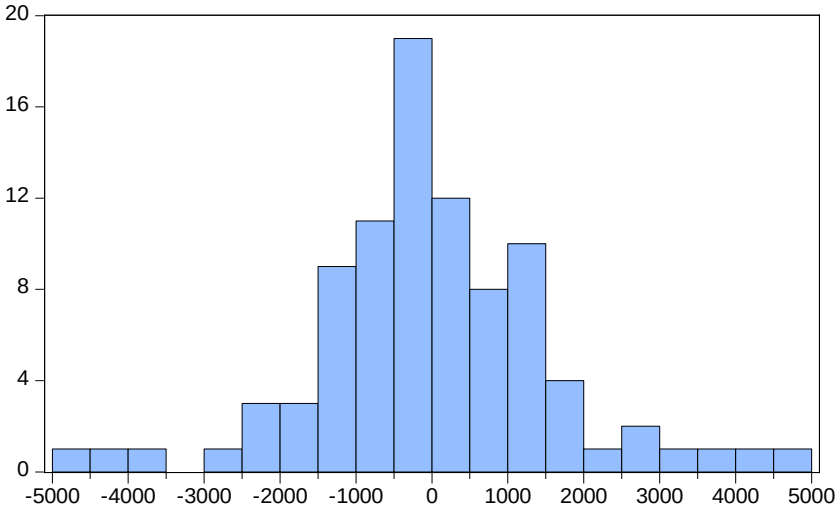
Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.992849	Mean dependent var	19065.71
Adjusted R-squared	0.991882	S.D. dependent var	13398.25
S.E. of regression	1207.160	Akaike info criterion	17.15017
Sum squared resid	1.08E+08	Schwarz criterion	17.46627
Log likelihood	-717.8820	Hannan-Quinn criter.	17.27731
F-statistic	1027.376	Durbin-Watson stat	2.189494
Prob(F-statistic)	0.000000		

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Figure 2.0 Normality Test



Series: Standardized Residuals
Sample 1995 2012
Observations 90

Mean	-1.36e-13
Median	-109.5851
Maximum	4875.156
Minimum	-4587.818
Std. Dev.	1567.599
Skewness	0.129186
Kurtosis	4.549656
Jarque-Bera	9.255718
Probability	0.009776

Table 2.1 Philippines

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15751.49	1595.435	9.872846	0.0000
BED	-448.6878	243.0941	-1.845737	0.0878
PHY	-182.8256	276.0531	-0.662284	0.5194
GOV	261.5679	62.56640	4.180644	0.0011
RATIO	-3722.360	476.3427	-7.814456	0.0000

R-squared	0.958490	Mean dependent var	7310.500
Adjusted R-squared	0.945718	S.D. dependent var	802.2139
S.E. of regression	186.9042	Akaike info criterion	13.52920
Sum squared resid	454131.2	Schwarz criterion	13.77653
Log likelihood	-116.7628	Hannan-Quinn criter.	13.56331
F-statistic	75.04452	Durbin-Watson stat	2.560317
Prob(F-statistic)	0.000000		

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Table 2.2 Malaysia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36447.74	9808.242	3.716032	0.0026
BED	-280.4758	2867.367	-0.097816	0.9236
GOV	-387.5971	500.9877	-0.773666	0.4530
RATIO	19749.59	5776.490	3.418960	0.0046
MORT	-179.9464	46.00363	-3.911570	0.0018

R-squared	0.930767	Mean dependent var	21325.78
Adjusted R-squared	0.909464	S.D. dependent var	2520.296
S.E. of regression	758.3349	Akaike info criterion	16.33026
Sum squared resid	7475933.	Schwarz criterion	16.57759
Log likelihood	-141.9723	Hannan-Quinn criter.	16.36436
F-statistic	43.69291	Durbin-Watson stat	1.854633
Prob(F-statistic)	0.000000		

Table 2.3 Singapore

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	74525.26	6873.626	10.84221	0.0000
MORT	-503.0478	63.97386	-7.863334	0.0000
GOV	-48.34844	411.8683	-0.117388	0.9082
RATIO	5125.652	6809.532	0.752717	0.4641

R-squared	0.832998	Mean dependent var	42943.39
Adjusted R-squared	0.797211	S.D. dependent var	5315.639
S.E. of regression	2393.742	Akaike info criterion	18.59223
Sum squared resid	80220030	Schwarz criterion	18.79009
Log likelihood	-163.3301	Hannan-Quinn criter.	18.61952
F-statistic	23.27703	Durbin-Watson stat	1.258560
Prob(F-statistic)	0.000011		

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Table 2.4 Thailand

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4478.139	4508.410	0.993286	0.3387
BED	-70.19031	2378.138	-0.029515	0.9769
PHY	10585.73	3651.141	2.899294	0.0124
GOV	402.2799	83.72520	4.804764	0.0003
RATIO	592.0001	1026.598	0.576662	0.5740

R-squared	0.931995	Mean dependent var	14129.39
Adjusted R-squared	0.911070	S.D. dependent var	1530.527
S.E. of regression	456.4210	Akaike info criterion	15.31484
Sum squared resid	2708162.	Schwarz criterion	15.56217
Log likelihood	-132.8336	Hannan-Quinn criter.	15.34894
F-statistic	44.54032	Durbin-Watson stat	2.060773
Prob(F-statistic)	0.000000		

Table 2.5 Indonesia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13986.23	2937.067	4.761972	0.0004
BED	4646.166	1595.468	2.912101	0.0121
MORT	-77.09313	16.19806	-4.759405	0.0004
GOV	315.3519	208.9684	1.509089	0.1552
RATIO	3478.075	954.4764	3.643961	0.0030

R-squared	0.914883	Mean dependent var	8978.778
Adjusted R-squared	0.888693	S.D. dependent var	1259.533
S.E. of regression	420.2152	Akaike info criterion	15.14954
Sum squared resid	2295551.	Schwarz criterion	15.39687
Log likelihood	-131.3459	Hannan-Quinn criter.	15.18365
F-statistic	34.93253	Durbin-Watson stat	2.174289
Prob(F-statistic)	0.000001		

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Appendix C

VIF – Philippines

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	28235376	14899.68	NA
MORT	1745.514	43992.64	49.98935
BED	59870.63	20.96220	2.022709
PHY	77529.40	46.93232	1.199002
GOV	8244.814	294.4252	4.900708
RATIO	3154470.	12131.94	36.39956

VIF – Malaysia

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.03E+08	5919.845	NA
BED	10028802	1005.881	2.159432
GOV	268978.7	239.9586	2.729615\\\\
RATIO	35791587	336.2048	2.449024
MORT	7472.880	3784.285	19.81140
PHY	8905623.	189.0747	12.30869

VIF – Singapore

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.48E+09	4908.928	NA
MORT	95422.29	1638.321	29.01563
BED	41821466	1014.250	11.03545

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

GOV	200212.5	50.09142	1.557760
RATIO	82266547	233.0426	2.338456
PHY	1.95E+08	1504.890	20.05675

VIF – Thailand

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	42383489	6206.879	NA
MORT	441.4868	2178.920	14.51218
BED	3420390.	2284.237	1.610150
PHY	15833423	227.8525	4.822186
GOV	8825.385	206.7909	7.475617
RATIO	669152.8	650.9020	2.864602

VIF – Indonesia

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	42383489	6206.879	NA
MORT	441.4868	2178.920	14.51218
BED	3420390.	2284.237	1.610150
PHY	15833423	227.8525	4.822186
GOV	8825.385	206.7909	7.475617
RATIO	669152.8	650.9020	2.864602

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Appendix D

Ramsey RESET Test - Philippines

	Value	df	Probability
t-statistic	0.578706	12	0.5735
F-statistic	0.334901	(1, 12)	0.5735
Likelihood ratio	0.495469	1	0.4815

Ramsey RESET Test- Malaysia

	Value	df	Probability
t-statistic	0.376740	12	0.7129
F-statistic	0.141933	(1, 12)	0.7129
Likelihood ratio	0.211650	1	0.6455

Ramsey RESET Test- Singapore

	Value	df	Probability
t-statistic	0.429881	13	0.6743
F-statistic	0.184798	(1, 13)	0.6743
Likelihood ratio	0.254072	1	0.6142

Ramsey RESET Test- Thailand

	Value	df	Probability
t-statistic	0.451644	12	0.6596
F-statistic	0.203982	(1, 12)	0.6596
Likelihood ratio	0.303402	1	0.5818

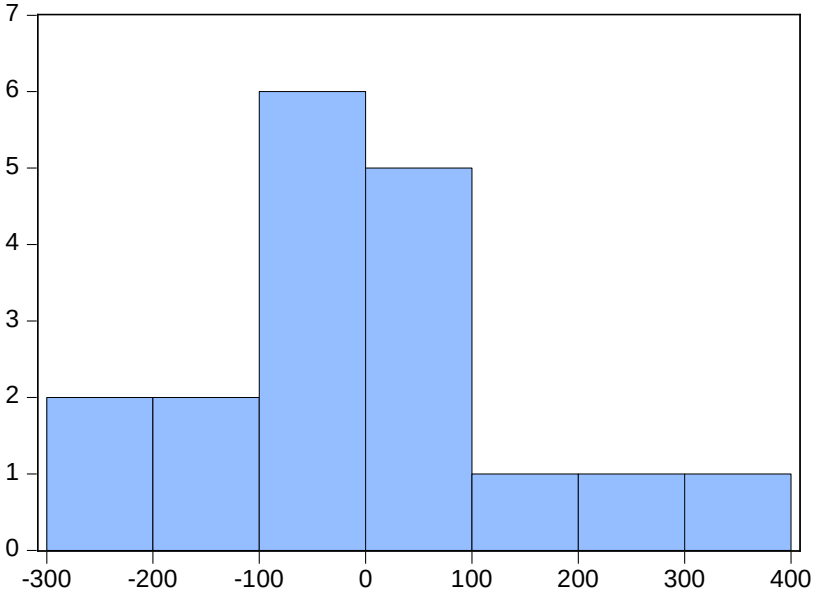
Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Ramsey RESET Test- Indonesia

	Value	df	Probability
t-statistic	0.004928	12	0.9961
F-statistic	2.43E-05	(1, 12)	0.9961
Likelihood ratio	3.64E-05	1	0.9952

Appendix E

Histogram-Normality Test – Philippines

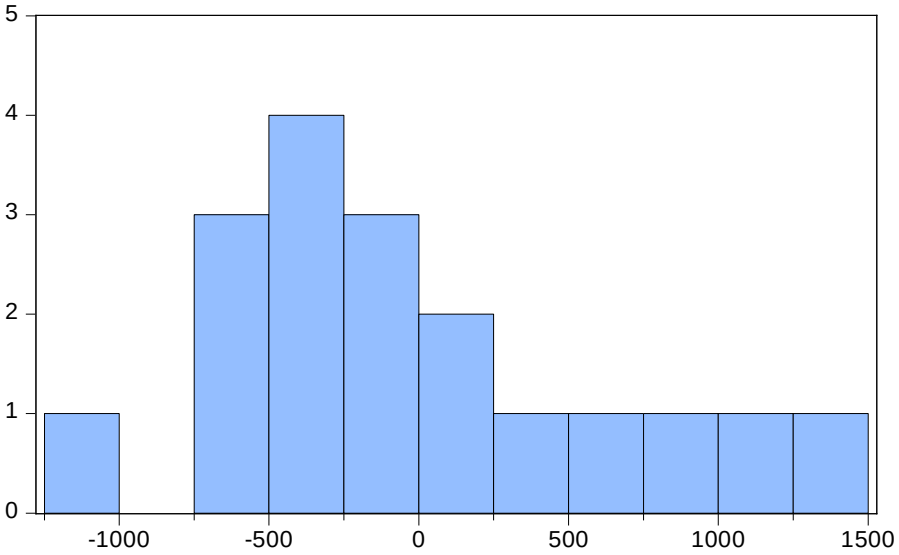


Series: Residuals
Sample 1995 2012
Observations 18

Mean	-3.33e-12
Median	-50.37432
Maximum	365.8618
Minimum	-233.1496
Std. Dev.	163.4430
Skewness	0.620888
Kurtosis	2.779335
Jarque-Bera	1.193025
Probability	0.550729

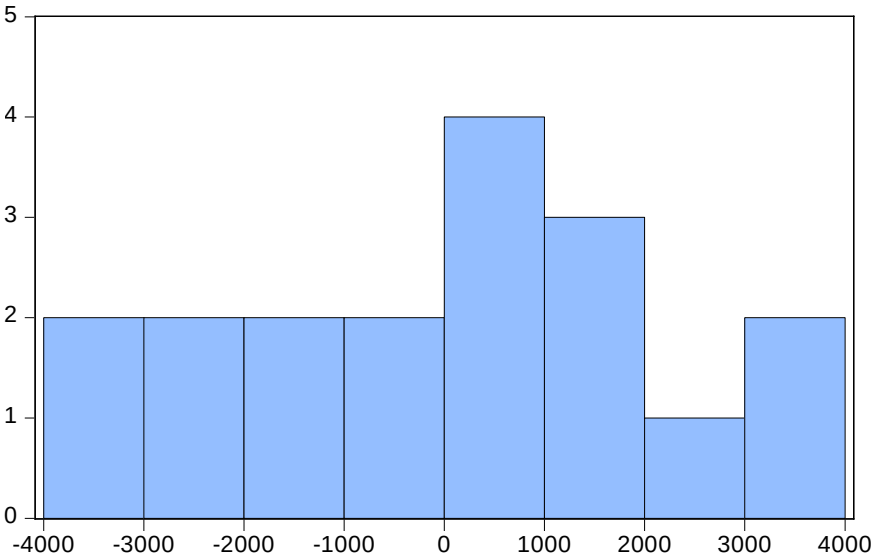
Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Histogram-Normality Test - Malaysia



Series: Residuals	
Sample 1995 2012	
Observations 18	
Mean	-8.29e-12
Median	-174.7687
Maximum	1411.955
Minimum	-1075.186
Std. Dev.	663.1446
Skewness	0.670050
Kurtosis	2.601018
Jarque-Bera	1.466289
Probability	0.480396

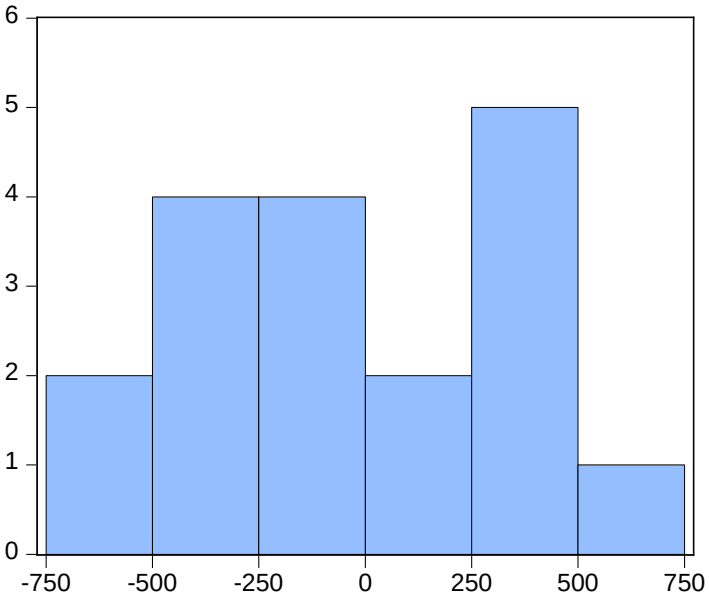
Histogram-Normality Test - Singapore



Series: Residuals	
Sample 1995 2012	
Observations 18	
Mean	-1.49e-11
Median	116.7447
Maximum	3815.251
Minimum	-3645.383
Std. Dev.	2172.286
Skewness	-0.005653
Kurtosis	2.108247
Jarque-Bera	0.596514
Probability	0.742111

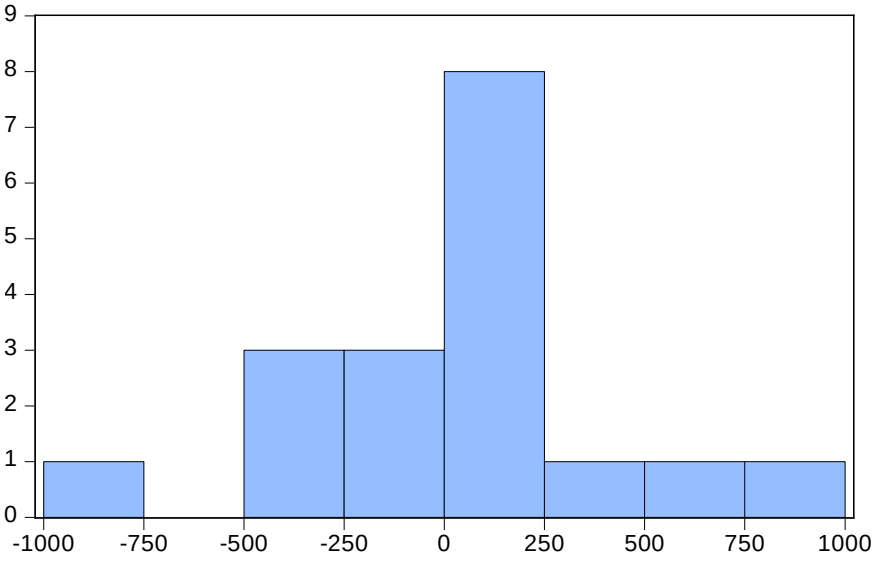
Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Histogram-Normality Test - Thailand



Series: Residuals	
Sample 1995 2012	
Observations 18	
Mean	-8.43e-13
Median	-28.07214
Maximum	657.6608
Minimum	-628.6444
Std. Dev.	399.1286
Skewness	-0.020560
Kurtosis	1.705938
Jarque-Bera	1.257215
Probability	0.533334

Histogram-Normality Test - Indonesia



Series: Residuals	
Sample 1995 2012	
Observations 18	
Mean	-1.69e-12
Median	49.39761
Maximum	754.5398
Minimum	-863.3820
Std. Dev.	367.4675
Skewness	-0.174028
Kurtosis	3.517222
Jarque-Bera	0.291496
Probability	0.864375

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Appendix F

White Heteroskedasticity Test – Philippines

F-statistic	2.492241	Prob. F(14,3)	0.2457
Obs*R-squared	16.57487	Prob. Chi-Square(14)	0.2795
Scaled explained SS	7.691652	Prob. Chi-Square(14)	0.9048

White Heteroskedasticity Test – Malaysia

F-statistic	1.005576	Prob. F(14,3)	0.5760
Obs*R-squared	14.83805	Prob. Chi-Square(14)	0.3893
Scaled explained SS	6.195619	Prob. Chi-Square(14)	0.9613

White Heteroskedasticity Test- Singapore

F-statistic	1.176014	Prob. F(9,8)	0.4149
Obs*R-squared	10.25145	Prob. Chi-Square(9)	0.3305
Scaled explained SS	3.436394	Prob. Chi-Square(9)	0.9445

White Heteroskedasticity Test- Thailand

F-statistic	0.683973	Prob. F(14,3)	0.7325
Obs*R-squared	13.70598	Prob. Chi-Square(14)	0.4718
Scaled explained SS	2.523413	Prob. Chi-Square(14)	0.9997

White Heteroskedasticity Test- Indonesia

F-statistic	11.98452	Prob. F(14,3)	0.0320
Obs*R-squared	17.68381	Prob. Chi-Square(14)	0.2216
Scaled explained SS	11.60938	Prob. Chi-Square(14)	0.6376

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

ACKNOWLEDGEMENT

This paper would not have been possible without hands-on support by our Research adviser, Mr. Al Faithrich C. Navarrete. The researchers express deep gratitude to him for being able to accommodate us despite his workload in the University.

REFERENCES

[1] Acemoglu, D,& Johnson, S. (2007). Disease and Development: The Effect of Life Expectancy and Economic Growth. *Journal of Political Economy, 115.*

[2] Adesanya, T., et al. (2012). Exploring The Responsiveness of Public and Private Hospitals in Lagos, Nigeria. *Journal of Public Health Research, 1.*

[3] Andaleeb, S. (2000). Public and Private Hospitals in Bangladesh: Service Quality and Predictors of Hospital Choice. *Journal of Health Policy and Planning, 15, pp. 95-102.*

[4] Arora, S. (2001). Health, Human Productivity, and Long-Term Economic Growth. *The Journal of Economic History, 61, pp. 699-749.*

[5] Attar, A. A., Gupta, A. K. & Desai, D.B. (2013). A Study of Various Factor Affecting Labour Productivity and Methods to Improve It . *Journal of Mechanical and Civil Engineering.*

[6] Awofoso, et al. (2012). Exploring Indonesia's "Low Hospital Bed Utilization-Low Bed Occupancy-High Disease Burden" Paradox. *Journal of Hospital Administration, 2.*

[7] Babakus, E. & Mangold, W. (1992). Adapting the SERVQUAL Scale To Hospital Services: An Empirical Investigation. *Health Service Research, 26(6), pp.767-780*

[8] Babatunde, M.A. (2009). The Relationship of Health and Economic Growth in Nigeria. *Journal of African Economics.*

[9] Balan, C. et al. (2014). The Relationship between Life Expectancy at Birth and Health Expenditures Estimated by a Cross-Country and Time Series Analysis. *Procedia Economics and Finance, 15, pp. 108-114*

[10] Bhargava, A., et al. (2001). Modeling The Effects of Health on Economic Growth. *Journal of Health Economics, pp. 423-440.*

[11] Bloom, D., Canning, D. (2005). Health and Economic Growth: Reconciling The Macro and Micro Evidence. *Harvard Journal of Public Health.*

[12] Bonelli, R. (2002). Labor Productivity in Brazil During The 1990s. *IPEA*

[13] Bonu,S., Guitierrez, L., Borghis,A, Roche, F. (2009). Transformational trends confounding the South Asian Health Systems. *Journal of Health Policy, pp. 230-238.*

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

[14] Chansarn, S. (2011). Labor Productivity and Economic Prospects in an Aging Society: Empirical Evidence from Thailand and Singapore. *Journal of Demography, 27.*

[15] Chen. Y, et al. (2014). The Relationship Between Physician Case Volume and In-Hospital Mortality of Critically Ill Children with A Diagnosis of Pneumonia: A Cross Sectional Observational Analytical Study. *Journal of Critical Care.*

[16] Contoyannis, P. & Forster, M. (1999). Our Healthier Nation. *Health Economics Journal, 8, pp.269-289*

[17] David, G. & Chiang, A. (2009). The Determinants of Public Versus Provision of Emergency Medical Service. *International Journal of Industrial Organization, 27, 312-319.*

[18] Devaragan, S.; Swaroop, V. and Zou, H. (1996). "The Composition of Public Expenditure and Economic Growth", *Journal of Monetary Economics, 37: 313-344.*

[19] Dollard, M. and Neser, D. (2013) Worker health is good for the economy: Union density and psychosocial safety climate as determinants of country differences in worker health and productivity in 31 European countries. *Social Science & Medicine Journal, Vol. 92, pp. 114-123.*

[20] Eneji, M.A., Juliana, D.V.,Onabe,B.J. (2013). Health care expenditure, health status and national productivity in Nigeria. *Journal of Economics and International Finance, 5(7), pp. 258-272.*

[21] Guagliardo, M., et al. (2004). Physician Accessibility: An Urban Case Study of Pediatric Providers. *Journal of Health & Place, 10, pp. 273-283.*

[22] Guisan, C. & Arranz, M. (2003). Econometric Models of Private and Public Health Expenditure in OECD Countries, 1970-96. *Applied Econometrics and International Development. 3.*

[23] Irfan, S.M., & Ijaz, A. (2011). Compariso of Service Quality Between Public and Private Hospitals: Empirical Evidences from Pakistan. *Journal of Quality and Technology Management, 7, 1-22.*

[24] Jamison, D. & Verguet, S. (2013). Performance in the Rate of Decline of Adult Mortality in the OECD, 1970-2010. *Journal of Health Policy, pp. 137-142.*

[25] Kroneman, M. & Siegers, J. (2004). The Effect of Hospital Bed Reduction on the Use of Beds: A Comparative Study of 10 European Countries. *The Journal of Social Science & Medicine, 59, pp. 1731-1740.*

[26] Leonard, C., Stodeur, S. and Roberfroid, D. (2009). Association between Physician Density and Health Care Consumptions: A Systematic Review of the

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Evidence. *Health Policy Journal, pp. 121–134.*

[27] Lavado, R. & Lagrada, L. (2008). Are The Regional Variations in The Utilization of Maternal and Child Care Services Across Income Groups? *Philippines Journal of Development, 32.*

[28] Mitchell, R. J. & Bates, P. (2011). Measuring Health-Related Productivity Loss. *Population Health Management, 14.*

[29] Mohan, R., Mirmirani, S. (2010). An Assessment of OECD Health Care System Using Panel Data Analysis. *Southwest Business and Economics Journal.*

[30] Moscone, F., Baltagi, B. (2010). Health Care Expenditure and Income in the OECD reconsidered: Evidence from Panel Data. *Journal of Economic Modeling, pp.804-811*.

[31] Mushtaq, A., Mogsin, A., and Zaman, K. (2013) Effects of Health on Changing Labor Force Participation in Pakistan, *SpringerOpenJournal,Vol. 2, p. 610.*

[32] Nicolini, E. (2004). Mortality, Interest Rates, Investment and Agricultural Production in the 18th Century England. *Explorations in Economic History, 41, pp.130-155.*

[33] Nurudeen, A. & Usman, A. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Economics Journal.*

[34] Nurudeen, A. Usman A. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Ecnonomics Journal.*

[35] Pierard, E. (2014) The Effects of Physician Supply on Health Status: Canadian Evidence,\. *Health Policy Journal, Vol. 118, pp. 56-65.*

[36] Rechel, B. et al. (2009). The Impact of Health Facilities on Healthcare Workers' Well-being and Performance. *International Journal Nursing.*

[37] Reidpath, D.D. and Allotey P. (2002) Infant Mortality Rate as an Indicator of Population Health. *J Epidemiol Community Health Journal, Vol. 57, pp. 344–346.*

[38] Rivera, B. and Currais, L. (2004) Public Health Capital and Productivity in the Spanish Regions: A Dynamic Panel Data Model, *World Development Journal, Vol. 32, No. 5, pp. 871–885.*

[39] Rosenthal, S. (2004) Target Population and Physician Population: The Effects of Density and Change. *Soc., Sci.& Med. Journal, Vol.12, pp. 111-115.*

[40] Sharma, V. (2013). Measuring Service Quality in Private Hospitals in Indor City. *Global Journal of Management and Business Studies, 3, pp.917-922.*

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

[41] Simotwe, F., et al. (2011). The Impact of HIV/AIDS on Labor Markets, Productivity and Welfare in South Africa: A Critical Review and Analysis. *African Journal of Agricultural Research, 6, pp. 2118-2131.*

[42] Sobhani, A., Wahab, M.I.M. and Nuemann, W.P. (2014) Investigating Work Related Ill Health Effects in Optimizing the Performance of Manufacturing Systems. *European Journal of Operational Research, Vol. 241, pp. 708-718.*

[43] Umoru, D.& Yaqub, J.O. (2013). Labour Productivity and Health Capital in Nigeria: The Empirical Evidence. *International Journal of Humanities and Social Science, 3.*

[44] Vujicic, M., et al. (2011). Physician Shortages in Rural Vietnam: Using a Labor Market Approach to Inform Policy. *Journal of Social Science and Medicine, pp. 970-977.*World Health Organization (2014).

[45] Yousapronpaiboon, K., & Johnson, W. (2013). A Comparison of Service Quality between Public and Private Hospitals in Thailand. *International Journals of Business and Social Science, 4.*

[46] Yesilda, F. & Direktor, E. (2010). Health Service Quality: A Comparison of Public and Private Hospitals. *African Journal of Business Management, 4, pp. 962-971.*

[47] Zamil, A., & Areiquat, A. (2012). The Impact of Health Service Quality on Patient's Satisfaction Over Private and Public in Jordan: A Comparative Study. *International Journal of Marketing Studies. 4.*

Copyright © 2016 GMP Press and Printing (http://buscompress.com/journal-home.html)
ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)