ASERC Journal of Socio-Economic Studies
Journal homepage: www.ajses.az
Volume 7, Number 2, (2024) Pages 139-160

EFFECTS OF ECONOMIC PROFITS ON ECONOMIC GROWTH IN UGANDA: A GENERALIZED LEAST SQUARES (GLS) APPROACH

Jimmy Alani, Bruno Yawe, John Mutenyo

Makerere University, School of Economic,
College of Business and Management Sciences,
Kampala, Uganda

ABSTRACT

This study employs the generalized least squares (GLS) method to investigate the impact of economic profit growth on economic performance in Uganda over the period 1970 to 2020. Specifically, the study explores the relationships among economic profit growth, economic growth, and profit rate growth. The data utilized in this analysis were sourced from the United Nations database. The study addresses the persistent inconclusiveness in existing literature regarding the interplay between innovation and profit growth, and vice versa. This gap serves as the primary motivation for this research, aiming to provide more definitive insights. Empirical results indicate that the investment-to-capital ratio exhibited the most significant direct contribution to economic profit growth during the studied period, followed by advancements in innovation and technological progress. Consequently, growth in household consumption emerged as the leading contributor to economic profit growth, ceteris paribus, followed by innovation, technological progress, disposable income, and real income (gross domestic product). The findings suggest that, to achieve accelerated economic growth, Uganda need prioritize growth in economic profits, employment, the investment-to-capital ratio, innovation, and technological development.

Keywords: Capital productivity growth, economic growth, economic profit growth, innovation advancement, labor productivity growth, technological progress, household consumption growth.

ASERC

INTRODUCTION

By using the generalized least squares method, we investigate the effects of growth in economic profits on economic growth in Uganda during the 1970 to 2020 period. In the study we also examine the relationships between economic profit growth, economic growth as well as the profit rate growth. In the New Classical profit function, the application of technology in production of goods and services will always maximize profits. In the paper, one of our contributions to knowledge is developing new and more accurate techniques for estimation of capital, labour, innovation and economic profit. Building accurate annual time series data for these variables for the 1970 to 2020 period and using them in empirical investigations provides reliable analyses regarding the effects of economic profit on economic growth; a case of Uganda.

Our second contribution involve using Rubi (2008) Causality Principle to build our own model for producing more accurate capital and labour parameters in the respective production functions. These two kinds of parameters generate different levels of total cost, technology and innovation time series. Secondly, our study recognizes the break-even point to be one of the most powerful tools of macroeconomic analysis, and employs it in empirical analysis.

Due to adverse demand conditions, an imperfectly competitive firm may find its total cost more than total revenue at its best output level. Provided that total revenue can adequately cover total variable costs, the best short-run output of a firm would be that level where its loss is minimized (net revenue maximized). Profit maximization for an imperfectly competitive firm does not always require marginal cost to have positive slope when it intersects marginal revenue.

Thirdly, empirical findings regarding the effects of innovation on profit growth in firms or the economies are inconclusive. For instance, Walker (2004) finds that innovation is considered as a key factor in generating positive effect on profit growth, because it helps companies improve their position, establish competitive advantage, and achieve satisfactory performance. But some research studies, find negative relationships between innovative activities and profit growth (Prajogo and Ahmed, 2006; Ngoc Mai et al., 2020). The inconclusive findings regarding the influence of innovation on profit growth is a motivation that compels us to find a conclusive answer in the study.

1. REVIEW OF LITERATURE

1.1. Macroeconomic Theories of Profit

The macroeconomic theory of profit is crucial for aligning economic theory more closely with real-world challenges, thereby addressing issues that microeconomic theory fails to solve. The macroeconomic theory of profit, is a theory that seeks to explain the following issues: (a) The nature and source of aggregate profits. (b) The actual volume of aggregate profits in an economy. (c) Behaviour of aggregate profits in response to changes in other economic variables, and the course they follow in a growing economy. (d) The relationship between aggregate profits and the rate of profit in the economy. (e) The share, as distinguished from the volume of profits in national income and the share's relationship to the wage share. (f) The extent of competition or monopoly in the market, its effect on the level of aggregate profits and their ratio to total income (Siddiqi, 1965, p.204).

Since the 1940s, efforts have been made to formulate a comprehensive macroeconomic theory of profit. These theories are based on the common Keynesian saving-investment analysis of the consumption function and the autonomous investment. Some of them include productivity of labour as well as the degree of market competition. The aggregate profits course is often studied under the theory of growth. All early contributions to the theories of economic profits and growth depended on very simplified models. Societal income was initially divided into two categories: profits (encompassing salaries, interest, and rent) and wages. Later, some theorists distinguished rentiers' income as a separate category (Siddiqi, 1965, pp.207).

1.2. Producing beyond the profit maximization point: mathematical exposition

For nearly a century the profit (total revenue minus total cost) maximization assumption has been at the forefront of the neoclassical economic theory. Profit maximization is based on the assumption that firms maximize profit by setting their output where marginal cost equals marginal revenue. This equality holds irrespective of the market structure being under perfect competition, monopoly, monopolistic competition, or oligopoly. The simplest version of the theory of the firm, consists of the assumption that the owner or manager aims at maximizing the short-run firm profits (current profits and profits in the near future).

More sophisticated models of profit maximization substitute the short-run profits maximization goal for the long-run profits maximization goal (Mankiw, 2009; Krugman and Wells, 2009; Carbaugh and Prante, 2011). Meanwhile, the profit-maximization assumption has been criticized because the managers often aim at attaining only "satisfactory" profits for the stockholders of the firm rather than maximum profits. Secondly, managers may pursue other goals apart from profit maximization such as sales maximization, personal welfare, and social welfare, etc. that tend to reduce profit. Even though these challenges persist, the $MR = MC$ model of profit maximization still dominates models that economists use to explain firm behaviour (Besanko and Braeutigam, 2005; Eaton, Eaton and Allen, 2009; Carbaugh and Prante, 2011). For a firm to maximize profit, net revenue (total revenue minus total cost) requires meeting conditions.

Thus, profit maximization requires that the first and second-order conditions be met. The first-order condition is given by

$$\pi(Q) = R(Q) - C(Q) \tag{1}$$

Meanwhile, the second-order condition is given by

$$\frac{\partial MR}{\partial Q} \leq \frac{\partial MC}{\partial Q} \tag{2}$$

Therefore, the minimization of net revenue (loss maximization) is economically irrelevant given the assumptions of rational seller behaviour. Hence, the necessary (first-order) condition for net revenue minimization is that marginal revenue equals marginal cost.

Meanwhile, the sufficient (second-order) condition is that the slope of marginal revenue curve exceeds that of the marginal cost curve at their point of intersection. Under perfect competition, the second-order condition necessarily indicates that the marginal cost curve is decreasing (negative sloping) at the point where it intersects the horizontal (zero slope) marginal revenue.

But when technological progress steps in both the first and second order conditions change to

$$\pi(Q) = R(A^{\lambda}Q) - C(Q) \tag{3}$$

Meanwhile, the second-order condition becomes

$$\frac{\partial MR}{\partial Q} = d(d(A^{\lambda})) \geq \frac{\partial MC}{\partial Q} \quad (4)$$

Under perfect competition, the conditions for net revenue maximization, implies that the second-order condition requires marginal cost to be increasing when it intersects marginal revenue. This is just a special case of the general rule that the slope of the marginal cost curve must be greater than that of the marginal revenue curve at their point of intersection. But the market structure of imperfect competition represents the general case (Carbaugh and Prante, 2011).

Due to adverse demand conditions, an imperfectly competitive firm may find its total cost more than total revenue at its best output level. Provided that total revenue can adequately cover total variable costs, the best short-run output of a firm would be that level where its loss is minimized (net revenue maximized). Unlike the competitive firm case, profit maximization for an imperfectly competitive firm does not always require marginal cost to have positive slope when it intersects marginal revenue. Because an imperfectly competitive firm's demand schedule is downward-sloping, its marginal revenue curve is negatively sloped. For imperfect competition, it is possible that the second-order condition is fulfilled when both the marginal revenue and marginal cost curves are negatively sloped (Carbaugh and Prante, 2011).

1.3. Gaps in literature

In the Solow (1956) model savings rate, population growth and technological progress are treated as exogenous variables. Meanwhile, the two inputs capital and labor are paid for their respective marginal products. But Mankiw et al (1992) assume the Cobb-Douglas production function to be given by

$$Y_t = K_t^{\alpha}(A_t L_t)^{(1-\alpha)} \quad (5)$$

The Solow model is composed of four variables: output, capital, labor and knowledge the level of technology at time but is effective labor (Romer, 1996, p.7).

Rewriting Equation (6) in terms of level of unity (1) as a function of labor productivity and capital productivity provides the following equation.

$$1 = K_{pt}^{-\alpha} L_{pt}^{-(1-\alpha)} \quad (6)$$

Where, labor productivity is given by (Romer, 1996, p.9). It is often useful to use a specific Cobb-Douglas function as given in Equation (7) (Weil, 2013, p.72).

$$Y_t = A_t K_t^{\alpha} L_t^{(1-\alpha)} \quad (7)$$

Rewriting Equation (7) in terms of level of technology as a function of labor productivity and capital productivity provides:

$$A_t = K_{pt}^{\alpha} L_{pt}^{(1-\alpha)} \quad (8)$$

Solow (1957) notes that an aggregate production can be represented as follows:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \quad (9)$$

where (Campante, Sturzenegger and Velasco, 2021, p.88).

Rewriting Equation (9) in terms of level of technology as a function of labor productivity and capital productivity gives:

$$A_t = Y_t^{(1-\alpha-\beta)} K_{pt}^{\alpha} L_{pi}^{\beta}. \tag{10}$$

Therefore, our contribution to knowledge is by showing that in the long run the growth in capital productivity as well as productivity of capital and labor have direct negative consequences on economic growth as follows:

$$Y_t = [A_t K_{pt}^{-\alpha} L_{pi}^{-\beta}]^{1/(1-\alpha-\beta)} \tag{11}$$

Representation of level of technology appears to be better because it makes the level of technology be represented by process innovation, product innovation and technological innovation. Our next contribution is to examine the influence of capital productivity, labor productivity and total cost (on profits by grafting Equation (11) with the real economic profit function as follows:

$$\pi_t = [A_t K_{pt}^{-\alpha} L_{pi}^{-\beta}]^{1/(1-\alpha-\beta)} - TC_t \tag{12}$$

According to Mankiw [2010, p.55] the aggregate profit is given by

$$\pi_t = Y_t - TC_t = Y_t - \alpha K_t - \beta L_t \tag{13}$$

Lastly, we contribute to knowledge by estimating the production function of Uganda using the Rubni (2008) model because though the Solow model consistently predicts the direction of effects, it does nor correctly predict the magnitudes. Mankiw et al (1992) are in support of our decision because they argue that an augmented Solow (1956) model including accumulation of human and physical capital provides an excellent description of the cross-country data.

2. RESEARCH METHODOLOGY

2.1. Theoretical framework

In our theoretical framework we examine the relationships between Profits and Economic Growth as well as the determinants of profit rate.

2.1.1. Relationships between profits and economic growth: a new classical exposition

Aggregate Economic profit is the income that remains after the firms have deducted their costs of production on capital and labor at the per unit price of capital and labor respectively (Mankiw, p.55).

$$\pi = (Y - C) = Y - \alpha K - \beta L \tag{14}$$

We are interested in examining the effects of profits on income. Therefore, we rewrite Equation (14) such that real output is a function of real economic profit.

$$Y = \pi + \alpha K + \beta L \tag{15}$$

The neoclassical revenue net revenue function can be represented as:

$$(Y) = R(Y) - C(Y) \tag{16}$$

Where is quantity of output, is the amount of total revenue and is the total cost function. Equation (16) can be maximized by total differentiation of the equation with respect to output to meet the first order condition that the first derivative of the function is set equal to zero. When the first-order condition is met, marginal revenue equals marginal cost.

$$\frac{d\pi}{\partial Y} = \frac{dR(Y)}{\partial Y} - \frac{dC(Y)}{\partial Y} = 0 \tag{17}$$

Implying that when revenues are equal in the economy profits are either mini mimed or maximized. Therefore, for the extremum to be maximum, the second derivative of the net revenue function should have a negative value as follows:

$$\frac{dMR(Y)}{dY} - \frac{dMC(Y)}{dY} \leq 0 \tag{18}$$

On adding to both sides of Equation (18) we obtain the following (Carbaugh and Prante, 2011).

$$\frac{dMR(Y)}{dY} \leq \frac{dMC(Y)}{dY} \tag{19}$$

When technological diffusion steps in due to creativity, technology embedded in both capital and labour, innovation and knowledge the equilibrium (equality) in Equation (17) is disrupted, therefore, leading us to a New Classical model given by

$$\frac{d(A^{\lambda}K^{\alpha}L^{\beta})}{dY} - \frac{d(\alpha K + \beta L)}{dY} \geq 0 \tag{20}$$

$$\frac{\partial Y}{\partial A} dA^{\lambda} + \frac{\partial Y}{\partial K} dK + \frac{\partial Y}{\partial L} dL - \alpha \frac{\partial Y}{\partial K} dK + \beta \frac{\partial Y}{\partial L} dL \geq 0 \tag{21}$$

$$dA^{\lambda} \geq 0 \tag{22}$$

Differentiation of Equation (22 provides the second order condition that confirms maxima.

$$d(d(A^{\lambda})) \geq 0 \tag{23}$$

Hence, in the New Classical profit function, the application of technology in production output will always maximize profits. Consequently, Equation (20) involves application of differential calculus to transform it into growth rates of variables and integration of the growth rates to give both the classical and neoclassical production functions that can be disaggregated into two equations as follows:

$$Y = A^{\lambda}K^{\alpha}L^{\beta} \tag{24}$$

and

$$Y = \pi K^{\alpha}L^{\beta} \tag{25}$$

Thus, implying that profit generation is a technological progress phenomenon.

$$\pi = A^{\lambda} \tag{26}$$

In turn, from Equation (26) it can be deuced that profit generation is a phenomenon of innovation, capital productivity and labor productivity as expressed in Equation (27). where:

$$\pi = \left(ZK_p^{\alpha}L_p^{\beta}\right)^{\frac{1}{1-\alpha-\beta}} \tag{27}$$

$$\log(\pi) = \frac{1}{1-\alpha-\beta}\log(Z) = \frac{1}{1-\alpha-\beta}\log(A) \tag{28}$$

2.1.2. The Determinants of profit and profit rate

The rate of profit in any given time can be defined as follows:

$$\pi_{Rt} = \frac{\pi_t}{K_t} \tag{29}$$

Where π_{Rt} is the rate of profit, π_t is the amount profit income and K_t is the quantity of capital stock in time t. From Equation (29), the rate of profit function can be decomposed into components (Basu et al., 2022).

$$\pi_{Rt} = \frac{\pi_t}{Y_t}\frac{Y_t}{K_t} \tag{30}$$

Where π_t/Y_t is the profit share and K_t/Y_t is the capital-output ratio at time t. Therefore, the profit rate is driven among other things by the decline in capital output ratio.

However, through output other variables can influence the profit.

$$\pi_t = Y_t - (Y_t - \pi_t) = C_{nt} + I_t + G_t + X_t - M_t - (Y_t - \pi_t) \tag{31}$$

Where $Y_t - \pi_t$ is the total income after deductions of profits in time t. From Equation (32) it can be discerned that profit also depends on disposable income and income taxes.

$$\pi_t = Y_{dt} + T_t - (Y_t - \pi_t) \tag{32}$$

Meanwhile, the neoclassical model in Equation (3.18) implies that profit depends on levels of technology, capital stock and labor.

$$\pi_t = A_t K_t^{\alpha} L_t^{\beta} - (Y_t - \pi_t) \tag{33}$$

Where are parameters of returns to scale capital and labour respectively. Similarly, by considering the neoclassical model and Equation (31) implies that profit depends on technology, capital productivity and labor.

$$\pi_t = \left(A_t K_{pt}^{-\alpha} L_{pt}^{-\beta}\right)^{\frac{1}{1-\alpha-\beta}} - (Y_t - \pi_t) \tag{34}$$

Hence, from Equation (3.8) shows profit depends on innovation also.

$$\pi_t = Z^{\frac{1}{1-\alpha-\beta}} + T_t - (Y_t - \pi_t) \tag{35}$$

2.2. Data types data sources

The relevant secondary data of times series type were collected from the United Nations data base on the following variables: household consumption (C_{nt}), investment spending (I_t), government spending (G_t), imports (I_t), and exports (I_t). Out of the time series data obtained, the five variables covering the period 1970 to 2020 other relevant data sets were generated, namely: gross domestic product (Y_t), disposable income (Y_{dt}), taxes (T_t), capital (K_t), labor (L_t), capital productivity (K_p), labor productivity (L_{pt}), capital depreciation (D_t), capital depreciation rate (δ_t), level of technology (A_t), total cost (TC_t), level of innovation (Z_t), economic profit (W_t), and rate of profit (W_t/K_t).

2.3. Data Generation Process

2.3.1. Data Generation Process for the Capital

A complete derivation of formula for estimation of capital exists in Alani, Yawe and Mutenyo (2023) where capital stock can be computed by using the formula

$$K_{t-1} = \frac{I_{t-1}}{\delta_t} \tag{36}$$

Given that

$$\delta_t = \frac{1}{\log(I_{t-1})} \tag{37}$$

Hence, in a country, annual quantities of capital, are given by a simple formula:

$$K_{t-1} = I_{t-1}\log(I_{t-1}) \tag{38}$$

Consequently, a more convenient formula for the calculation of capital stock is:

$$K_t = I_t\log(I_t) \tag{39}$$

2.3.2. Data Generation Process for the Labour, Technology, Innovation and Profit Series

This study extends the current method of computing the level of innovation by defining it not as the residual of the level of technology but presenting it as a function of capital and labor productivity. To define Total Factor Productivity (TFP), the Cobb-Douglas version of the production function is given by output as a function of technology, capital, labour and parameters (Lipsey and Carlaw, 2004).

$$Y = AK^{\alpha}L^{\beta} \tag{40}$$

Where $0 < \alpha + \beta < 1$

The TFP is got after dividing through Equation (2.17) by the total factor.

$$TFP = \frac{Y}{K^{\alpha}L^{\beta}} = A \tag{41}$$

Similarly, to define innovation the Cobb-Douglas version of technology function is represented by the level of technology as the function of innovation, capital productivity, labour productivity and parameters.

$$A = ZK_p{}^{\alpha}L_p{}^{\beta} \tag{42}$$

Meanwhile

$$Z = Y^{1-\alpha-\beta} = AK_p{}^{-\alpha}L_p{}^{-\beta} \tag{43}$$

In other words, level of technology is given by having obtained the time series data on the annual long run capital stock and aggregate disposable income the annual quantities of labor can be generated by using the classical Cobb-Douglas production function and by causality theory (Mishkin, 2004, p.16), where is average propensity to invest and is average propensity to consume.

From the Cobb-Douglas we make the subject and obtain

$$L_{t-1} = \left[Y_{dt}/\left((K_{t-1})^{(API_t)}\right)\right]^{[1/APC_t]} \tag{44}$$

since the long run equals long-run Implying, marginal propensity to invest and average propensity to invest are equal in the long run (Hadden, 1965, p.9).

3. RESEARCH FINDINGS

Non-equilibrium in the economy establishes flux (Rubi, 2008), as follows:

$$1= \alpha(Y_t - 0)/I_{t-1} = \alpha Y_t/I_{t-1} \tag{45}$$

Here, α is the marginal propensity to invest. Equation (4.1) can be estimated by rewriting it as follows:

$$1 = \alpha Y_t / I_{t-1} + \varepsilon_t \tag{46}$$

Where, the Greek letter epsilon (ε_t) ,is the disturbance term at time, t.

Estimate of marginal returns to scale on capital or investment (MPI) in the long run, is the relationship arising from a given value. It provides the expression that is equal to: 1 (flux constant), and the long run trends of α and β. Thus, to estimate parameters of the consumption function, disposable income flux is transformed into a causal form as follows:

$$1 = \alpha \frac{Y_{dt}}{I_{t-1}} + \beta \frac{Y_{dt}}{C_{nt-1}} + \varepsilon_t \tag{47}$$

Table 1. Estimation of capital formation elasticity of output: the case of Uganda

Dependent Variable: 1						Period: 1972-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
Y/I(-1)	0.155	1282	1.0000	1.94	-	0.02	47
-			$Vector = 1/d(d(Y^2))$				

By using the GLS technique and the relevant data on Uganda, and conducting linear regression of Equation (46), the value of MPI turned out to be 0.155 as in Table 1.

Table 2. Estimation of labor elasticity of output: the case of Uganda

Dependent Variable: 1						Period:1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
Y/I(-1)	0.044	35.75	1.0000	1.91	960576	0.64	48
Y/Cn(-1)	0.562	70.56	$Vector = 1/d(d((Y/I(-1))^2))$				

Using the GLS technique and the relevant data on Uganda, and conducting linear regression of Equation (47), the value of MPC turned out to be 0.562 as shown in Table 2.

Table: 3. Estimation of the production function with technology in Uganda

Dependent Variable: $d(log(Y))$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
d(log(A))	1.000	1.60×10^7	1.0000	1.76	1.64×10^{16}	0.000	48
d(log(K))	0.155	1.75×10^7					
d(log(L))	0.562	3.99×10^7	$Vector = 1/d(d((d(TF))^2))$				

From Table 3 it can be discerned that a 1 percent increase in technological progress, growth in both capital and labour could have caused economic growth in Uganda during the 1973 to 2020 to increase by 1.00, 0.155, and 0.562 percent respectively. Having obtained the returns to scale on both capital and labour we use these two values and the quantities of output, capital and labour to compute the annual values of level of technology by using the formula: The given regression results got are presented in Table 3 (Alani et al., 2022). Therefore, technological progress has been very important in enhancing economic growth within Uganda during the given period.

Table 4. Estimation of the production function with profits capital & labor in Uganda

Dependent Variable; $d(Y)$						Period: 1972-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$d(W)$	1.000	5.07×10^{10}	1.0000	2.03	$F = 5.70 \times 10^{23}$	0.09	49
$d(K)$	0.155	1.09×10^{11}					
$d(L)$	0.562	5.92×10^{10}	$Vector = 1/d(d(Y_d^2))$				

Table 4 shows that a 1% increase in growth of economic profits, capital and labor could have caused economic growth to raise on average annually by 1.000%, 0.155% and 0.562% respectively during 1972 to 2020.

Table: 5. Estimation of the production function with profits and labor in Uganda

Dependent Variable: $dlogY$						Period: 1974-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogW$	0.173	13.37	1.0000	2.16	$F = 4.54 \times 10^{13}$	0.62	47
$dlogK$	0.244	12.64					
$dlogL$	0.578	18.20	$Vector = 1/d(d((d(Y_{d-1}))^2))$				

Table 5 indicates that a 1% increase in growth of profits, capital and labour could have caused economic growth to rise by 0.173%, 0.244% and 0.578% respectively during the given period.

Table 6. Estimation of effects of profits on economic growth in Uganda

Dependent Variable; $dlogY$						Period: 1974-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogW$	0.977	359	1.0000	1.98	$F = 1.78 \times 10^{12}$	0.01	47
$dlogKp$	-1.375	-41.90					
$dlogLp$	-2.182	-6.54	$Vector = 1/d(d((d(Y_{d-1}))^2))$				

Table 6 shows that a 1% increase in growth of economic profits, capital productivity and labor productivity could have caused economic growth to rise on average annually by 0.9777%, -1.375% and -2.182% respectively.

Table 7. Effects of growth in profits, and total cost on economic growth in Uganda

Dependent Variable: $dlogY$						Period: 1972-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogW$	0.176	11.69	1.0000	1.87	2.71×10^6	0.04	49
$dlogTC$	0.877	19.42	$Vector = 1/d(d(Y^2))$				

Table 7 shows that a 1% increase in growth of economic profit and total cost could have significantly caused economic growth to rise on average annually by 0.176% and 0.977% respectively, ceteris paribus.

Table 8. Estimation of economic growth with growth in profit ratio in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlog(I/K)$	17.7	16.85	0.9998	1.82	223653	0.000	48
$dlogTC$	1.61	9.19	$Vector = 1/d(d((TF_{-1})^2))$				

From Table 8 it can be discerned that profit ratio is one of the most powerful profit maximization tools of a firm. Therefore, a 1% increase in capital accumulation growth had the potential of causing economic growth to rise by 17.7% in Uganda during the 1973 to 2020 period, ceteris paribus.

Table 9. Effect of growth in profits on per capita income growth in Uganda

Dependent Variable: $dlogY_p$						Period: 1974-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogW$	0.143	14.65	1.0000	1.98	501251	0.01	47
$dlogTC$	0.645	17.18					
$dlogPO$	-0.630	-15.21	$Vector = 1/d(d(Y^2))$				

Table 9 shows that a 1% increase in growth of economic profits, total cost and population could have significantly caused economic growth to rise on average annually by 0.143%, 0.645% and -0.63% respectively.

Table: 10. Estimation of economic growth with profits rate and labor in Uganda

Dependent Variable; $dlogY$						Period: 1974-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Stat.	HSDT	N
$dlog(W/K)$	0.173	13.37	1.0000	2.16	4.54×10^{13}	0.88	47
$dlogK$	0.417	13.15					
$dlogL$	0.578	18.20	$Vector = 1/d(d((d(Y_{d-1}))^2))$				

Table 10 reveals that a 1% increase in growth of economic profit rate, capital and labor could have caused economic growth to rise on average annually by 0.173%, 0.417% and 0.578% respectively.

Table 11. Estimation of economic growth with disposable Income in Uganda

Dependent Variable: $dlogW$						Period: 1974-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Stat.	HSDT	N
$dlog(W/K)$	0.813	75.61	1.0000	1.79	1.16×10^{11}	0.000	47
$dlogY_d$	1.021	707.87	$Vector = 1/d(d((d(TF_{-1}))^2))$				

Table 11 indicates that a 1% increase in growth of profits ratio, and disposable income could have significantly caused economic profit growth to rise on average annually by 0.813%, and 1.021% respectively in Uganda during the given period.

Table 12. Estimation of economic profit growth with economic growth in Uganda

Dependent Variable: $dlogW$						Period: 1974-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogY$	1.023	359.4	1.0000	1.97	1.45×10^{12}	0.02	47
$dlogK_p$	1.404	38.68					
$dlogL_p$	2.206	6.39	$Vector = 1/d(d((d(Y_{d-1}))^2))$				

Table 12 reveals that a 1% increase in economic growth, capital productivity growth as well as labour productivity growth could have significantly caused economic profit growth to increase on average annually by 1.023%, 1.404% 2.206% respectively.

Table 13. Effects of technological progress on economic profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1974-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogA$	3.655	239.9	1.0000	2.09	1.04×10^9	0.00	47
$dlogK_p$	0.959	14.93					
$dlogL_p$	0.672	3.72	$Vector = 1/d(d((d(K_{-1}))^2))$				

Table 13 shows that a 1% increase in growth of technology, capital productivity and labour productivity could have significantly caused economic profit growth to rise on average annually by 3.655%, 0.959% 0.672% respectively.

Table 14. Estimation of Technological Progress with Profit Growth in Uganda

Dependent Variable: $dlogW$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogA$	5.250	27.8	0.9998	1.96	84067	0.06	48
$dlogK$	2.993	4.56					
$dlogL$	5.838	6.00	$Vector = 1/d(d(TF_{-1}{}^2))$				
$dlogTC$	-3.953	-5.57					

Table 14 shows that a 1% increase in growth of technology, capital, labour and total cost could have caused economic profit growth to rise on average annually by 5.250%, 2.993%, 5.888% and -3.953% respectively.

Table 15. Effect of innovation advancement on economic profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogZ$	3.592	863.8	1.0000	2.02	1.61×10^6	0.00	48
$dlogK_p$	1.329	114.9					
$dlogL_p$	1.744	7.60	$Vector = 1/d(d(Y_{d-1}^2))$				

Table 15 indicates that a 1% increase in growth of innovation, capital productivity and labour productivity could have caused economic profit growth to rise on average by 3.592%, 1.329%and 1.744% respectively, ceteris paribus.

Table 16. Effects of growth in innovation, and labor on profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogZ$	14.46	18.26	1.0000	2.02	1.61×10^6	0.00	48
$dlogK$	-1.329	-114.86					
$dlogL$	-1.745	-7.60	$Vector = 1/d(d(Y_{d-1}{}^2))$				

Table 16 shows that a 1% increase in growth of innovation, capital and labour could have significantly caused yearly economic profit growth to rise on average by 14.46%, -1.3293% and -1.745% respectively, ceteris paribus.

Table 17. Effects of growth in innovation and total cost on profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1974-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogZ$	15.126	11.69	0.9999	1.80	808463	0.04	47
$dlogTC$	-3.01	-5.85	$Vector = 1/d(d(Y^2))$				

From Table 17 it is clear that a 1% increase in growth of innovation and total cost could have significantly caused economic profit growth to rise on average annually by 15.126% and -3.01% respectively in Uganda during the 1972 to 2020 period. Implying that innovation advancement could have had a spectacular positive influence on economic profit growth. Thus, in the short run innovation advancement could have had the potential to increase profit growth by 15.12 while in the long run the innovation advancement could have had the potential of increasing profit growth by 3.59 as shown in Tables 15 and 17.

Table 18. Effects of growth in output and total cost on profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1972-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogY$	5.817	36.50	0.9998	1.91	808463	0.22	49
$dlogTC$	-4.853	-19.81	$Vector = 1/d(d((d(TC))^2))$				

Table 18 shows that a 1% increase in GDP and total cost could have significantly caused economic profit growth to rise on average annually by 5.817%and -4.853% respectively in Uganda during the 1972 to 2020 period.

Table 19. Effects of growth in disposable income & total cost on profit growth

Dependent Variable: $dlogW$						Period: 1972-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogYd$	8.415	15.36	0.9990	2.21	43013	0.01	49
$dlogTC$	-6.173	-9.24	$Vector = 1/d(d(Y^2))$				

Table 19 shows that a 1% increase in growth of disposable income, and total cost could have caused economic profit growth to rise on average annually by 8.415%and -6.173% respectively in Uganda during the 1972 to 2020 period.

Table 20. Estimation of profit growth with lump sum tax ant total cost in Uganda

Dependent Variable: $dlogW$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statis.	HSDT	N
$dlogYd$	4.730	11.20	1.0000	2.00	2.28×10^6	0.00	48
$dlogT$	4.24	21.95					
$dlogTC$	-3.721	-8.84	$Vector = 1/d(d(Y_{d-1}{}^2))$				

Table 20 shows that a 1% increase in growth of disposable income, income taxes and total cost could have significantly caused economic profit growth to rise on average annually by 4.73%, 4.24%and -3.721% respectively, ceteris paribus in Uganda during the 1973 to 2020 period showing that income tax growth has positive effect on profit growth. In addition, tax revenues could influence profit growth though the provision of the required infrastructure like roads information and communication technology systems that can stimulate business growth and economic profit generation.

Table 21. Estimation of profit groth with growth in the national indicators in Uganda

Dependent Variable: $dlogW$						Period: 1972-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogYd$	5.217	10.94	0.992	2.02	1352	0.81	49
$dlogG$	0.376	5.34					
$dlogX$	0.525	17.32					
$dlogM$	-1.068	-15.04					
$dlogTC$	-4.01	-8.28	$Vector = 1/d(d(W^2))$				

Table 21 shows that a 1% increase in growth of disposable income, government spending, exports imports and total cost could have caused economic profit growth to rise on average annually by 5.217%, 0.37%, 0.525% and -4.01% respectively. Results from Table 21 indicate that stimulation of consumption could be important for enhancing profit growth in Uganda.

Implying that One District One Factory could be a good policy for income generation at the district level for ehancing the circular flow of income at the local level. Meanwhile, export promotion has a much higher potential (0.525) than import promotion (-1.07) does in stimulation of economic profit growth.

Table 22. Effects of growth in four national indicators on profit growth in Uganda

Dependent Variable: $dlogW$						Period: 1972-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogCn$	16.6	11.52	0.999	1.95	16261	0.41	49
$dlogI$	5.82	10.23					
$dlogG$	0.45	8.41					
$dlogX$	0.43	11.10	$Vector = 1/d(d(Y_d{}^2))$				

Table 22 shows that a 1% increase in growth of household consumption, investment spending, government spending, exports, imports and total cost could have caused economic profit growth to rise on average annually by 16.6%, 5.82%, 0.45% and 0.43% respectively, ceteris paribus.

Table 23. Effects of Technological Progress on Economic Growth in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogA(-1)$	2.42	57.61	1.0000	2.07	5.34×10^5	0.00	48
$ddlogY$	1.00	732.7	$Vector = 1/d(d(TF_{-1}{}^2))$				

Table 23 shows that a 1% increase in growth of technology could have caused economic growth to raise on average annually by 2.42%, ceteris paribus.

Table 24. Effect of growth in real level of technology on economic growth in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogA_R$	2.419	3.34×10^7	1.0000	1.81	2.91×10^{16}	0.00	48
$dlogK$	0.155	96×10^7					
$dlogL$	0.562	5.93×10^7	$Vector = 1/d(d((d(Y_d))^2))$				

Table 24 shows that a 1% increase in real technology, capital and labour could have caused economic growth to annually rise on average by 5.73%, 2.419%, 0.155 and 0.562% respectively.

Table 25: Effect of growth in real level of technology on economic growth in Uganda

Dependent Variable: $dlogW$						Period: 1972-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Stat.	HSDT	N
$dlogA_R$	14.34	14.36	0.9998	1.79	2.78×10^5	0.03	49
$dlogKp$	2.61	4.47					
$dlogLp$	5.22	5.22					
$dlogTC$	−8.67	−8.67	$Vector = 1/d(d(Y^2))$				

Table 25 shows that a 1% increase in growth of real technology, capital, labor and total costs could have caused economic profits growth to have a yearly rise on average by 14.34%, 2.61%, 5.22% and -8.67% respectively.

Table 26. Effects of augmented labor growth on economic growth in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogA$	0.283	6.41×10^6	1.0000	1.80	2.91×10^{16}	0.00	48
$dlog(A.K)$	0.155	2.95×10^7					
$dlog(A.L)$	0.562	5.93×10^7	$Vector = 1/d(d((d(Y_d))^2))$				

In Table 26 a 1 percent increase in growth of technology, capital and labour could have cause annual economic growth to rise by 0.284%, 0.155% and 0.562% respectively in Uganda during the given period.

Table 27. Effect of economic growth, on technological progress in Uganda

Dependent Variable: $dlogA$						Period: 1973-2020	
Variable	Coeff.	t-Statistic	R^2	DW	F-Statistic	HSDT	N
$dlogY$	0.283	7963	1.0000	2.02	8.05×10^8	0.10	48
$dlogKp$	0.155	1236					
$dlogLp$	0.562	1696	$Vector = 1/d(d((d(W))^2))$				

Table 27 shows that a 1% increase in growth of GDP, capital productivity & labor productivity could have caused economic growth to have a yearly rise on average by 0.283%, 0.155% and 0.562% respectively.

Table 28. Effects of growth in augmented capital productivity on economic growth

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogA$	6.074	2.32×10^5	1.0000	1.85	6.40×10^{11}	0.17	48
$dlog(A.Kp)$	-0.548	-1.37×10^5					
$dlog(A.Lp)$	-1.989	-1.29×10^5	$Vector = 1/d(d((d(Y)))^2))$				

Table 28 shows that a 1% increase in growth of technology, augmented capital productivity and augmented labor productivity could have caused economic growth to increase by a yearly average of 6.07%, -0.548% and -1.989% respectively.

Table 29. Estimation of economic growth with capital productivity in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Stat.	HSDT	N
$dlog(K_{p(-1)})$	0.760	10.68	1.0000	2.02	18236	0.01	48
$dlog(L_{p(-1)})$	1.404	10.96					
$dlog(Y/(K_p * L_p))$	1.281	8.30	$Vector = 1/d(d(Y^2))$				

Table 29 shows that a 1% increase in growth of capital productivity & in labour productivity could have caused economic growth to yearly increase on average by 0.760%and 1.404% respectively.

Table 30. Estimation of economic growth with growth in true technology level

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogA_R$	2.445	3.34×10^7	1.0000	1.81	2.91×10^{16}	0.00	48
$dlogK$	0.155	2.96×10^7					
$dlogL$	0.562	5.93×10^7	$Vector = 1/d(d((d(d(Y_d)))^2))$				

Table 30 shows that a 1% increase in growth of true level of technology, capital and labor on could have caused economic growth to yearly increase on average by 2.445%a, 0.155% and 0.5624% respectively in Uganda during the 1973 to 2020 period.

Table 31: Effects of Innovation Advancement on Economic Growth in Uganda

Dependent Variable: $dlogY$						Period: 1974-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$dlogZ$	3.537	3.52×10^9	1.0000	2.10	9.57×10^{26}	0.00	47
$ddlogY$	1.000	3.13×10^{13}	$Vector = 1/d(d(TF_{-1}{}^2))$				

Table 31 shows that a 1% increase in innovation advancement could have caused economic growth to annually rise annually on average by 3.537%, ceteris paribus.

Table 32. Estimation of economic growth with investment to capital ratio in Uganda

Dependent Variable: $dlogY$						Period: 1973-2020	
Variable	Coeff.	t-Stat.	R^2	DW	F-Statistic	HSDT	N
$ddlog(I/K)$	17.626	3.64	0.9998	1.93	803927	0.00	48
$dddlogY$	0.771	48.45	$Vector = 1/d(d(TF_{-1}{}^2))$				

Table 32 shows that a 1% increase in growth of technology advancement could have caused economic growth to annually rise on average by 3.537%.

5. DISCUSSION

In this paper we use the generalized least squares (GLS) method to conduct the data analysis. For each of the regressions, tests are conducted by examining the coefficient of determination, statistic, Durbin-Watson statistic, F-statistic, heteroscedasticity statistic and transformation vector all indicate the regression results to be good enough for drawing reliable conclusions. Meanwhile, all the parameters of interest obtained are found to be significantly different from zero. According to Rubi (2008) the Causality Principle states that all real events necessarily have a cause. The principle indicates the existence of a logical relationship between two events: the cause always precedes the effect. Thus, we assume that no product is introduced in the economy at the beginning of the year. But at the end of the year the products will have increased from zero up to level of income. Here we assume that the economy is following the tendency that systems have to evolve towards equilibrium. The increase in products can be described by the flux accounting for the quantity of output per level of investment spending at the beginning of year,

Table 4 shows that the economy is all the time at the equilibrium state all the time. Meanwhile, there may be times when the economy is briefly stationary at equilibrium, but there are times when the economy drifts away from equilibrium before it reverts back to its equilibrium state. When the regression is performed in logarithm the respective coefficients differ from each other. Meanwhile, Table 5 confirms “the superiority of economic profit is the break-even point” (Steliac, 2010) because by the short run economic growth being zero does not mean that the long run profits would be zero. Moreover, the actual economy is subject to fluctuations and economic profit captures the up and down movements of the economic variables about the equilibrium very well.

Table 6 implies that if capital was to become more productive, firms would be in a position to produce more products with the same amount of capital stock. On the other hand, if capital becomes more productive, then the firms would be in a position to produce the same quantity of products with less units of capital. The same applies to firms when labour becomes more productive. What is very clear is that increase in the productivity of an input, causes that input to become more expensive to use. Therefore, the price increase in the cost of such input would cause firms to buy and use less of that input. As a result, a fall in demand of an input would cause less input to be employed in the production process, hence resulting in output decline. Clearly, production of the same amount of output by using less amount of input leads to the maximization of the per unit profit as depicted by the coefficient of profit being very close to 1.

Results in Tables 7 and 8 confirm Moseley (1997) to be correct on the Marxian theory. This theory states that the performance of the capitalist economies depends on the rate of profits. As a result, when its profit is high the capitalist firm enjoys high prosperity in terms of high business investments, low unemployment, and rising living standards of workers. The reverse is true when profit is low. Thus, when the profit rates are low, the prosperity of the capitalist becomes depressed and stagnant. In brief, in the capitalist economies rampant crises are common. Capital or labour becomes more productive due to the amount of technology embedded in it. The productivity of inputs causes the producers of goods and services to produce the same amount of output with less units of inputs. Implying that the more a firm employs more productive units of inputs in production process, the more output it generates, the less costs it incurs and the more profits it generates.

Meanwhile Table 10 shows that the labour elasticity of income is almost as much as it is in the neoclassical production function regression results in Table 3, implying that our results are robust. The implication of such results in Table 9 is that although growth in both capital accumulation and total cost of production enhance income per capita growth (economic development), population growth dose not. The lesson to learn from here is that for a country to develop more rapidly, it must enhance the economic profits as it controls its population growth.

According to Table 11 profit can be examined at the level of the firm, sector, or economy; gross or net; and at many other different levels. This present section examines the profitability of production in the entire economy with a focus on its role in enhancing economic growth. Gross profit of the firms is revenue minus wages and costs of other intermediate inputs. It includes an equilibrium return to factors employed: interest costs, a return to enterprise or management, and in some cases the labour income of the self-employed.

It includes categories of normal profit (any surplus over and above normal profit represents rents or super-normal profits). These super-normal profits are often derived from monopoly or from semi-fixed factors like capital stock (Chan-Lee and Sutch, 1985, p.129).

However, these super-normal profits are competed away in long-run competitive equilibrium. Thus, leaving only the return necessary to keep factors in place. Meanwhile, the degree of competition varies in practice leading to endless interruptions to the process, arising from the introduction and diffusion of new technology and other shocks. Consequently, the observed data reflect a series of adjustment paths that portray the level of profit at any time to be a function of the state of disequilibrium indicating that the division between normal and super-normal profits cannot be identified (Chan-Lee and Sutch, 1985, p.129).

Theoretical arguments regarding the effects of innovation on profit growth show that better performing firms are likely to engage in innovative activities (Freeman, 1994). It suggests that innovation is an indicator that shows only better firms are likely to innovate. Meanwhile, some studies show that innovation plays an important role in firm profitability because innovation enables firms to produce new brands, strengthen their position in the market, gain competitive advantage, and boost productivity (Ali, 1994; Greve & Taylor, 2000; Ngoc Mai et al., 2020).

From Table 15 it can be discerned that upon substitution of innovation for income, in the economic profit function having capital productivity and labour productivity as variables all the parameters in the resulting regression equation become more than one. The GLS regression results obtained indicate that innovation could have played a key role in enhancing economic profit growth in the country during the given period. So that, a 1% increase in innovation advancement could have caused growth in economic profits to rise by 3.592%. This particular finding also indicates that productivity of labour or capital causes use of fewer inputs in the production process. As a result, firms in the economy would tend to spend less to meet the input costs of production, while reaping a lot of revenue and profits.

Similarly, results in Table 16 indicate that upon substitution of innovation for income, in the economic profit function having capital and labour as additional variables all the parameters in the resulting regression equation are more than one. The GLS regression results obtained indicate that innovation could have played a dramatic role in enhancing economic profit growth in the country during the given period.

In Table 21 we find that household disposable still had a positive and significant effect on economic profits between 1972 and 2020. Secondly, our results in Table 17 are in support of what some theorists believe in: that growth affects profitability, while others believe that profitability causes growth. Blundell and Bond (1998) results show statistically significant positive relationship between current profits and current growth.

Meanwhile, empirical results coming from Coban (2014) show that the effect of current profits on current growth is much stronger than the impact of current growth on current profits in the case of Turkish manufacturing firms. Our finding supports the conclusion that Coban (2014) makes that current income has significant and positive effects on profits. Table 18 represents the notion that economic profit is a function of the equilibrium between the demand for output and (aggregate supply). In the dynamic state, aggregate demand for output has very high effect on economic profits.

Similarly, Table 18 represents the notion that economic profit is a function of the equilibrium between the demand for household goods and services as well as (aggregate supply). In the dynamic state, aggregate demand for disposable income has very high effect on economic profits. In the treatment of our model in Table 19, the model is based on the fact that disposable income is aggregate income after deduction of taxes from aggregate income. Therefore, we strongly believe that aggregate income equals disposable income plus income taxes. We then find that both disposable income and income taxes could have had significant and positive influence on economic profits in Uganda during the 1973 to 2020 period, ceteris paribus. Implying the indirect contribution of tax to profits in the country could have been within the range of 40% to 50%.

Table 22 shows that the household consumption had positive and the greatest significant effect on economic profits in Uganda during the 1972 to 2020 period. By employing the theoretical framework of Alani et al. (2022) we find that during the given period the technology elasticity of income was 2.42 as shown in Table 22. This finding implies the case of increasing returns to knowledge where the Cobb-Douglas production function exhibits real technology elasticity of income 2.42 as shown in Table 22, where the relation between restricted technology and real (true) technology.

On comparing Table 23 with Table 24 it can be deduced that augmenting the Cobb-Douglas production function according to Mankiw et al. (1992) indicates that at equilibrium technological progress and economic growth reinforce each other at a rate exhibited by the technology elasticity of income or income elasticity of technology (0.283). Tables 27 and 28 reveal that there is inverse relationship between capital and capital productivity as well as between labour and labour productivity. Once again augmenting capital productivity and labour productivity in the Cobb-Douglas production function according to Mankiw et al. (1992) as given in Table 28 shows the net effect of technological progress and growth in productivity of labour and capital is much higher than previously thought (without augmentation), i.e., it is 3.537 instead of 1.

Meanwhile, from Tables 28 and 22 it can be discerned that the circular flow of income is in operation because the average annual capital accumulated is almost equal to the average aggregate amount of goods and services consumed as depicted by the investment to capital ratio elasticity of income (17.7) and consumption elasticity of income (16.6). The real flow of income describes the flow of aggregate goods and services and the flow of aggregate factor services in an economy. The flow of factor services from households generates money that flows form firms to households in form of factor payments. The circular flow of income implies the continuous flow of production, income and expenditure. In the circular flow of income, the real flow takes place in one direction but the monetary flow takes place in the opposite direction.

Finally, growth in: investment to capital ratio, economic profits, technology and innovation were instrumental in causing economic growth in Uganda during the 1970 to 2020 period. Meanwhile, growth in: household consumption, investment to capital ratio, disposable income, real income (GDP), technology and innovation had spectacular effects on economic profit growth in Uganda during the 1970 to 2020 period.

These findings imply economic growth and growth in economic profit feed on each other. More importantly, among other things the government of Uganda must endeavour to ensure persistent growth in the investment to capital ratio.

CONCLUSION

Our empirical findings show that a 1% increase in growth of (a) investment to capital ratio, (b) innovation advancement, (c) real technology, (d) total cost, (e) technology, (f) labour, (g) capital stock, (h) economic profit, and (i) profit ratio growth could have caused annual economic growth to rise by (a) 18%, (b) 3.537%, (c) 2.445%, (d) 1.61%, (e) 1.00%, (f) 0.58%, (g) 0.24%, (h) 0.17% and (i) 0.17% respectively, ceteris paribus in Uganda during the 1970 to 2020 period.

Empirical analysis shows that growth in capital accumulation had the greatest direct contribution to economic growth in Uganda during the given period, ceteris paribus; followed by innovation advancement and technological progress. On the other hand, empirical findings show that a 1% increase in (a) household consumption growth, (b) growth in innovation, (c) disposable income growth, (d) growth in investment spending, (e) growth in income, (f) technological progress, and (g) income tax growth could have caused annual economic growth to rise by (a) 17%, (b) 15%, (c) 8.42%, (d) 5.92%, (e) 5.82%, (f) 5.25% and (g) 4.24% respectively, ceteris paribus in Uganda during the 1970 to 2020 period. Hence, implying that among other things, in the long run growth in economic profits stimulates economic growth.

Finally, growth in household consumption had the greatest direct contribution to economic profit growth in country during the given period, ceteris paribus. Hence, for the economy of Uganda to grow faster, there is need for the country to set its priority goals to be enhancing (a) capital accumulation (b) stimulation of consumption through creation of more jobs, (c) innovation advancement, (d) technological progress and (e) investment.

FUNDING

There are no financial and personal relationships with other people or organizations that could inappropriately influence/or bias our work.

ACKNOWLEDGEMENT

Outstanding reviews, editorial support, and constructive comments are acknowledged.

1. **REFERENCES**
2. Alani, J. (2021). Role of Higher Education Growth in Enhancing Economic Growth, Innovation Advancement and Technological Progress in Uganda (1970-2014). *The Uganda Higher Education Review*, *9*(2), 1.
3. Ali, A. (1994). Pioneering Versus Incremental Innovation: Review & Research Propositions *Journal of Product Innovation Mana*gement, 11(1), 46-61.
4. Basu, D., Huato, J., Jauregui, J. L., & Wasner, E. (2025). World profit rates, 1960-2019. *Review of Political Economy*, *37*(1), 92-107.
5. Besanko, D., Braeutigam, R. R., & Gibbs, M. (2005). *Microeconomics*. Hoboken.
6. Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, *87*(1), 115-143.
7. Campante, F. F, Sturzenegger & A. Velasco (2021). *Advanced Macroeconomic: An Easy Guide*. London: London School of Economics Press.
8. Carbaugh, R. & T. Prante (2011). A Primer on Profit Maximization. *Journal of Economic Educators*, 11(2): 34-45.
9. Chan-Lee, J.H. & H. Sutch (1985). Profits & Rates of Return in OECD Countries. *OECDE Comity Studies*, 5, 127-167.
10. Coban, S. (2014). The Interaction between Firm Growth and Profitability: Evidence from Turkish Listed) Manufacturing Firms. *Bilgi Ekonomisive Yönetimi Dergisi Cilt*, 9 (2), 73-82.
11. Eaton, C., D. Eaton & D. Allen (2005). *Microeconomics: Theory with Applications*. Upper Saddle River, New Jersey: Prentice Hall.
12. Freeman C. (1994). Innovation and Growth. in Dodgson M. & Rothwell R.(eds), *The Handbook of Industrial Innovation*. Cheltenham: Edward Edgar.
13. Greve, H.R. & A, Taylor (2000). Innovations as Catalysts for Organizational Change: Shifts, in Organizational Cognition and Search. *Administrative Science Quarterly*, 45(1), 54-80.
14. Hadden, J.J. (1965). *A study of the consumption function in Canada*. Electronic Theses and Dissuasions, 6384.
15. Krugman, P. & R. Wells (2009). *Economics*. Madison Avenue, New York: Worth Publishers.
16. Lipsey, R.G. & K.I. Carlaw (2004). Total Factor Productivity and Measurement of Technological Change. *Canadian Journal of Economics*, 37(4): 1118-1150.
17. Mankiw, G. (2009). *Principles of Microeconomics*. London: Cengage Learning.
18. Mankiw, N.G. (2010). *Macroeconomics (Seventh Edition)*. New York: Worth Publishers.
19. Mankiw, N.G. D, Romer & G.N. Wiel (1992) A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, 407-437.

20. Mishkin, F.S. (2004). *Economics of Money, Banking and Financial Markets*. Boston: Pearson.
21. Moseley, F. (1997). The rate of profit and the future of capitalism. *Review of Radical Political Economics*, *29*(4), 23-41.
22. Ngoc Mai, A. H. Vu Van, & B. Bui Xuan (2020). The Lasting Effects of Innovation on Firm Profitability: Panel Evidence from a Transitional Economy. *MPRA Paper*, 98168.
23. Prajogo, D.I. & P.K. Ahmed (2006). Relationships between Innovation Stimulus, Innovation Capacity, and Innovation Performance. *R&D Management*, 36(5): 499-515.
24. Romer, D. (1996). *Advanced Macroeconomics*. New York: McGraw-Hill.
25. Rubi, J.M. (2008). *The Causality Principle: Complexity is the Limit*, in Confluence: Interdisciplinary Communications 2007/2008. Edited by: Osberg, W., 119-122, Oslo Norway: Center for Advanced Study, Norwegian Academy of Science and Letters.
26. Siddiqi A. (1965). *Profits*. Doctoral Thesis. Available at the Department of Economics, Aligarh Muslim University.
27. Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65-94.
28. Solow, R. M. (1957). Technical change and the aggregate production function. *The Review of Economics and Statistics*, *39*(3), 312-320.
29. Steliac, N. (2015). The Superiority of Economic Profit, the Break-Even Point.
   https://www.researchgate.net/publication/279528522 (Accessed 15.12.2024)
30. Walker, E. & A. Brown (2004). What Success Factors are Important to Small Business Owners? *International Small Business Journal*, 22(6), 577-594.
31. Weil, D.N. (2013). *Economic Growth (Third Edition).* Boston: Pearson Education Ltd.