Domestic Investment, Capital Formation and Population Growth in Nigeria

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Abstract
Capital formation issues had hardly received attention of the Nigerian academic until recently, though it is a measure of capital accumulation that impacts the productive capacity of the economy. Population growth in the face of dwindling and inadequate real investment in assets and capital formation for the country can lead to increase in poverty. This paper shows that the rate of investment does not assist the rate of growth of per capital GDP in Nigeria. Secondary data employed are from the Central Bank of Nigerian, for capacity utilisation, capital expenditure bank credit and capital formation while growth and investment rates are from World Economic Information database. It is also observed that investment rates of the country have fluctuated wildly. Investment has not translated into capital formation and has not aided growth in Nigeria. The paper tests on the curve estimation regression models confirm that growth is in existence but is found to be insignificant. The linear result indicates the importance of government expenditure, capacity utilisation and bank credit in increasing the income of Nigerians.   The results also show that there is negative relationship between growth rates of the population and capital formation. With the curve estimation method results, investment rate can engender growth in the economy though slowly, on a linear path. It makes useful recommendations on how to increase and sustain capital formation to increase income and to avoid further poverty in the country.
Keywords: Per capital GDP, investment, Capital expenditure, Bank credit, **JEL**: E22, J11, H54.

1.0 Introduction

Real investment in the economy is an acceptable way of increasing capital formation in the economy has been known to increase productivity and output generally.   Investment of this type can be undertaken by the public or private sectors, with the government being involved mainly with autonomous investments which act as the main drivers of other investment in the economy.   Autonomous investment had dwindled drastically while the expenditure being made by the public sector are not delivering value where rightly conceived. A simple analysis of the of the of capital formation statistics from the Central Bank of Nigerian shows that the nominal investment in capital formation is going down and has fallen in real terms. Investment could be social or soft in outlook (housing, health and education), while others are infrastructural or hard (transport, power and water), and yet others are purely economic, which the private sector undertakes for private capital accumulation. While financial investment is an avenue to increase wealth, real investment should be more emphasised to increase productivity and growth in the economy.

The importance of investment has been realised by successive administrations long time ago. Rather than to take concrete steps to implement policies formulated and establish a culture of continuous domestic investments, the government is gradually transferring this functions by encouraging a hybrid way of investment with the use of Private Public Partnership (PPP) in the country.   Savings in the economy has increased in real terms but this has not translated to investments (Uchendu 1993). In the meanwhile, population growth and general increases in number of persons in the community and country necessarily bring responsibilities to the family, society and the government. Though, it is the primary source of labour, the most important factor of production, it has long been realised that diminishing returns can set against the economic elements by relying on its use alone. As a result of this realisation, families in most countries of the world have their population being on downward trend in recent years. While Nigeria population growth has averaged 2.5% in the past ten years, there has been a general increase in the transfer of responsibilities the government had initially assumed to the family units and immediate society or environment. Though, this is expected to rise overtime, the only immediate way to stop this

mismatch of available resources and consumers continues. The implication of this scenario on poverty reduction and eradication strategies of the government is glaring and obvious failure.

In the light of the above the objectives of this paper are to investigate and the relationship between investment and capital formation on one hand and their relationship with the welfare of the population growth indices to measure the actual growth of the country. To achieve these objectives, the paper is organised as follow: following after this introduction is the current literature on capital formation, investment and growth of the population. The section also examines the theories underlying significance of the main vectors of growth in any economy. Next after are methodology adopted and discussions of results. Section five summarises, recommends and concludes the paper.

2.0 Literature Review
2.1 Capital Investment and Formation
The Keynesians term investment as additions to capital which enables increasing production and the purchase of capital goods (Jhingan, 2003). An investment is the purchase of goods that are not consumed today but are used in the future to create further capital (wealth). Investment can also be referred to as the production of capital goods (Heim, 2008). Investment in this form is an addition to real capital and capital stock in the economy. Though investment in finance is the acquisition of financial assets for earning returns (Stiglitz, 1993), it does not directly qualify for capital formation. Investment and can be divided into autonomous and induced investment. Autonomous investment is service based and not induced by demand as it is not influenced by immediate returns while induced investment is largely profit motivated. Autonomous investment is in the purview of the public sector and therefore propelled by the government. The investment that leads to capital formation and increase productive capacity of the economy is the most stressed and significant (Malinvaud, 1982 and Snessens, 1987). Most autonomous investments end up increasing capital formation in the economy.

Capital accumulation or formation refers to the process of amassing or stocking of assets of value, the increase in wealth or the creation of further wealth. Capital formation can be differentiated from savings because accumulation deals with the increase in stock of needed real investments and not all savings are necessarily invested. Recent literature has confused investment with capital formation. Investment can be in financial assets, human (capital) development, real assets that can be productive or unproductive. The increase in investment through non-financial assets has been held to increase value to the economy and the increase in the gross domestic product through further increase in employment.

Real domestic investment is expenditure made to increase the total capital stock in the economy. This is done by acquiring further capital-producing assets and assets that can generate income within the domestic economy. Physical assets particularly add to the total capital stock. Boosting economic development requires higher rates of economic growth than savings can provide. Part of the finance for investment is provided by the corporate sector, bank loans and households' savings make up the other part. With this, savings is no longer a constraint to investment demand. While short-term investment are highly encouraged by external sources of fund, long-term investment are more domestically driven. This is one of the reasons why aid is less effective in the long run. With lower rates of interest, asset values tend to be on the upward swing which invariably represents the discounted value of such assets thereby increasing the rate of acquisition and investment in such assets increases aggregate demand. Investment therefore is not constrained by aggregate savings but more by domestic interest rates. Therefore, the new equation of investment is Investment = (Savings) + (newly created money available to Deposit Money Banks). Attempts at reducing expenditure have affected investment rates and had led to poor and sluggish growth and eventually affecting savings performance (Khan and Villanueva, 1991).

The components of the Nigerian capital formation as analysed by the National Bureau of Statistics (NBS, 2011) comprises of both tangible and intangible stocks. The intangibles are the soft assets, and increases or improvements on them. They are also known as the non-produced assets that eventually add up to increases in productive capability of the country. The statistics further states that the increase in capital formation in the country over the past year – 2010, was merely ₦1 billion (about $6.3 million) has been propelled by capital equipments imports by firms involved in crude oil exploration and exploitation. This is worrisome, though nobody seems to care about the general welfare of the population.

The basis of the discussion above can be seen in the provision of infrastructure in the economy with autonomous investment which s more government propelled and powered. The relationship between physical investment and GDP is considered the most important of the factors antecedent to growth (Levine and Renelt, 1992). Ige (2008) mentions the irreducible role of the government in the process of governance and public financial management. The government as an economic unit has not been helpful to domestic investment in the country and with the direction of its investments over the years. Where the government has made investment, it is in projects that do not crowd in other investments though it might have borrowed from the financial system to

commit to such investment. The contention is that the government should provide necessary infrastructure for the enhancement of the life of individual members of the society and encourage private entrepreneurship, which would then pave the way for private entrepreneurs venturing successfully into various production outlets.

Net accumulation of capital assets as represented from various sources is often referred to as fixed capital formation, as purchased by the three economic units of government, firms and households. It is the creation or expansion, through savings, of capital or of *producer's good/*buildings, machinery, equipment that produce other goods and services, the result being economic expansion **(**Barron's Educational Series, 2006). The Central Bank of Nigeria (2007), defines it as the total change in the value of fixed assets in the economy in addition to fixed stocks (or Gross Domestic Investment). While gross fixed capital formation is expenditure undertaken on fixed assets either for replacing or adding to the stocks, it refers to the increase in the fixed capital stocks of the capital formed. Governments by their autonomous investment influence the direction of other investment by crowding in other investment as desired. Ajao (2011) study concludes that long-term capital formation in Nigeria were not majorly sourced from the capital market as the above result shows the marginal contribution of Market Capitalization and New Issues to Gross Fixed Capital Formation. Though, it is unarguable that when investors take position for profit, it can affect the level of wealth which can then be used to build private capital. This result is in line with the findings of Sarkar (2006) where he concludes that there exist no meaningful relationship between stock market capitalization and gross fixed capital formation.

The realisation of the above facts and the near difficulty to deliberately form capital and aggregate stocks in most countries informed the World Bank (1994) to encourage the use funded contributions to provide for pension rather than the then commonplace pay- as- you- go system which seem to constrict funding of firms. Its advantages are numerous as the financial market further develops and is deepened by its introduction (Singh, 1996). Most countries seem to have heeded the advice though the transition costs have been enormous and expensive for some countries to bear. Funds aggregated by the various pension funds can be used to improve infrastructure by the government, through the public, private partnership route and by the government using part of the funds as guarantee for borrowed funds. The advantages are numerous and the methods cannot be ignored as it improves the savings environment significantly

The above analysis bring to the fore the importance of, and the role of savings in the national development in general and capital formation in particular, Capital formation requires huge outlay at every starting point which could be difficult to aggregate without external financings sources. Bakare (2011) adopts the scarcely-used Harrod-Domar model in a conintegration technique to test the impact of capital formation on economic growth. The paper finds that the impact is significant and that the main driver of capital formation has been the savings rate. It recommends the use of savings as a major driving force to encourage the formation of capital in the economy.

2.2 Population Growth and Development

The growth rate is the average annual percent change in the population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country. The rate may be positive or negative. The growth rate is a factor in determining how great a burden would be imposed on a country by the changing needs of its people for infrastructure (e.g., schools, hospitals, housing, roads), resources (e.g., food, water, electricity), and jobs. Rapid population growth can be seen as threatening by neighbouring countries. While less developed countries have increasing growth rates or at least some growth rates, developed countries are experiencing a decline. Wolfgang, Sanderson and Scherbov (2004) however believe that the world population will stop growing in this century. This would happen by voluntary efforts made at fertility reduction by individual families rather than by some compulsory or punitive measures. This would raise other challenges in terms of capital needed to care for the aged as people begin to live longer.

People have moved from agriculture as major employer of labour to industry, which is the trend globally. This is with increase in incomes in those countries (Presbich, 1991). This cannot be possible without quality investment in education. Awe (2011) says that for any sustainable growth to occur the government should increase its budgetary allocations in human capital development and ensures proper implementation, monitoring and evaluations of expenditure disbursed to both health and education sectors. The key to real development is education and human development which has been established to be the cure for the challenges of poverty and other human deprivation (IIASA Policy Brief, 2008). The publication conclusively proves the key to reducing poverty and population growth is in the quality of secondary school and vocational education made available in the economy. Anfofum (2010) posits that increase in capital formation increases gross domestic product growth rate and consequently poverty reduction in Nigeria. The study also finds that the persistent deficit financing is one of the obvious reasons for the declining capital formation and increase in poverty rates in Nigeria.

On comparative basis, a measure of European investment in capital goods, fixed capital investments typically increase productivity and GDP growth. When businesses are investing in big fixed capital items, such as machinery, vehicles, and buildings, it typically reflects optimism for future growth; otherwise, those businesses would find other uses for that money. Higher capital investments also tend to increase productivity and contribute to GDP growth. This is why GFCF is important as a measure of capital stocks available in the domestic economy as well as a leading indicator for economic growth. GFCF expenditure makes up about 20% of the Euro-zone GDP, with machinery, equipment, vehicles, land-improvements, and buildings being the biggest contributors. Software and artwork are sometimes considered as the intangible fixed assets.

3.0 Materials and Methods

Primary data employed for the study are population, investment to GDP (INVTGDP), Real Gross Domestic Product (RGDP), capacity utilisation (KAPUTIL) and Government capital expenditure (KAXPND), Bank credit to the economy (BCRT) and population (POPTN). The Gross Domestic Product per capita (GDPPC) represents the wealth of the individual member of the society and is the dependent variable. The major variable is investment which is the main situate of gross fixed capital formation for the economy. Data transformation was employed on Investment to the GDP, and Gross domestic product per capita. The data used in this study is obtained from various sources which includes the Central Bank of Nigeria Statistical Bulletin (2010) for capacity utilisation, government capital expenditure, bank credit to the economy, while   real gross domestic product investment were obtained from the World Economic Forum data as at   April 2011. The data used is from 1980 to 2009.

The attempt is to ascertain the gradient of economic development by regression of country growth rates on country population growth rates.   Country growth characteristics are caused and altered by other determinants, which can make causation ambiguous.

A full linear regression is of the following form

$Yi = b_0 + b_1 xi_1 + ... + b_p xi_p + e_i$

where

yi is the value of the *ith* case of the dependent scale variable

p is the number of predictors

bj is the value of the *jth* coefficient, $j=0,...,p$

xij is the value of the *ith* case of the *jth* predictor

ei is the error in the observed value for the *ith* case

and explicitly,

Gddpc f Invtgdp, Kaxpnd, Kautil, Bcrit

To estimate the curve regression, choices of the following are made out of a suite of seventeen available. The importance of the variables to the study is shown by the way it contributes to the GDPPC and to the welfare of the people and reduction in poverty incidence. There are many functional forms for nonlinear regression. The two of the three of interest in this study are power regression and growth regression.

The most common method of regressions is to estimate on the understanding that there is a linear relationship between the variable of interest. However the gradient or slope is seen by the magnitude of the coefficients. The other models measure the direct impact of the coefficients on the dependent variables of interest. The growth and the power curve estimation models enable the understanding of the variables impact on general development of the country where population growth assumes its present stance.

   a.   *Linear*: Model whose equation is $Y = b_0 + (b_1 * t)$. The series values are modeled as a linear function of time.

   b.   *Power:* Model whose equation is $Y = b_0 * (t**b_1)$ or $ln(Y) = ln(b_0) + (b1 * ln(t))$. That is, instead of plotting Y against X, the plot of the residuals of a linear regression against X is adopted.

   c.   *Growth*. Model whose equation is $Y = e**(b_0 + (b_1 * t))$ or $ln(Y) = b_0 + (b_1 * _t)$.

4.0 Results and Discussions

The estimates obtained from the regression indicate that the two of the variables are related with the variable inflation factors and tolerance levels. This necessitated the retaining of only three variables, the *BCRDT*, *KAXPND* and *KAUTIL* and the main *INVTGDP*. The variables of *KAXPND* and *KAUTIL* were significant in the growth of the *GDDPC* in Nigeria. While the *BCRDT*, *KAUTIL* and *KAXPND* show a high level of significance, not less than 0.05 in each case, *INVTGDP* show a near significance at *t 1.558* which indicates that the investment is performs poorly in Nigerian *GDPPC* and has not been very meaningful in the increase of the per capital income in Nigeria. Diagnostics indicates that the *VIF* factor is well tolerated in the regression, and becomes

meaningful only with the addition of *BCRDIT*. *INVTGDP* performance in Nigeria is poor without the bank financing as it is.

From Table 1 which shows the regression estimates, *BCRDT* is highly significant beyond *0.01* while *KAXPND* is also highly significant at *0.002*. *KAUTIL* shows that industrial effort is also significant beyond at *0.1* and *t* of *1.967*. The impact of income generated from the industrial sector is too obvious to ignore and as such the significance indicated by the estimation. The regression fit is very reliable at *Adj.R^2* of *0.828*, with less than 18 % of the causative factors for growth in *GDPPC* outside the simple model. *F* statistic for this model is 34.6. The performance of *INVTGDP* is of greater interest here because this is the base of capital formation in the economy, it can be seen that the banks contribution is noted but has not been sufficient. However, the private sector borrowing which enables a buildup of capital in the process cannot also be said to have been sufficient. A closer look at the coefficients indicates that the *BCRDT* is most significant in the bootstrap diagnostics and should indicate that there has been a general increase private involvement in capital formation unlike the other variables.

From the result, it can be safely inferred that the banks have contributed to the build-up of capital in the economy, though a better result can be achieved. The result also accounts for the role of the private sector in the investment process in Nigeria all of which can be improved upon. The main use of *BCRDT* is to increase assets in the industries which generate employment, and to increase the domestic income in the economy by the individual.

Figure 3 shows the disparity in capital formed and actual investment in the economy. The logs of investment and capital formation show that the there has been less capital formation out of investment in the economy while there have been changes generally on the downward trend in the population growth in Nigeria. The yearly reduction in growth of the population has been spatial with deep reduction in capital formation in 2000 before rising again in 2003. The relationships and correlation between capital formation, *GDPPC*, investment and population is *r 0.284, r .107* and *r -.019* respectively. Figures 1 and 2 indicate the graphical changes in the relationships between population growth and capital formation and investment. The correlation produces no significant relationship but indicates that the relationship is on the downward trend with negative correlation between population and capital formation. By this result further increases in population will take capital formation further down. The relationship is already negative. Investment translating to capital formation is indicated by *r .107*.

The *KAXPND* of the government show that it does impact positively on *GDPPC* significantly. The use of the variables of capital formation process cannot be overemphasized. The investment that a developing economy should engage in should be the autonomous types that increase the aggregate demand for other goods and services. The engagement of the government in the increase of capital allocation to various sectors of the economy should be taken seriously. This apart the investment procedures must be by allocation to the best needs of the autonomous sector to facilitate further growth and the increase in aggregate demands for the economy. In the final analysis, the choice of investment targets by the government determines the rate of growth of the income of the Nigerian given the opportunity to allocate by choice and other competing reasons by the government of the day.

The main variable of interest is not significant though has been assisted by the *BCRDT* to show a reasonable *t* but still not significant. The implication of this scenario is that the investment to GDP has been ineffective in Nigeria, and has not contributed to the growth of per capita income in Nigeria. The investment scenario has been fluctuating after 1992. This is after it maintained a near constant trend. The fluctuating nature shows that lack of planning and infective implementation of plans have resulted in a wildly fluctuating relationship between investment in Nigeria and income of people.

While the VIF (*Variance inflation factor*) and *tolerance* levels of the variables are not affected by its inclusion, the *BCRDT* improved the status of *INVTGDP*. The adoption of *BCRDT* to improve *INVTGDP* indicates that bank financing is important in Nigeria, as indeed in many parts of the world, to improve investment and capital formation. However, the direction of financing and facilities obtained from Banks to improve the real investment environment in Nigeria is another matter and indeed the use of bank loans to finance imported items is a challenge that this paper is not presently directing its interest

Curve Estimation

Having examined the determinants that impact the growth of individual income in Nigeria, a close look at the investment and income growth in curve estimation process produces an interesting observation. Four of the suite of regressions available was adopted to see the relationship. The *linear* relationship present poorer a results with R^2 at 0.091 (less than 10%).The alternate results presented by *Power* and *Growth* are also similar with the R^2 at 0.10 but different *F* statistics showing that the *Growth* is much more applicable in the Nigerian case. With this result investment in the economy can engender growth. However, the result is poor still given the non-significance of the R^2 (not reaching at least *0.5*) one can safely conclude that *the current level of investment cannot stimulate*

growth. Fluctuating constants indicates the wild nature of the relationship which is much better here because of the lower coefficients that the growth regression yields. The relationship of capital formation is less promising as none of the curve estimation process yield any significant t or R^2 though the highest of the estimation processes is linear while growth is next, the two still are insignificant. The indication is that the capital formation has fairly linear relationship with per capita income in Nigeria but cannot induce growth in the per capita income of Nigerians.

5.0 Conclusions and Recommendations

The state of investment in the Nigerian economy has been worrisome for some time now, given its poor performance and insignificant correlation with capital formation. The economy needs continuous investment from both the private and public sectors. The investment that results into capital formation has been the most affected by this neglect. This has made the economic environment stifling and expensive for business. The population generally, is hit most as most people are poor though growth rate has been reducing.

The study has looked at the relationships between investment and capital formation and population growth in Nigeria while at the same time investigated their direct impacts on the per capital gross domestic product. The *curve estimation process* has shown that investment is on the **growth** path while capital formation is on the **linear** path. Also it has been proved that investment performance is poor and do not result into capital formation in Nigeria. The power and growth curve rather than linear has been found to be appropriate. Even with the growth regression, it is found that investment does not power the increase in per capita GDP in Nigeria. The regression for growth is only significant at *0.10* and is not conclusive evidence that the there is growth with the independent variable. However, it can be taken to mean that the investment does have a causal effect on growth on the per capita income of Nigerians which is the *a priori* expectation.

Investment in education and infrastructure would be of great help in the domestic economy. The infrastructural deficit facing the country can be remedied by engaging a direct investment effort to eliminate the deficit which would be supported by the capital expenditure from the public sector. It is important to understand there must be a causal relationship flowing from capital expenditure by the government capital formation for growth to be recorded. Therefore, a problem that the country faces now is the effectiveness of public expenditure which militates against the delivery of value for public contracts. Capital expenditure of the optimum quantity and quality at this time would be of great help in the providing employment opportunities directly and much more opportunities indirectly in the economy.

Bank credit to the economy is essential. However, banks have been noted to be financing consumption and wasting assets of low value and high liquidity in the consumer loan category - cars for example. While the banks need assurance of safety of their funds in a business environment that is highly expensive and unpredictable, the role of the regulator is important in this respect to assure the banking system of support. A direct fiscal encouragement might be made available to enable banks lend long and for capital development purposes. The *skewness* of bank loans towards consumption and trade is not good for economic growth. Direct guarantees are possible with government backing to encourage bank lending for investment to the industrial sector to increase capacity utilisation.

The population of the country may not be optimal yet, but needs policy address to enable the country not overstretch the available infrastructure. While reduction on the basis of family units would produce aggregate reduction, this cannot be said to be uniform, across the geographical spread of the country. Since reduction in family can be correlated with education levels, the adoption of educational incentives for the maintenance of smaller families can be adopted to encourage family units to maintain small size families in order to reduce aggregate population. A population policy is needed to control population now before it becomes a problem. A policy to reduce the size per family must take account of the polygyny status of some families. The policy would work if it is per the married woman.

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Figure 1 Relationship between INVTGDP changes and GDPPC changes 1980 – 2009
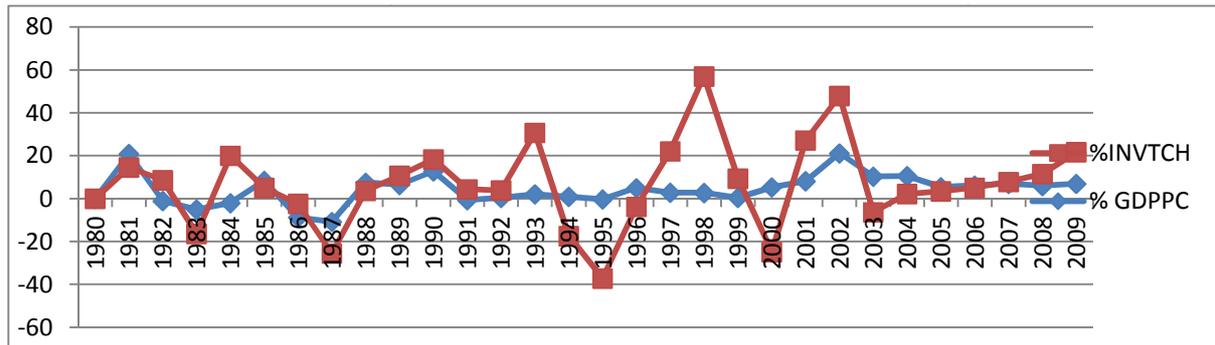
Source: From Author's data from various sources.

Fig 2   % Change in Capital formation changes, Investment changes and Population growth in Nigeria
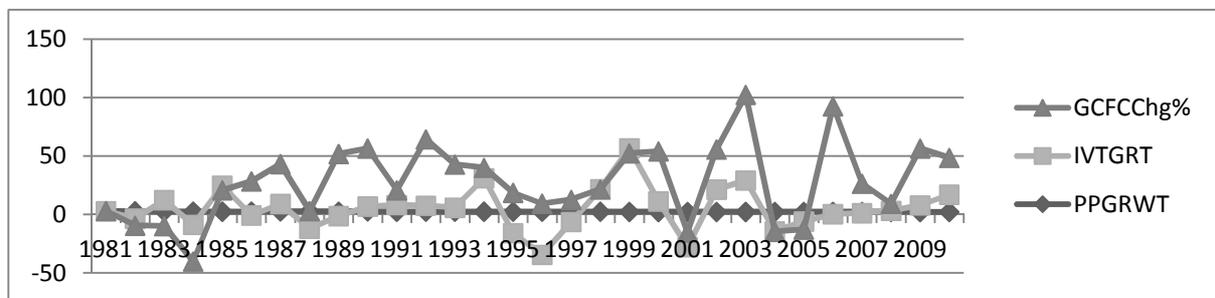
Source: From Author's data from various sources.

Fig 3 Logs of Investment and capital formation and changes in population growth
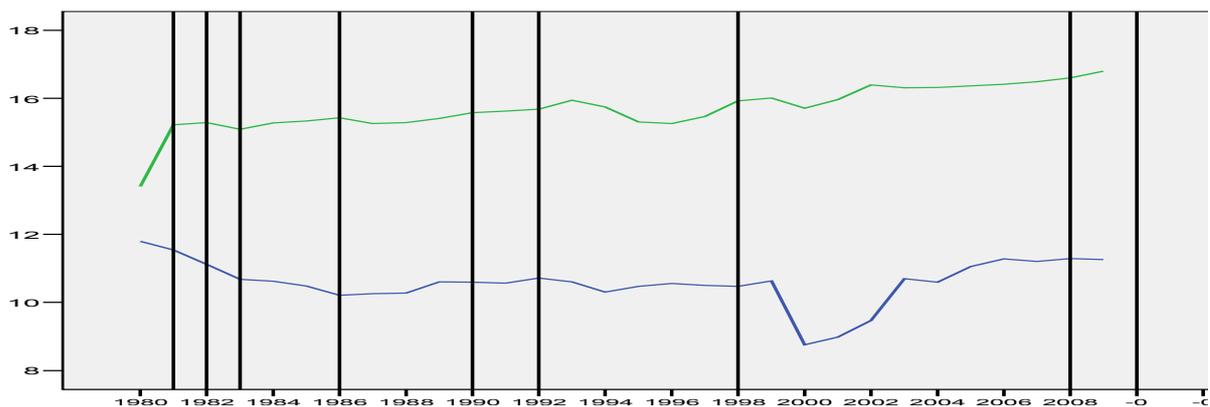
Key: Upper curve is investment; lower curve is capital formation and perpendicular lines represent years of changes in population growth: generally reduction by 10 basis points
Source: Author's calculations and SPSS

Tables

Table 1 Estimation Results of per capital GDP

Model			Standardized Coefficients			Collinearity Statistics	
	Unstandardized Coefficients						
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	2835.587	1083.164		2.618	.015		
INVTGDP	62.955	40.451	.123	1.556	.133	.981	1.020
KAXPND	-152.214	42.658	-.329	-3.568	.002***	.724	1.381
BCREDT	.001	.000	.657	6.843	.000***	.668	1.496
KAUTIL	27.186	13.818	.168	1.967	.061*	.840	1.190

Source: Output of the variables of INVTGDP and GDPPC

Figure 2 Model Summary and Parameter Estimates

(a)Dependent Variable :GDPPC

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.091	2.802	1	28	.105	1191.946	168.864
Inverse	.091	2.794	1	28	.106	8574.455	-78289.840
Power	.101	3.140	1	28	.087*	573.515	.676
Growth	.102	3.165	1	28	.086*	7.755	.031

Independent variable is INVTGDP

(b)Dependent Variable: GDPPC

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.081	2.456	1	28	.128	4010.490	.022
Inverse	.012	.345	1	28	.562	5278.518	-7176279.160
Power	.033	.945	1	28	.339	1623.477	.100
Growth	.045	1.330	1	28	.259	8.322	2.83E-006

Independent variable is GCFC.

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