

# Demographic Transition and saving behavior in developing countries

Sidra Haroon, Sarfraz Ahmad, Mubashir Ahmad, Hafiz Muhammad Zahid

## ABSTRACT

The objective of the research is to find out the "Demographic Transition and saving behavior in developing countries" In this research data is used from (1991-2017) and data is taken from WDI and various uses of the economic survey. In my study I use the variables gross saving is dependent variable and independent variables are Labor force participation (total rate) Life expectancy (at birth total years ) Population ages(15-64 of total ) School enrollment (secondary gross) Trade (%GDP) Population age (total) Secondary education (pupils) Fertility rate (women birth). In this research, the GMM Generalized Movement Method technique is used. When we applied GMM than this result show the demographic transition positively effect on gross saving and all others variables labor force participation, life expectancy (at birth total years), population age (15-64), trade, school enrolment, secondary education (vocational education), population age (total age) has positively effect on gross saving. If demographic transition (population age) increase one year than gross saving increase 12%.

**Keywords:** Demographic, Transition, Developing, saving behavior

## Introduction

Why can some countries be rich from poverty while other countries are always poor? The issue of sustained economic growth has always attracted people attention. Now from the classical economic theory to the new economic theory, the labor division, factor accumulation, human capital, and technological progress have always been the old and trendy topics in economics. The demographic factor played an important role in Adam Smith's labor division theory, Malthus' trap theory and Solow's steady-state growth theory. After the Second World War, the rejuvenation of the population became a trend in the world, especially the dependency ratio of the population rapidly decreased in East Asia, and sample labor supply and high savings rate significantly promoted an economic take-off in East Asia. .com Therefore, among a number of economic growth factors, the demographic factor has gotten increasing attention in macroeconomic studies in the last 20 years.

In some research projects, the changes in the demographic structure were taken as the factors directly affecting national savings and capital accumulation and thus exerting an impact on economic growth (Horioka, 1991; Li, 2010). Leff (1969) used cross-sectional data concerning 74 countries in 1964 to conduct research and found that the child dependency ratio, the old-age dependency ratio, and the total dependency ratio had significant effects on the national savings rate. Lindh and Malmberg's (1999) research on the OECD countries also arrived at the same conclusion. Mason (1997, 2003) believed that taking full advantage of the favorable opportunity from the transformation of the age structure of the population was one of the important causes of economic growth in East Asia, and the transformation of the generalized age structure of the population contributed. About 10% to economic growth in countries and territories such as Japan, Taiwan of China, South Korea and Thailand (Bloom and Williamson, 1997).

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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Cai and Zhao (2012) believed that the impact from the rejuvenation of the population on China's economic growth reached 7%.

In these research projects, the transformation of the generalized age structure of the population was considered as the factor which can increase national savings and labor input; in fact, these research projects are based on the framework of the neoclassical growth theory: except for the fact that technological progress is very rapid, the increase in per capita capital stock will meet with diminishing marginal return, and economic growth based on factor input is unsustainable. The additional labor from the rejuvenation of the population mitigates the diminishing of the marginal product of capital and continues the intensity of factor accumulation at a certain stage so that the economies with the rejuvenation of the population grow more rapidly on the same population scale. The Mechanism of Action of the Demographic Factor on Economic Growth. The impact of the transformation of the age structure of the population on economic growth is manifested in the following four aspects: First, a decrease in the dependency ratio of the population is beneficial to keeping a relatively high savings rate in the national economy and creating conditions for capital accumulation. Second, the sustained growth of the working-age population brings about ample labor supply and low-cost advantages. Third, the agricultural surplus labor accumulated during the period of the dual economic structure is continuously transferred so as to deliver labor relocation efficiency and become the source of total factor productivity. Fourth, there are other effects of the transformation of the age structure of the population; for example, young people become more creative, (Year) Mainland China Japan South Korea Taiwan of China Source: The data concerning the Chinese Mainland, Japan, and South Korea comes from the statistical bureaus of various countries and the World Bank's WDI database; the data concerning Taiwan of China comes from the Taiwan Statistical Data Book of the various years.

In order to understand the demographic factor in economic growth, the most important aspect lies in the role of the decreasing dependency ratio of the population in mitigating the decrease in the marginal product of capital. In the neoclassical growth theory, capital accumulation is much faster than an increase in labor, so labor is assumed to be scarce, and the increasing input of material capital will also meet with the diminishing returns so that the economic growth model based on the increasing input of the capital factor is unsustainable. Sustained economic growth comes from sources — contribution from increasing total factor productivity — other than visible factors (Solow, 1956). The dual economy provides at least two additional sources for economic growth, which can mitigate the diminishing of the marginal product of capital during a certain economic stage. They are economic growth coming from the relocation of labor resources and economic growth from the transformation of the age structure of the population. Both effects guarantee sufficient labor for capital and promote economic growth.

When the age structure of the population is at a stage of being very productive, a high savings rate and an ample labor supply maintain the input of investments and support labor in boosting sustained economic growth. East Asia's economy once presented a dual structural characteristic — unlimited labor supply, avoiding the diminishing of capital returns in a very long time, thus creating the conditions for the emergence of the East Asian Miracle. The period before the decline in the dependency ratio of the population came to an end was the golden era of economic growth.

However, with population aging, the contribution from the demographic transformation to economic growth changes from a positive one to a negative one. New labor decreases and the capital-labor ratio increases, so the marginal product of capital will inevitably decline more easily. A country has to allocate more national income to consumption and cultivation instead of savings and investments. The same is true on the Chinese Mainland, where marketization is the prerequisite for converting the rejuvenation of the population into economic growth. On the Chinese Mainland, capital productivity steadily improved beginning in 1978 and peaked in the mid- the 1990s.

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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The dual economic structure hindered the factor flow, so the role of the demographic factor was limited in the 1990s. As farmers migrated from rural areas to urban areas, the demographic factor once again played a role, bringing the agricultural migrant population to capital in urban areas, thus injecting a new impetus into economic growth. With the completion of the transfer of the surplus rural labor and the rapid capital accumulation, capital productivity declined. Overall, capital productivity was kept at a relatively high level amidst a decrease in the dependency ratio of the population, which embodied the role of a decrease in the dependency ratio of the population in overcoming the diminishing of the marginal product of capital. After the dependency ratio of the population began to rise in 2010, like other countries and territories, the Chinese Mainland entered a period during which the dependency ratio of the population was inversely related to capital productivity — a period of demographic debt. Second, the relationship between the employee wage level and the dependency ratio of the population. An increase in the dependency ratio of the population will produce a decrease in the proportion of the working-age population, it will reduce the labor supply and promote old-age care and child-rearing consumption in households, thus exerting pressure on increasing wages in the whole society. At the macro level, wage increase means a decrease in the accumulation rate of the national economy and an increase in the consumption rate.

## LITERATURE REVIEW

Gazi, Khorshed Alam & Jeff Gow (2016) investigated that Population Age Structure and Savings Rate Impacts on Economic Growth: Evidence from Australia. The main Objective of this study to analysis saving rate is expected to be positively related to GDP per capita. This paper examines the relationship between the dependency ratio, savings rate and real GDP for Australia for the period 1971–2014. Population age and the saving rate was an independent variable while economic growth used as dependent variable. Econometric techniques – dynamic ordinary least squares (DOLS), fully modified ordinary least squares (FMOLS) and the vector error correction model (VECM) – are applied to estimate the relationship. The conclusion of this study was that policy measures must be put in place to ensure that the economy grows at a faster rate than the population. This will ensure that the increasing demand for services arising from population growth was met. Having a larger, healthier and better-educated workforce will only bear economic fruit if the extra workers can find jobs.

Zhao Wen, ZHU Xuyang (2016) analyzed that The Impact of the Transformation of Age Structure on Economic Growth. This paper describes the mechanism of action of the transformation of the age structure of the population on economic growth. Growth was dependent variable and capital, population, labor market, education and transformation of age was independent variable it also analyzed the sources of economic growth in 12 economies under observation in this paper and focuses on the impact of the transformation of the age structure of the population on economic growth. There are other effects of the transformation of the age structure of the population Source: The data concerning the Chinese Mainland, Japan, and South Korea comes from the statistical bureaus of various countries and the World Bank's WDI database; the data concerning Taiwan of China comes from the Taiwan Statistical Data Book of the various years. Data was collected from 1960 to 2012. The conclusion of this study was that a decrease in the dependency ratio of the population is beneficial to keeping a relatively high savings rate in the national economy and creating conditions for capital accumulation. The sustained growth of the working-age population brings about ample labor supply and low-cost advantages.

Anjum Siddiqui & Atiq Ur Rahman (2016) investigated that the human capital and economic growth nexus: in East and South Asia. This study adopts a disaggregated regional focus to test for the human capital (HC)-growth nexus various measures. The dependent variable  $y$  is the level of output or real GDP and the independent variables are physical capital  $\delta PCP$  and human capital (HC). The data for real GDP, gross capital formation and education

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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expenditures are retrieved from the World Development Indicators, and enrolment data for various levels of education is obtained from the World Bank Education Statistics database estimated for all 5 proxies of HC by using annual data for the period 1972–2014. Using the EB methodology, they found an unambiguous and statistically significant effect of HC on economic growth in South and East Asia.

It was also found that vocational education showed up as a clear determinant of growth regressions in both South and East Asia showing the importance of skills training outside the traditional schooling system. Also, government education expenditure had a positive effect on economic growth in both regions of Asia. These findings demonstrate that the public sector can play a positive role in HC development in Asia.

David E. Bloom and Jeffrey G. Williamson (1998) analyzed that Demographic Transitions and economics miracle in emerging Asia. This study had two main objectives. The first was to estimate an empirical model that isolate the impact of demographic variables on economic growth. The second is to use these results to infer how much of the East Asian miracle can be explained by the region's spectacular demographic transition. These variables used in this study Growth rate of economically active population, the Growth rate of the population under age 15, Growth rate of population over age 64, Growth rate of the dependent population. Data was collected World Bank from 1967-2010 and different time period. The major finding was that population dynamics account for a substantial share of East Asia's economic miracle. Population dynamics account for somewhere between 1.4 and 1.9 percentage points of East Asia's annual growth.

David E. Bloom, Salal Humair, Larry Rosenberg J.P., Sevilla James Trussell (2013).investigated that A Demographic Dividend for Sub-Saharan Africa: Source, Magnitude, and Realization. However, for a long time, researchers found no measurable relationship between the rate of population growth and economic advancement. If the fertility rate were lower by just half a child, the age distribution of Sub-Saharan Africa would shift. At present, the ratio of those between ages 15 and 64 (what demographers typically consider the "working-age population") and the nonworking-Age population is 1.17 – the lowest of any region in the world. In the medium-fertility scenario, the demographic dividend is the economic growth potential that is created by favorable shifts in the age distribution of the population. The present results for three Sub-Saharan countries (Kenya, Nigeria, and Senegal) for multiple scenarios, where unmet need for contraceptives is met with different degrees of success. The data sources for these countries are United Nations World Population Projections (WPP2010) (United Nations (2011) and Demographic and Health Surveys (DHS), supplemented with data from other sources (Stover, Heaton and Ross 2006; Trussell 2011). For DHS data, finally, we should note that our emphasis on the potential of fertility decline to spur economic growth is offered in the spirit of preventing future problems. Fertility decline certainly does not guarantee future economic growth. But it does pave the way for lessening the many problems that are exacerbated by having a large and rapidly growing population.

David E. Bloom, David Canning, Günther Fink, Jocelyn E. Finlay (2012) investigated that Microeconomic Foundations of the Demographic Dividend. The objective of this study to find the demographic transitions increase or decrease inequality within societies. They investigated whether the change in dependency ratio observed during the various stages of the demographic transition is larger in richer than among poorer households. We combine all currently available data from the Demographic and Health Surveys (DHS) into a large micro-database over the period 1990-2008. Techniques which is used was Regression or stratified regression analysis used in this study. Assets holdings by permanent income quintiles Youth dependency by region and permanent income Number of dependent children by region and permanent income. Variables which was used in this study that were income and dependency ratios can be found at the micro level. Independent of the country and region, high SES households are characterized by

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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lower youth dependency ratios and a lower absolute number of dependent children than low SES households. And our finding of this study was that there were long-term implications of these shifts in human capital investment for differences in human capital and life-time across SES groups appear ambiguous from a theoretical perspective, and will depend both on the elasticity of human capital investment with respect to family size and the relative returns to education.

## OBJECTIVE

- The main objective of this research to find out the "impact of Demographic Transition on Gross Saving in developing countries".com
- To find out the labor force participation effect on gross saving

## DATA AND METHODOLOGY

Data has been having been taken from World Development Indicators for years 1991-2017. The study is based on panel data collected for 34 developing countries. The selected variables that may determine the relationships between demographic transition and saving behavior in developing countries are as follows:

Savings (% of GDP)

Labor force participation (total rate)

Life expectancy (at birth total years)

Population ages (15-64 of total)

School enrollment (secondary gross)

Trade (%GDP)

Population age (total)

Secondary education (pupils)

Fertility rate (women birth)

Generalized Method of Moments (GMM)

Generalized method of moments (GMM) is a general estimation principle. Estimators are derived from so-called moment conditions. Three main motivations:

- (1) Many estimators can be seen as special cases of GMM. A unifying framework for comparison.
- (2) Maximum likelihood estimators have the smallest variance in the class of consistent and asymptotically normal estimators.

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
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- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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(3) GMM estimation is often possible where a likelihood analysis is extremely difficult. We only need a partial specification of the model. Indigeneity exists in data so to remove indigeneity GMM technique used .indignity means that when dependent, independent and error term are correlated to each other.

The Equation

The economics model as follows:

Saving = f (labor force participation, life expectancy, population age, trade, school enrollment, population age, secondary education)

Econometric model

**SAVING =  $\beta_0 + \beta_1$  (LABR PARTI) +  $\beta_2$  (LIFE EXP) +  $\beta_3$  (POP AGE) +  $\beta_4$  (TRA)**

**$\beta_5$  (SCHL ENROL) +  $\beta_6$  (POP AGE TOTAL) +  $\beta_7$  (SEC EDU) +  $\beta_8$  (FER RATE) +  $\mu_i$**

SAV=Savings (% of GDP)

LABR PART=Labor force participation (total rate)

LIFE EXP=Life expectancy (at birth total years)

POP AGE=Population ages (15-64 of total)

SCHL ENRO=School enrollment (secondary gross)

TRA=Trade (%GDP)

POP AGE=population age (total)

SEC EDU=Secondary education (pupils)

FER RATE=Fertility rate (women birth)

$\mu_i$  = Random error term independently distributed with zero mean and constant variance.

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$

The direction and strength of saving and explanatory variables are determined significant results

These are regression coefficients to be estimated using a linear regression model.  $\mu$  is a random error independently distributed with zero mean and constant variance. After estimating the regression equation using GMM to determine the relationship between demographic transitions and saving behavior in developing countries.

These variables are a significant and positive relationship with each other. Saving and growth are a positive and significant relationship. Dependency had a positive and significant relationship with saving. Longevity among the

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.  
E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.  
E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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elderly should have an immediate negative effect on economic growth because this implies a greater number of elderly to support. The rise in fertility should have an immediate negative effect on economic growth, given the presence of more mouths to feed, and so should population growth stemming from a fall in infant mortality. The growth rate of GDP per capita has used a proxy for economic growth and gross capital formation is used as a proxy for physical capital stock.

## RESULTS AND DISCUSSION

In this section, empirical investigation is undertaken regarding the impact of selected variables on demographic transition and saving behavior in developing economies (1991-2017) using GMM estimator to determine the relationship between dependent and independent variables.

**Table of Result:**

Dependent Variable	Independent Variable	Coefficient	Z STAT	Probability
	<b>constant</b>	-6.49e		0.00
<b>Saving</b>	<b>Labor force</b>		16.73	0.00
	<b>Life Expectancy</b>		1.86	0.06
	<b>Population Age 15-64</b>		12.20	0.00
	<b>Trade</b>		16.48	0.00
	<b>School Enroll</b>		7.45	0.00
	<b>Secondary Education</b>		8.12	0.00

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
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	<b>Population Age Total</b>		17.99	
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SAVING = -6.49 + 16.73(LABR FORC) + 1.86(LIFE EXP) + 12.20(POP AGE) + 16.48(TRA) + 7.45(SCH ENRO) + 8.12(SEC EDU) + 17.99(POP AGE TOT) +  $\mu_i$

### Demographic transition & saving

The dependent variable that is saving is regressed on seven explanatory variables which are labor force participation, life expectancy, population age, trade, school enrollment, population age total and secondary education following results are obtained. Regression results are shown in tabulation form.

#### Labor force

Saving has positive impact on labor force participation .if 1% increase in labor force participation then saving has increased in 16% because labor force participation increase people move for better resources better facilities moved rural to urban, then increase in employment, resources generate, income level increase which will increase the saving. Labor force participation measured in term of the total.

#### Life expectancy

Life expectancy has positive on saving. Life expectancy measured (birth total years). If the 1year increase in expected life, saving has increased by 2% because people save money for future spending.

#### Trade

Trade has a positive impact on saving.it measured by % of GDP. When the economy produces surplus production then exchange commodities with other countries. GDP will be automatically increased. Theory tells us that If a 1% increase in trade 16.48 increase in saving.

#### Population age

Population age between 15-64 has a positive impact on saving .above the age of 64 and below the age of 15 then person depend on other but between the age of 15-64 saving will increase because he earns well one year increase in population age like as 16 then saving will increase after time spend.

#### School enrollment

School enrollment measured in gross enrollment .school enrollment increase then saving will increase. People qualified and take a rational decision. Employment level will increase which will increase in saving and our results tell us that a 1% increase in school enrollment then it will lead to an increase in saving 7%.

#### Secondary education

Secondary education measured in the vocational pupil. Vocational education increase that's mean skills increase and employment will increase finally saving increase.

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan [E-mail: siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- [E-mail: Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- [E-mail: Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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## Conclusion

As indicated, the increase in the dependency ratio of the population is often accompanied by a decrease in capital productivity, while a decrease in the dependency ratio of the population is often accompanied by a relatively stable, Capital accumulation and technological progress are the main sources of economic growth both in the past and in the future. The age structure of the population is a long-term variable that is difficult to change artificially. Decrease the dependency ratio of the population is beneficial to keeping a relatively high savings rate in the national economy and creating conditions for capital accumulation. The sustained growth of the working-age population brings about ample labor supply and low-cost advantages. The agricultural surplus labor accumulated during the period of the dual economic structure was continuously transferring so as to deliver labor relocation efficiency. Also, government education expenditure had a positive effect on economic growth in both regions of Asia. These findings demonstrate that the public sector can play a positive role in HC development in Asia. The study finds that primary and secondary education was more prominent in explaining the fluctuations of economic growth in East Asia, whereas tertiary and vocational education showed positive effects on economic growth in South Asia. Government expenditures on education were also found to positively affect economic growth in both regions. The results shed new evidence to establish that the differences in growth rates within East and South Asia are associated with differences in educational progression in the regions. Others have argued that large populations are important for countries striving to gain a place on the world stage and for economic advancement in general. However, for a long time, researchers found no measurable relationship between the rate of population growth and economic advancement. That understanding changed in the last two decades. If the fertility rate were lower by just half a child, the age distribution of Sub-Saharan Africa would shift. At present, the ratio of those between ages 15 and 64 (what demographers typically consider the "working-age population") 1 and the nonworking- age population is 1.17 – the lowest of any region in the world. In the medium-fertility scenario, this ratio is projected to rise to 1.59 in 2050; the corresponding figure in the low-fertility scenario is 1.80. The demographic dividend is the economic growth potential that is created by favorable shifts in the age distribution of the population. Finally, we should note that our emphasis on the potential of fertility decline to spur economic growth is offered in the spirit of preventing future problems. Fertility decline certainly does not guarantee future economic growth. But it does pave the way for lessening the many problems that are exacerbated by having a large and rapidly growing population. In mortality during the demographic transition is associated with lower dependency ratios, higher human (and physical) capital investment as well as higher female labor force participation.

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- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.
- E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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IJSER

- Sidra Haroon is currently pursuing MPhil economics IUB Bahawalpur, Pakistan E-mail: [siddra0786@gmail.com](mailto:siddra0786@gmail.com)
- Sarfraz Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.  
E-mail: [Sarfraz.ahmad7243@gmail.com](mailto:Sarfraz.ahmad7243@gmail.com)
- Mubashir Ahmad Pursuing M Phil in Pakistan institute of development economics (PIDE) Islamabad.  
E-mail: [Mubashirahmad\\_17@pide.edu.pk](mailto:Mubashirahmad_17@pide.edu.pk)
- Hafiz Muhammad Zahid Pursuing M Phil in National University of Modern Languages (NUML) Islamabad. E-mail: [zahdkhan73@gmail.com](mailto:zahdkhan73@gmail.com)

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