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CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	CHALLENGES AND OPPORTUNITIES IN BUILDING THE EMPLOYEES' ORGANISATIONAL COMMITMENT: A STUDY WITH REFERENCE TO THE EDUCATION SECTOR (NCR REGION) <i>SANGEETA RANI & PRABHAT SRIVASTAVA</i>	1
2.	COMMON DENOMINATORS OF WRITING DISABILITY <i>DR. SREEDEVI.V.G.</i>	4
3.	CONSUMERS ATTITUDE AND PREFERENCES TOWARDS DAIRY PRODUCT: A STUDY OF MILMA MILK WITH SPECIAL REFERENCE TO NALLEPILLY PANCHAYATH <i>DR. P. S. CHANDNI & SARANYA .S</i>	10
4.	GOLD JEWELLERY TREND IN INTERNATIONAL GOLD MARKETS <i>GNANADURAI PANDITHURAI & JOJI CHANDRAN</i>	14
5.	IMPACT OF TELEVISION ADVERTISEMENTS OF JUNK FOOD ON CHILDREN WITH SPECIAL REFERENCE TO SALEM CITY <i>DR. S. DHAKSHAYANI & P. V. RAJESWARI</i>	18
6.	FDI IN INDIA: CURRENT TRENDS AND WAY FORWARD <i>BALA DEVI & REKHA RANI</i>	25
7.	WORK STRESS WITH SPECIAL REFERENCE TO EMPLOYEES OF ELANTE MALL (CHANDIGARH) <i>RENU SAINI</i>	28
8.	STOCKHOLM SYNDROME WITHIN THE FRAMEWORK OF GOVERNMENT-VOTER BEHAVIOUR: COALITION YEARS 1991-2002 IN TURKEY <i>CEYHUN HAYDAROĞLU</i>	34
9.	AN INSIGHT INTO THE CONCEPT OF FINANCIAL SOCIALIZATION WITH SPECIAL REFERENCE TO ROLE OF PARENTS <i>SHIKHA SHARMA</i>	41
10.	A STUDY ON ROLE OF MILKFED IN PUNJAB <i>HARPREET KAUR</i>	45
11.	MANUFACTURING SECTOR: AN MISSED OPPORTUNITY & WAY AHEAD <i>BALA DEVI</i>	48
12.	ROLE OF FISCAL POLICY IN ECONOMIC DEVELOPMENT <i>DARSHINI.J.S</i>	52
13.	ANALYSIS OF THE FINANCIAL SUPPORT FOR HOTEL AND LODGING INDUSTRY IN KASHMIR: PERSPECTIVES ON INSTITUTIONAL SUSTAINABILITY INITIATIVES <i>AIJAZ AHMAD DAR & DR. SUSHIL KUMAR MEHTA</i>	60
14.	RESEARCH AND METHODOLOGIES OF RURAL DEVELOPMENT AND EMPLOYEES JOB SATISFACTION <i>G. APARNA & DR. C. SUBRAMANIAN</i>	65
15.	A STUDY ON IDENTIFICATION OF TOP FACTORS IMPACTING EMPLOYER BRANDING IN IT MULTINATIONALS IN INDIA & ITS STRATEGIC IMPLICATIONS <i>DR. SONAL SHREE, APURVA SAXENA, ASTHA AWASTHI & SEEMA KOHAR</i>	68
16.	ANALYSIS OF THE EFFECT OF GOVERNORS' TERM ON MONETARY POLICY: A CROSS-SECTIONAL ANALYSIS OF SELECTED SUB-SAHARAN AFRICAN CENTRAL BANKS <i>DR. IBRAHIM NYABOGA, NYAUNCHO JOSIAH & ELIJAH MAGORI OMOBE</i>	73
17.	VERTICAL INTEGRATION AS GROWTH STRATEGY: AN ANALYSIS IN THE MEXICAN CORN SECTOR <i>JOSÉ G. VARGAS-HERNÁNDEZ, JOSÉ SATSUMI LÓPEZ-MORALES & ROSA PENÉLOPE MARES-GALINDO</i>	78
18.	ANXIETY AND SELF-CONCEPT OF SECONDARY SCHOOL STUDENTS: SPECIAL REFERENCE TO THE STATE OF ASSAM AND SIKKIM <i>RASHMI MILI & NAR MAYA SUBBA</i>	83
19.	MODELING THE CAUSES OF STAGNATION OF A MATURED CAPITALIST ECONOMY <i>SAIKAT BHATTACHARYA</i>	88
20.	RISE OF PLASTIC MONEY IN MODERN ERA AND ITS ECONOMIC DIMENSIONS <i>KIRAN SINGH PARIHAR</i>	92
	REQUEST FOR FEEDBACK & DISCLAIMER	97

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MODELING THE CAUSES OF STAGNATION OF A MATURED CAPITALIST ECONOMY

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ABSTRACT

The crisis of 2008 clearly shows the weak economic condition of the developed countries. This weakness is not limited to any particular economy rather all developed economies are showing low growth rates. Moreover, a closer look will make it clear that most developed capitalist economies are facing the problem of low growth rate since 1990s. Developed countries like Japan, Germany, France, United Kingdom are recording almost less than 2% average annual growth rates for the last two decades. Even USA is struggling to return to its pre-2008 crisis growth rate at the moment. In this paper we have explained the low growth in matured capitalist economy as inherent contradiction in capitalist economy. So we here present a model which shows that capitalist economy stagnated as it matures i.e. more and more goods and services are produced by capitalism. We have applied here Marxian concept of continuous profit accumulation by increasing automation and Schumpeterian concept of product innovation and process innovation by capitalist entrepreneurs to raise profit. On one hand as new product is introduced, profit is made by recruiting more labor which raises real wage in the capitalist economy. But in process innovation, profit is made by increasing automation which reduces demand for labor and hence real wage. In early stage of capitalism, existing product base is small so effect of automation is low but as existing product base rises impact of automation dominates that of product innovation. We have divided the paper into five sections where section 2 explains the theory working behind the model, section 3 explains the relation between technological progress and employment where there is no introduction of new products, section 4 explains the model with closed economy and fixed population, section 5 explains the model with closed economy and changing population and section 6 gives the concluding observations.

KEYWORDS

economy, closed economy, matured capitalist economy.

1. INTRODUCTION & LITERATURE REVIEW

The theory of monopoly financial capitalism is first forwarded by Marxist economist ¹Paul M. Sweezy and Harry Magdoff in the two books namely "Irreversible Crisis" and "Stagnation and the Financial Explosion". Now theory of Monopoly Financial Capitalism says that capitalism in the monopoly financial capitalist stage can survive by creating bubbles in the financial market by continuously inflating financial asset prices. Thus speculative profits can be made by buying and selling of financial assets (including real estate). This asset price inflation feeds on the assumption of the investor that asset prices only go up and it is done by channeling huge credit to finance speculative activities. This can be traced from rising debt to GDP ratio in all matured capitalist economies. But as asset price inflates above the real valuation of the asset the time will come sooner or later when bubble will burst. Thus the capitalist economy starts facing recession. Now capitalist investors find no more financial assets in which they can profitably invest. So investment as a whole in the economy falls. Hence recession is in full force. Now as financial asset price starts falling, asset holders have to face losses and creditors who financed those asset holders start facing losses too since their debtors are defaulting. At this moment Government of a matured capitalist economy emerges to save financial firms from defaulting. The Government bails out the financial firms using expansionary monetary policies. This can be seen historically in US economy in the year 1987, 2001 and 2008. Thus its becoming clear that matured capitalist economies are getting adopted to this kind of policies in this age.

²John Bellamy Foster and Fred Magdoff has extended this theory and applied it to understand the Great Financial Crisis that originated in 2008 from sub-prime mortgage crisis of USA in their book, "The Great Financial Crisis- Causes and Consequences". They said that in USA in this age of Monopoly Financial Capitalism the financial firms are using financial assets of common people of households as collaterals and spreading debt among US households. Thus debt of household rises too. This household debt was actually stimulating the consumption of US economy which actually helped to counter the over-accumulation crisis in US economy. Financial firm themselves have become debtors in this age of Monopoly Financial Capitalism. Thus the financial firms who financed asset holders' investment in financial assets are debtors too. These financial firms start facing default too.

³A. Shaikh in his "Falling Rate of Profit and Economic Crisis in USA", shows us the continuous fall of profit rate in USA between 1970 and 1987 and with cointegration analysis pointed out that falling profit is leading to fall in investment in the US economy and not the other way round.

⁴Easterly William in his "Economic Stagnation, Fixed Factors and Policy Thresholds" points out how lack of production inputs including land, skilled labor as well as stagnant population can lead to stagnation in an economy.

⁵Edward Prescott and Stephen Parenti in his "An Exogenous Growth Model Based on Total Factor Productivity" shows that the growth rate of a country depends on technology stock of the world and the later a country starts the more the technological stock available for it and higher is its growth rate of output and faster is its development.

2. THEORY BEHIND THE MODEL

This model is based on Marxian concept of capital accumulation, Schumpeterian idea of innovation and input output model framework.

By Marxian concept of capital accumulation, we mean that: Two class i.e. capitalist class and labor class. Capitalist class has several properties :-> (1) the desire of continuous capital accumulation; (2) ownership of means of production; (3) capitalist class employs labor class to produce goods and services by using the means of production; (4) capitalist class earns profit by selling goods and services at a price above what was to labor class as wage; (5) this profit is the basis of capital accumulation.

By Schumpeterian concept of innovation, we mean that: (1) Applying new technology to create new goods and services. (2) Applying new technology in existing production i.e. automation.

In our Input-Output model we hold the following assumptions: (1) There is one capital accumulating sector. Labor is supplied from outside the model. (2) Labor is completely mobile between different products. (3) There is full employment of labor i.e. for a specific real wage rate offered the total amount of labor demanded by the accumulating sector is equal to total amount of labor supplied from outside. If more labor is demanded by the capital accumulating sector, it has to offer higher real wage to draw in more labor from outside.

¹ Sweezy, Paul M. and Magdoff, H. "Stagnation and the Financial Explosion", *Monthly Review Press* (2008).

Sweezy, Paul M. and Magdoff, H. "Irreversible Crisis", *Monthly Review Press* (1998).

² Foster, J. B. and Magdoff F. "The Great Financial Explosion: Causes and Consequences", *Monthly Review Press* (2009).

³ Shaikh, A. "The Falling Rate of Profit and the Economic Crisis in the US", *unpublished* (October, 1987).

⁴ Easterly William, "Economic Stagnation, Fixed Factors and Policy Thresholds", *Working Paper of Economics Department of World Bank* (October, 1991).

⁵ Parenti Stephen and Prescott Edward "What a Country Must Do to Catch up Industrial Economies", *Working Paper of Economics Department of World Bank* (October, 2001).

The capitalist class will want to increase profit by introducing new technologies. Whenever a new technology is invented, it can be used by the capitalist class in two ways. First is to raise profit rate in the existing production and second is to raise profits from introducing new production. Now profit rate from existing production can be raised by increasing capital labor ratio in the production process. So this automation of production reduces demand for labor. On the other hand, new production increases demand for labor. So new product introduction brings about rise and fall in demand for labor simultaneously.

This model shows that during initial years of capitalism, when the size of existing production is negligible and all production is new production from capitalist point of view, the demand for labor is high. But as the capitalism matures and existing production size is large enough, the impact of new production increasing demand for labor becomes marginal. Hence the falling labor demand from automation of existing production has more impact. So demand for labor is low.

Now the model also assumes that the goods and services produced are entirely consumed by the labor class while capitalist class used all its income in investing for capital accumulation. So fall in demand for labor implies fall in demand for wage rate which implies fall in demand for consumption of goods and services. So fall in labor demand growth rate entails fall in output growth rate as capitalist economy matures.

Hence, the model predicts that as capitalism matures and the number of production rises, the demand for labor falls. Now growth rate of output also depends on the growth rate of demand for labor which further effects growth rate of real wage. And rise or fall in wage and employment growth rate entails rise or fall in demand for consumption goods. So fall in growth rate of labor demand entails fall in growth rate of output. So as capitalism matures, growth rate of output becomes lower steadily and can end up in stagnation.

3. RELATION BETWEEN PROFIT RATE AND DIRECTION OF TECHNOLOGICAL PROGRESS IN A MODEL OF OLD PRODUCT WITH NO INTRODUCTION OF NEW PRODUCTS

In this model production consists of two types of goods: (1) consumer products and (2) the capital goods required to produce those consumer products.

Both consumer products and capital goods use labor and capital goods as factors.

The capitalist class hires labor and gives wage in return. Labor is hired from outside the model. The more the amount of labor the capitalist class needs to employ the higher is the real wage rate that capitalist class must offer in order to draw in more labor from outside the model.

Similarly, real profit rate rise too as the demand for capital goods rises. This is because capital goods require inputs like labor and different raw materials which are supplied from outside the model. As demand for capital goods rises, demand for these inputs rises as well and so their price. Thus, real profit rate rises.

Moreover, the demand for consumer products comes from the labor class only. Capitalist class spends its entire income in capital accumulation.

NOTATIONS

p = general price level in the economy

Y = aggregate output level in the economy

w = wage rate

r = profit rate

L = amount of labor employed in the economy

K = amount of capital in forms of machineries called capital goods produced and employed in the economy

C = consumer product produced in the economy

p_c = price of consumer good

EQUATIONS

$$Y = C + K \quad (1)$$

[There are two types of production: a consumer good and capital goods.]

$$C = AK \quad (2)$$

[Where, A is a constant implying the ratio of consumer product produced to the capital goods employed in the economy.]

$$pY = wL + rK \quad (3)$$

[Both consumer good and capital goods use labor and capital good as factors.]

$$L = aK \quad (4)$$

[Where, a = labor-capital ratio or technological coefficient.]

$$w/p = bL = baK \quad (5)$$

[Here b is a positive constant implying real wage rate is directly related to the total amount of labor employed in the economy. As total number of employed labor increase, real wage increase too at a fixed ratio.]

$$r/p = hK \quad (6)$$

[Here, h is a positive constant implying that as the employment of capital goods in the economy rise, the real profit rate rise too at a fixed ratio.]

$$p_c C = wL \quad (7)$$

[Here we assume the entire consumer goods is consumed by the labor class.]

Here in this system, we have seven equations and seven endogenous variables i.e. Y , C , K , L , a , w and r . The parameters in the system are: A , p , p_c , h and b .

At equilibrium,

$$pY = p(C+K)$$

$$\Rightarrow wL + rK = pC + pK$$

$$\Rightarrow waK + rK = pAK + pK$$

$$\Rightarrow wa + r = pA + p$$

$$\Rightarrow (w/p)a + (r/p) = 1 + A$$

If capitalist class wants to increase (r/p) , $(w/p)a$ needs to fall since $(1+A)$ is constant. Hence, to raise real profit rate, capitalist class either has to reduce wage or reduce labor capital ratio which will entail fall of wage or has to do both simultaneously. So new technology will be used by the capitalist to reduce labor-capital ratio to raise real profit rate.

MATHEMATICAL DEDUCTION 1

Since we assume that the entire consumer goods is consumed by the labor class then,

$$p_c C = wL$$

Taking natural logarithm on both sides we get,

$$\ln p_c + \ln C = \ln w + \ln L$$

Differentiating both sides with respect to time t we get,

$$(1/p_c) (dp_c/dt) + (1/C) (dC/dt) = (1/w) (dw/dt) + (1/L) (dL/dt)$$

[Let us denote $(1/i) (di/dt) = \Delta i$]

$$\Rightarrow 0 + \Delta C = \Delta w + \Delta L$$

[since, p_c is a constant at equilibrium]

$$\Rightarrow \Delta C = \Delta w + \Delta L$$

[since, $w/p = bL \Rightarrow \ln w - \ln p = \ln b + \ln L \Rightarrow \Delta w - \Delta p = \Delta b + \Delta L \Rightarrow \Delta w = \Delta L$ as p and b are constants]

$$\Rightarrow \Delta K = 2 \Delta L$$

[since, $C = AK \Rightarrow \ln C = \ln A + \ln K \Rightarrow \Delta C = \Delta A + \Delta K \Rightarrow \Delta C = \Delta K$ as A is a constant]

$$\Rightarrow \Delta Y = 2 \Delta L$$

[since, $Y = C + K \Rightarrow Y = K(1+A)$ (as $C = AK$) $\Rightarrow Y = KA' \Rightarrow \ln Y = \ln K + \ln A' \Rightarrow \Delta Y = \Delta K + \Delta A' \Rightarrow \Delta Y = \Delta K$ (as $A' = 1+A$ is constant)]

\Rightarrow So, growth rate of output = twice the growth rate of labor.

4. MODEL WITH CONTINUOUS INTRODUCTION OF NEW CONSUMPTION PRODUCTS WITH CLOSED ECONOMY AND FIXED POPULATION

Here we assume that the economy is closed, no government intervention, population is fixed and entire population falls within exchange economy i.e. entire population has purchasing power to consume all consumption goods and services. Moreover, a commodity caters to the entire market from the moment it is introduced. There is no lag period between the time of introduction of the model and the time when it is marketed to the entire population to the full extent.

Let K_i = total capital employed by commodity i for making it available to the entire population.

Commodity $i = i$ signifies the order of introduction of the commodity. First commodity introduced will be called commodity i .

a_{ij} = labor to capital ratio or technological coefficient of commodity i in period- j or after $[j-i+1]$ phases of commodity i , i.e. in period- j commodity i is automated for $[j-i+1]$ times.

L_i = total labor amount needed to produce commodity i for making it available to the entire population at the time of its introduction.

Another important assumption is that at each and every period, a new commodity is introduced and older commodities' labor-capital ratio falls. In real world whenever there is an invention of new technology, the capitalist class uses the technology to maximize profit. Profit can be maximized in two ways i.e. introducing new commodities and mechanization of older commodities. Again there is no lag period between introduction of new commodity and automation of older commodities' production process.

TECHNOLOGICAL COEFFICIENT MATRIX TABLE

TABLE 1

K_i	K_1	K_2	K_3	K_4	.	.	.	K_{n-1}	K_n
Period- 1	a_{11}								
Period- 2	a_{12}	a_{22}							
Period-3	a_{13}	a_{23}	a_{33}						
Period-4	a_{14}	a_{24}	a_{34}	a_{44}					
.
.
.
Period-n-1	$a_{1\ n-1}$	$a_{2\ n-1}$	$a_{3\ n-1}$	$a_{4\ n-1}$				$a_{n-1\ n-1}$	
Period-n	a_{1n}	a_{2n}	a_{3n}	a_{4n}				$a_{n-1\ n}$	a_{nn}

Estimated technological coefficient of all commodities in their phase-1 or time of introduction

$$\alpha_1 = (a_{11} + a_{22} + a_{33} + \dots + a_{n-1\ n-1} + a_{nn})/n$$

Estimated technological coefficient of all commodities in their phase-2

$$\alpha_2 = (a_{12} + a_{23} + a_{34} + \dots + a_{n-1\ n})/(n-1)$$

Similarly,

$$\alpha_3 = (a_{13} + a_{24} + a_{35} + \dots + a_{n-2\ n})/(n-2)$$

$$\alpha_j = (a_{1j} + a_{2\ j+1} + a_{3\ j+2} + \dots + a_{n-j+1\ n})/(n-j+1)$$

$$\alpha_n = a_{1n}/1$$

We know that, $a_{11} > a_{12}$, $a_{22} > a_{23}$, $a_{33} > a_{34}$ and so on since, profit rate can be increased only decreasing labor-capital ratio.

$$\Rightarrow \sum^{n-1} a_{ii} > \sum^{n-1} a_{i\ i+1}$$

$$\Rightarrow \sum^{n-1} a_{ii}/(n-1) > \sum^{n-1} a_{i\ i+1}/(n-1)$$

$$\Rightarrow \sum^{n-1} a_{ii}/(n-1) > \alpha_2$$

$$\Rightarrow \alpha_1' > \alpha_2 \text{ [Where, } \sum^{n-1} a_{ii}/(n-1) = \alpha_1']$$

$$\text{Now, } \alpha_1 = \sum^n (a_{ii})/n = [\sum^{n-1} a_{ii} + a_{nn}]/n$$

$$= [\sum^{n-1} a_{ii}/(n-1)] + [(\sum^{n-1} a_{ii}/n) - [\sum^{n-1} a_{ii}/(n-1)]] + a_{nn}/n$$

$$= [\sum^{n-1} a_{ii}/(n-1)] - [\sum^{n-1} a_{ii}/(n(n-1))] + a_{nn}/n$$

$$\alpha_1 \geq \alpha_2, \text{ according to,}$$

$$[\sum^{n-1} a_{ii}/(n-1)] - [\sum^{n-1} a_{ii}/(n(n-1))] + a_{nn}/n \geq \alpha_2$$

$$\Rightarrow \alpha_1' - [\sum^{n-1} a_{ii}/(n(n-1))] + a_{nn}/n \geq \alpha_2$$

$$\text{[Where, } \sum^{n-1} a_{ii}/(n-1) = \alpha_1']$$

$$\Rightarrow n(n-1)\alpha_1' - [\sum^{n-1} a_{ii}] + (n-1)a_{nn} \geq n(n-1)\alpha_2$$

$$\text{[Here, both sides are multiplied by } n(n-1)]$$

$$\Rightarrow n(n-1)\alpha_1' - [\sum^{n-1} a_{ii}] + (n-1)a_{nn} \geq n(n-1)\alpha_2$$

$$\Rightarrow n(n-1)(\alpha_1' - \alpha_2) + (n-1)a_{nn} \geq [\sum^{n-1} a_{ii}]$$

$$\Rightarrow n(\alpha_1' - \alpha_2) + a_{nn} \geq \alpha_1' \text{ [Here, } \alpha_1' - \alpha_2 > 0]$$

Now the larger the value of n , the higher the value of $n(\alpha_1' - \alpha_2) + a_{nn}$.

Hence, greater is the chance that $n(\alpha_1' - \alpha_2) + a_{nn} > \alpha_1'$

\Rightarrow higher the value of n , greater is the chance that $\alpha_1 > \alpha_2$.

\Rightarrow In matured capitalism where n is large implying $\alpha_1 > \alpha_2$.

The economic interpretation is that as the number of goods and services is small, the impact of a new good or service is quite visible and often leading. But as the number of goods and services rises, the impact of new technology on the over all economy is marginal in nature.

Similarly, $a_{12} > a_{13}$, $a_{23} > a_{24}$, $a_{34} > a_{35}$ then $\alpha_2 > \alpha_3$ when n is large.

Similarly, $\alpha_1 > \alpha_2 > \alpha_3 > \dots > \alpha_n$ as the value of n is large i.e. for matured capitalism.

Amount of labor used by commodity i at the time of introduction, $L_i = a_{ii}K_i$

$$\text{Therefore, } \sum(L_i) = \sum(a_{ii}K_i)$$

$$\Rightarrow nL_M = n\alpha_1 K_M$$

$$\text{[Where, } L_M = \sum(L_i)/n \text{ \& } K_M = [\sum(a_{ii}K_i)]/(n\alpha_1)]$$

$$\Rightarrow L_M = \alpha_1 K_M$$

$$\Rightarrow a_1 L_M = \alpha_1 K_M$$

$$\text{[Where, } a_1 = 1]$$

Here, L_M and K_M denote the amount of labor and capital employed by any commodity at the time of its introduction. Here, the value of labor and capital employed by any commodity implies the mean value of total amount of labor and capital employed for all commodities.

Now, α_1 is estimated labor-capital ratio of all commodities in their phase-i.

So $\alpha_1 K_M$ implies the average of the total labor employed by all commodities in their phase-i.

$$\text{Now, let, } \alpha_2 K_M = a_2 L_M \Rightarrow a_2 = \alpha_2 (K_M/L_M)$$

Here, a_i denotes the average ratio of total labor employed by all commodities in phase-i and total labor employed by all commodities initially.

$$\text{Similarly, } \alpha_3 K_M = a_3 L_M \Rightarrow a_3 = \alpha_3 (K_M/L_M)$$

$$\text{Similarly, } \alpha_n K_M = a_n L_M \Rightarrow a_n = \alpha_n (K_M/L_M)$$

Since, $\alpha_1 > \alpha_2 > \alpha_3 \dots > \alpha_n$ then, $1 = a_1 > a_2 > a_3 > \dots > a_{n-1}$

Now labor demand function in initial period is: $L_1 = L_M$.

In period-1, there is only one commodity more precisely oldest commodity i.e. commodity-1.

Labor demand function in period-2: $L_2 = a_2 L_M + L_M$.

In period-2, commodity-1 is automated for the first time and commodity-2 is introduced as well.

Labor demand function in period-3: $L_3 = a_3 L_M + a_2 L_M + L_M$.

Labor demand function in period-n: $L_n = a_n L_M + a_{n-1} L_M + \dots + a_2 L_M + L_M = (1 + a_2 + a_3 + \dots + a_n) L_M$

Therefore, $^A L_n = (L_n - L_{n-1}) / L_{n-1} = a_n / (1 + a_2 + a_3 + \dots + a_{n-1}) = a_n / \sum^{n-1} a_i$.

As n rises, a_n falls and $a_i > 0$ i.e. $\sum^{n-1} a_i$. Hence, $^A L_n$ falls.

By mathematical deduction (1) it is proved that $^A Y = 2 \ ^A L$.

So as n rises $^A L$ falls which entails $^A Y$ falls too.

So as capitalism matures i.e. more and more goods and services are formed, growth rate of output falls. As n tends to infinity, growth rate of output tends to zero.

5. CLOSED ECONOMY WITH CHANGING POPULATION

Here, we assume that population changes at every period i.e. whenever one new production is introduced. Here $g(i)$ denotes the population change rate in period-i when also there are i number of commodities.

Labor demand function in initial period is: $L_1 = L_M (1 + g(1))$

Labor demand function in period-2: $L_2 = (a_2 L_M + L_M) (1 + g(2))$

Labor demand function in period-3: $L_3 = (a_3 L_M + a_2 L_M + L_M) (1 + g(3))$

Labor demand function in period-n:

$L_n = a_n L_M + a_{n-1} L_M + \dots + a_2 L_M + L_M = [(1 + a_2 + a_3 + \dots + a_n) L_M] (1 + g(n)) = L_M \sum^n a_i (1 + g(n))$

Therefore, $^A L_n = (L_n - L_{n-1}) / L_{n-1}$

$= [(\sum^n a_i) L_M (1 + g(n)) - (\sum^{n-1} a_i) L_M (1 + g(n-1))] / [(\sum^{n-1} a_i) L_M (1 + g(n-1))]$

$= [(1 + g(n)) / (1 + g(n-1))] [1 + [a_n / (\sum^{n-1} a_i)]] - 1$

$= \Phi [1 + ^A L_n] - 1$

[Where, $\Phi = [(1 + g(n)) / (1 + g(n-1))]$]

Here if $g(n) > g(n-1)$ then, $\Phi > 1$. Hence, $^A L_n > ^A L_{n-1}$ p=constant.

If $g(n) = g(n-1)$ then, $\Phi = 1$. Hence, $^A L_n = ^A L_{n-1}$ p=constant.

If $g(n) < g(n-1)$ then, $\Phi < 1$. Hence, $^A L_n < ^A L_{n-1}$ p=constant.

The larger the value of Φ , the higher is the value of $^A L$.

Since, $^A Y = 2 \ ^A L$, we can conclude that, the larger the value of Φ the higher is growth rate of output. This conclusion is in line with that of demographic dividend theory.

6. CONCLUDING OBSERVATIONS

In this analysis we reach our conclusion that as a capitalist economy matures its growth rate slows down due to its own inherent profit maximization logic. During the infant stage of capitalism, the power of new goods and services to generate new demand for labor and with new demand for consumer goods and services is quite strong. Then, profit maximization can go on along with high growth rate of output. But as the capitalism mature, the number of goods and services produced increase, the power of new goods and services to create new demand for labor and consumption becomes marginal in nature. On the other hand, in the infant stage, the number of goods and services are small, so their power to reduce demand for labor and with it consumption level of the economy by increasing automation is small. But as capitalism mature, the number of old goods and services are large, their power to reduce demand for labor and general consumption capacity through automation rise. Hence, there is an inherent tendency of falling growth rate of output as capitalist economy become mature.

Now, in matured level, the only factor that can increase growth rate of output is rising growth rate of population. If growth rate of population in a matured capitalist economy rises at every new period when one more commodity is introduced, then only growth rate of output can be higher than the previous period. Since, population growth rate usually rises with rise in per capita income up to certain level and then falls with rise in per capita income and ultimately becomes zero. So when n is large, when capitalism is matured, either population growth rate is zero or falling then $g(n) \leq g(n-1)$. The growth rate of output is bound to slow down at every period.

Comparison with Solow's neo-classical model shows that:

$^A Y_{\text{solow}} = ^A a + ^A g$ but $^A Y_{\text{here}} = 2\Phi [1 + (a_n / \sum^{n-1} a_i)] - 2$

In Solow model, even when population growth rate is nil, then also a matured capitalist economy can growth at the rate of growth of productivity of labor. A matured capitalism can face stagnation or very low growth rate only when rate of growth of labor productivity is nil or low.

In the model described here, a matured capitalist economy with nil population growth is bound to face slow down since, rise in labor productivity of older products i.e. automation reduces demand for labor and hence consumption capacity. Only labor productivity of new product do increase demand for labor and consumption capacity. But the new product is only one among many old products. So the net result of rising labor productivity is falling growth rate of output.

In reality, countries like Japan and UK which are facing long term stagnation are not technologically static, rather they are very dynamic. But Solow cannot explain such stagnation. In this model we have seen that even when a country is technologically dynamic then also it has full chance to stagnate.

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