Some “Alternative” Remarks on Long-run Growth Based on the Labour Theory of Value

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Abstract

The purpose is to contribute to the theory of growth by presenting a “simple” alternative growth model based on the concepts of **labour-efforts** and **technological innovations**. **Technological innovation** can be described as:

1- Knowledge that is used to produce a given product with a **new production method** and/or,

2- Knowledge for producing a **new product**[1] which often brings with it a **new production method**.

For example, producing a mobile phone or computer with the same features at a lower unit cost through a "new production method" falls into the first category. A mobile phone or computer with higher specifications falls into the "new product" category.

Table 1. Old Product – New Product

Old product		**New product**
Corded telephone device		Mobile phone device
Black & White TV set		Android TV set
Diesel engine for cars		Hybrid engine for cars
Windows-7		Windows-12

Keywords: Creative mental labour, technological progress, creative destruction, new products, long-term growth

JEL Classification: E00, J24, O1, O3, O4,

[1] An important note: The "**new product - old product**" distinction and the contribution of "new products" to long-term growth were not made by masters such as A. Smith, D. Ricardo, K. Marx, who made priceless contributions to the formation of the labor-value theory. This does not mean that their knowledge was insufficient and/or that they were negligent. It merely shows that they did not focus their research on this type of analysis. It should be noted that Marx did not live to complete the second and third books of Capital. If he did, he probably would study the relationship between long-term growth and technological progress.

Introduction

It is well known fact that the relationship between the labour and value-production was a top economic priority in the research conducted by the economists like A. Smith and D. Ricardo. At that time, technological progress[2] used to play an important role in their dynamic analysis and was treated as an "endogenous" factor, in contrast to Nobel Prize rewarded growth model developed by Solow in 1950s where Solow "rediscovered" the significant and irreplaceable role of technological progress as an "exogenous" factor. But, despite the important role assigned to it in their economic analysis, economists failed to construct any satisfactory growth models which demonstrated the inter-relation between labour effort, technological progress, and long-term economic growth. Nevertheless, they were aware of the significance and contribution of these to the long-run economic growth.

After the 1870s, long-run dynamic economic growth analysis began to be replaced by the "static equilibrium" analysis of the Marginalist and succeeding neoclassical doctrines. Inspired by the positive sciences like astronomy and physics, the primary aim of the new doctrines was to find new methods which could bring economies into "steady-state equilibrium" to be able to cope with the growing Marxist challenge. Leaving aside the attempts of Schumpeter in the 1930s and 1940s which re-emphasized the importance of technological progress in economic growth, the dominant economic growth models of this neoclassical heritage completely ignored this technological aspect, until the appearance of Solow's contributions in the 1950s. In other words, the economists of the neoclassical heritage according to the models they proposed had no idea at all the impact of technological progress and how they affected the course of long-run economic growth.

The advocates of the neoclassical doctrine "rediscovered" technological progress and the fundamental role it played in growth process, thanks to the works of Schumpeter and Solow. Using an analogy, they were very happy at finding the dog, which they neglectfully lost. After his "rediscovery" of technological progress in growth process, Solow was awarded the Nobel Prize. However, Solow had some problems with the source of technological progress and could not explain in his works how it emerged. But he soon found an "ingenious solution" (!) to this problem by declaring that technological progress was an "exogenous" input to the system. They were being produced outside the economic system and "fell" into the economic system like "manna from heaven".

Despite all the shortcomings of the new theory, Solow's "rediscovery" engendered a renewed interest in the relationship between long-run economic growth and technological progress among economists. Later, economists also "re-discovered" the crucial role played by the **qualities of the labourer** (human capital) in this process. In the 1980s, new equilibrium models called **endogenous economic growth**

[2] **Technology**: Knowledge necessary for production and increasing productivity per unit time. "New technology" means new knowledge for production. Technology is embodied in the means of production and its source is **creative mental labor**.

models began to emerge, which considered technological progress as deliberate and conscious consequence of economic decisions.

All these neoclassical patch-up models also had many serious shortcomings in fully explaining the actual process of economic growth, just like all the other neoclassical models.

At present there does not appear to be any single economic growth model or a paradigm about which economists have displayed any consensus. Therefore, there seems still to be a need and scope for further research and new ideas in the field of long-run economic growth analysis. The shortcomings of these prevailing theories are the driving force behind this present work.

The Purpose

The purpose of this work is to contribute to the theory of growth by presenting a "simple" alternative growth model based on the concepts of **labour-efforts** and **technological innovations**. **Technological innovation** can be described as:

1- Knowledge that is used to produce a given product with a **new production method** and/or,

2- Knowledge for producing a **new product**[3] which often brings with it a **new production method**.

For example, producing a mobile phone or computer with the same features at a lower unit cost through a "new production method" falls into the first category. A mobile phone or computer with higher specifications falls into the "new product" category.

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"Distinction between the old and new product" is vital as well as imperative because **"new products" are not only the source of long-term growth process but also the main reason why the average rate of profit does not tend to fall towards zero.**

The claim put forward above that "***the rate of profit does not tend to fall towards zero" in the long run*** is related to "new products" and should not be confused with Okishio theorem[4] (1961). Okishio's theorem does not refer to "new products", but to a "***new production method"*** that enables the production ***of the given product*** at a lower unit cost.

The genesis of all the value added to the prevailing market values of raw materials, thus the continuing source of all long-term economic growth and nations' riches, is the labourer. To put it more specifically, given the gifts of nature, **labour of the labourer** appears to be both the genesis of and the reason for the continuity of all long-run economic growth. To put it another way, technological progress, which is the indispensable ingredient of all long-run growth, is, in fact, the product of **labourer**. The efficient use of technologies is also an essential factor in relation to growth, but its efficiency is also related to labourer.

The qualities of labour inputs can be divided into two general categories:

1. Technology-producing **creative mental labour**.
2. Technology-using (implementing-practicing) **qualities**.

The technology-producing "creative mental labour" precedes the latter in importance in the process of long-run economic growth.

With the application of technology, which is the result of creative mental labour, in the production process, raw materials (gifts of nature) are transformed into "useful" products such as tools, intermediary inputs or consumption goods. To put it another way, the technology produced by the labourer is used to produce an output either for further production or final consumption. When new technologies are embodied in the tools/machinery of production or so-called capital-goods, they may either help, for example, to increase the "per unit time productivity" (**added-value**) of employees or introduce **new products**. Following the argument, the lavishly used concept "marginal productivity" of capital (-goods) becomes a sterile fallacy.

The probability of the acceptance of an "alternative" growth analysis as presented in this section is not high, especially by the proponents of the neoclassical doctrine who rigidly adhere to their equilibrium analysis based on fictitious assumptions and models. The ignorant minds are expected to close their minds to any "alternative" idea by claiming "why should we bother with an alternative theory?"

If these narrow economists decide to leave aside their "prejudices" and try to evaluate this "alternative" growth theory with, say one percent, of the degree of the objectivity and tolerance they gave to

[4]"…if one capitalist raises his profits by introducing a new technique that cuts his costs, the collective or general rate of profit in society goes up for all capitalists". (https://en.wikipedia.org/wiki/Okishio%27s_theorem)

equilibrium analysis, they might encounter some **logical, consistent, and realistic alternative analysis** for long-run economic growth.

Let us begin with the discussion of two critical and vital concepts: "**Production Factors**" and "**Productive Factors**".

"Productive" Factors & "Production" Factors

In this section of this work, the reader will be presented with a different approach to these issues which differs from those prevalent at this time. This approach claims that there are only "**two productive factors**" of production, but "**many inputs or factors of production**".

1- Factors (Inputs) of Production

In this section all required inputs of production are the factors or inputs of production. For instance, along with labour and capital goods, all raw materials, the energy used, buildings, tools, in short, every item necessary for a required output are factors (inputs) of production. In contrast to the orthodox equilibrium theories, capital goods are not assumed to be productive; on the contrary, they are used to increase the productivity of the labourer employed in production. The common factors (inputs) of production are:

- Labourer.
- Raw-materials.
- Intermediaries (semi-finished goods).
- Energy inputs, water, etc.
- Capital goods (machinery, tools).
- Consultancy services.
- Post-production marketing and sale efforts.
- Transport-insurance.
- Management.
- And all other inputs required for the output.

Factors (inputs) of production can be subdivided into two broad groups:

1- Labourer (L).

2- Other inputs (X_i).

"2- Productive" Factors and Value-creation

There are only two "productive" factors:

1- Nature, and

2- Labour, to be more specific, labour-power of the labourer.

Nature is productive in the sense that it can supply natural products with “use-value” without any external intervention. These products range from directly consumable products such as vegetables and fruits to the basic inputs of production which in turn are transformed by labour. To be ready to consume, nature’s products, must be **transformed** into “useful” products by some form of labour.

The labour-time spent could range, from a "simple" labour-time, say transporting the apples from a garden to the marketplace, to a more "complex" labour-time requiring higher qualifications in transforming nature’s products into semi-finished or finished products. For instance, the raw form of a chair is the tree, and it is transformed by labour into a useful product such as chair and table with an “exchange-value”. In other words, nature supplies the basic inputs of all output and labourer converts them into the other forms demanded by the consumer. Thus, the source of all "exchange-values" is the physical and mental inputs of laborers, given the inputs of nature.

In short, it is only after being processed by labour nature’s supplies become products with an “exchange-value”. The physical and mental labour of the labourer comes forth as the only productive factor that can add value to products. Therefore, **the only source of technological innovations and long-run growth is the labour inputs, or to be more specific, the “creative” mental labour assisted by physical labour.**

Following this line of reasoning, an attempt will be made below to construct a simple growth model based on physical and mental labour inputs. It will not be the aim of this simple model to give an exact account of actual complex economic relations. But, rather, it is hoped to be used as a precursor to pave the way for more realistic models. In other words, the main purpose of the simple model to be presented is to show that the original source of all created exchange-values, technological innovations and long-run growth is labourer, or, more specifically, **creative mental labour** of the labourer assisted by physical labour. Therefore, the reader is asked to bear in mind the mental labour aspect of the model all times.

The Genesis of Growth

In the subsequent section, the concept of labour will be categorized under two headings, to get a clearer insight into its contribution to the growth process:

1. **Physical labour.**
2. **Qualified labour or human capital.**

The qualification of the labour or synonymously the labour-quality or the human capital can further be divided into two categories:

2-a: Technology-using-implementing labour.

2-b: “Technology-creating” labour or “creative labour”.

1- **Physical labour** ($\mathbf{L^b}$) refers to all kinds of basic physical activities such as walking, drinking, holding, etc. Such activities can be initiated by basic instincts. But, nevertheless, the control centre of every type of activity is the brain, and in the absence of mental directives, human beings could not survive. Even the most basic activities are initiated by instructions from brain. There must always be some degree of mental contribution in every stage of activity. Therefore, the concept of physical labour, in our case, simply means the carrying out of these sets of instructions directed from brain.

2- **Qualified labourer ($\mathbf{L^n}$)**: As mentioned before, nowhere, there is a labour-power without some degree of qualifications (i.e., without any form of education, training, skills). In other words, there is no labourer endowed with only physical labour. Every labourer possesses some degree of qualification which by some is referred to as human capital. Therefore, it is a serious error to divide the labour force in terms of "qualified" and "unqualified".

There are five basic factors determining the level of qualifications of labour and its productivity:

1- The individual's "natural" capabilities and talents.

2- The general level of the knowledge in society.

3- Formal and informal education.

4- Learning-by-doing.

5- Experience.

Any increase in any one of the factors mentioned above would in turn raise the qualifications of the labour of individuals. Thus, every capable individual enjoys a certain level of ability by possessing a certain degree of the five factors stated above.

There is a direct relationship between the level of a labourer's qualifications and the standard of education in a particular country. The higher the general level of qualifications of the individuals, the higher the expected individual or total level of general wealth would be. On the other hand, regardless of the level of the individual's natural talents, if the nation's general development level is below the global contemporary level, productivity per unit time employed would likely be lower than the global average. That is to say, the level of the quality of the labour force and the productivity of a nation is directly related to the general level of the accumulated knowledge and the qualifications of the individuals.

Some of the productivity growth may be attributed to practice at work. In his third model, Lucas (1988) claims that the necessary capabilities for production are acquired through the "learning-by-doing" process. The quality of work done increases as the hours spent at work increases, given the same technology. Workers are so specialized at practicing the job that over time the cost of production is expected to fall while and output to increase. Thus, per unit time productivity would increase with increasing practice at work.

Experience, a concept usually neglected in growth theories, has a wider implication than simply "learning-by-doing". The impact of experience is also significant in the development of mental capability and thus to value generation. For instance, a doctor or a nurse may learn surgical procedure step by step first at theoretically then by practicing (learning-by-doing) with a given technology and become a certified person to exercise her/his knowledge. Experience, on the other hand, would make the person's knowledge vital in some critical situations, say during surgery. In a similar fashion, a more experienced teacher or security officer is likely to be more productive at work after several years of experience. In other words, more experienced individuals are more likely to make wiser and less faulty decisions.

2-a: Technology using-implementing labour of varying quality levels: Those who produce new technologies and those who employ these technologies are, in general, not the same laborers. There is always a need for qualified labour to efficiently employ the existing technologies. In other words, the degree of utility of a technology depends on the qualities of existing labour force. For instance, if the labour force is not properly equipped with the knowledge necessary for efficient production, it would be impossible to produce, say, airplanes or automobiles, or at least not of the same quality. Therefore, the qualities of the labour force are important for the efficient production and the total wealth of society.

2-b: "Creative" labour is the source of all the added value accrued from the brain activity. In modern societies, creative labour is, in general, employed in R&D departments in search of new ideas. Research funds are normally employed to finance the creation and development of either**" new products" or "new production methods**" which in turn are used to produce the available goods or services at a lower cost.

Naturally, it is not only the highly educated, but also those with a relatively lower level of formal education can contribute to the creation of new technologies. One way or another, the new technologies required to raise the productivity per unit time and the long run growth is always a result of the creative abilities of human beings.

In short, all technological developments necessary to increase both individual and total productivity stem from the creative mind of individuals.

Basic Assumptions

1- The determining factor of growth is technological progress (**A**), which is a product of **creative mental labour,** ($\mathbf{L^y}$)

2- Nature's supplies are "given".

3- Nature, one of the two "productive factors", supplies the necessary physical inputs for production, while labourer, the only value-adding factor, transforms them into useful products.

A Simple Alternative Growth Model

Firstly, we shall consider a simple barter-exchange economy with two producers, two consumers and two goods in the absence of any technological progress. “Only physical labour” is employed, and no growth takes place.

Then, we shall consider a simple growth model with the same two producers and two goods in which one of the producers develops a “tool” by utilizing her **creative mental abilities** which increases her daily output. Increased output or in similar fashion increased productivity implies growth in the quantity supplied.

Then will continue with the study of productivity increase (growth) in a “real economy” where the qualified labour will be included in the model to show its impact on growth.

Initial Case: A Simple Output, Exchange & Distribution Model

The purpose is to analyse the barter-exchange relationships, along with the individual and the total consumption level, using the "physical labour-time employed" approach. The growth does not occur since there is no technological progress.

Assumptions:

- There are only two producers and two consumers, Leyla, (**L**) and Maria, (**M**).
- Only two products are produced and consumed: $\mathbf{X_1}$ and $\mathbf{X_2}$.
- Consumer preferences are the same.
- No accumulation. All output is consumed on the same day of production.
- No money. Barter-exchange takes place.
- Only “physical labour” is used in production, $\mathbf{L^b}$.
- Since "creative" mental labour, $\mathbf{L^y}$, has not yet been introduced, there is no new technology (**A**) developed nor any "means" of production (capital-goods) **K**, has been produced. Thus, there is no need for any qualified labour, $\mathbf{L^k}$, for the efficient employment of any technology.

The production function is:

$$Q = f\,(L^b_L,\ L^b_M)$$

$\mathbf{L^b_L}$**,** denotes Leyla’s, and $\mathbf{L^b_M}$ Maria’s physical labour. Initially, both Leyla and Maria enjoy "the same level of simple "physical labour" ($\mathbf{L^b_L=L^b_M}$). Each of them works 10 hours a day and they produce two different products ($\mathbf{X_1}$ and $\mathbf{X_2}$). Leyla’s daily output is 4 units of $\mathbf{X_1}$ that of Maria is 2 units of $\mathbf{X_2}$. Since both have identical tastes and preferences, at the end of each day, they exchange products worth 5 hours of labour-time (2 $\mathbf{X_1}$ = 1 $\mathbf{X_2}$). The outcome is:

Leyla's output	4 $\mathbf{X_1}$	10 hours / day
Maria's output	2 $\mathbf{X_2}$	10 hours / day
Total output	$\mathbf{Q^T = q^L + q^M = 4\ X_1 + 2\ X_2}$ = 20 hours / day	
Leyla's consumption	$\mathbf{C^L = 2\ X_1 + 1\ X_2}$	
Maria's consumption	$\mathbf{C^M = 2\ X_1 + 1\ X_2}$	
Total consumption	$\mathbf{C_t^{L,M} = 4\ X_1 + 2\ X_2}$	

Both, Leyla, and Maria, spend equal quantities of physical labour-time and consume equal quantities. The exchange is "fair" in terms of labour-time employed and both enjoy an equal quantity of use.

The existing system is capable of only maintaining the status quo of any existing production and exchange relations. Equilibrium exists but there is no growth. For growth to take place, both the output and consumption must increase. For output to increase there is need for a new idea, a new method to increase productivity, which is a product of "**creative mental labour**". In other words, there must be **a new production method for a "given" product**.

In the following section, we shall assume that, given the product, **a new production method** increases output.

A Simple „Short-Medium" Term Growth Model

A Given[5] Product but a New Production Method

Additional assumptions:

1- By utilizing her "creative mental" abilities, Leyla develops a tool which increases the output of her labour-time employed. Leyla's labour input now is no longer purely $\mathbf{L^b}$, but $\mathbf{L^n}$.

2- Supply creates its own demand, i.e., supply and demand are in balance. Every additional item produced is consumed, but the exchange-relationships will have to change, cet. par.

Leyla increases her daily output from 4 $\mathbf{X_1}$ to 8 $\mathbf{X_1}$ with the employment of the "innovation" developed by her creative mental ability.

$$L^n_{L,t+1} > L^n_{L,t}$$

And:

$$q^L_{t+1} > q^L_t$$

[5] What is meant by "given" product is a previously known and consumed product. For example, if the product in question is a table, the production of tables with the same characteristics increases or the unit cost decreases, as a result of the new production method (technological innovation).

For Maria, the initial conditions are still valid.

$$L^{b}_{M,t+1} = L^{b}_{M,t}$$

And.

$$q^{M}_{t+1} = q^{M}_{t}$$

The new total production function is:

$$Q = f\,(L^{n}_{L};\, L^{b}_{M})$$

The new method or tool developed by Leyla's "creative mental labour" ($\mathbf{L^{y}}$) help to increase her productivity.[6]

Since preferences and working-hours have not changed and there is no third party with whom to enter an exchange-relation, so for the entire output to be consumed, the production and exchange relationships must change:

Leyla's output	8 $\mathbf{X_1}$	10 hours/day
Maria's output	2 $\mathbf{X_2}$	10 hours/day
Total output	$\mathbf{Q_{t+1} = q^{L}_{t+1} + q^{M}_{t+1} = 8\ X_1 + 2\ X_2}$ = 20 hours/day	

The "fair" exchange ratios according to the "labour-time spent" approach would be as follow:

Leyla's consumption	$\mathbf{C^{L}_{t+1} = 4\ X_1 + 1\ X_2}$
Maria's consumption	$\mathbf{C^{M}_{t+1} = 4\ X_1 + 1\ X_2}$
Total consumption	$\mathbf{C^{L,M}_{t+1} = 8\ X_1 + 2\ X_2}$

Both producers continue to work 10 hours a day, as in the initial case. But, due to the "new method" developed by Leyla's creative mental labour, total output is increased (growth occurs):

$$\mathbf{Q_{t+1} > Q_t}$$

As is personal consumption:

$$C^{L}_{t+1} > C^{L}_{t}$$

and

$$C^{M}_{t+1} > C^{M}_{t}$$

Since, by assumption, there is no supply-demand imbalance, every output supplied is consumed, but exchange-ratios vary. Although the increase in total consumption is entirely due to Leyla's contribution, the other consumer, Maria, who has so far contributed nothing to growth, now benefits from the new

[6] New technology increases the productivity of laborer not of capital goods as mainstream theories imply.

situation just as much as Leyla. To put it differently, Maria, who makes no contribution to total output growth, benefits just as much as Leyla from the new situation. Leyla's creative productivity is, in a sense, being penalized, while the "stationary" position of Maria is rewarded. This kind of exchange relationship calculated in accordance with "labour-time employed" criterion does not seem "fair", at all.

Denoting growth with the symbol "g", the growth depends on the qualification level of Leyla's labour, $\mathbf{L^n}$, or to be more precise, on her "creative" mental labour, $\mathbf{L^y}$.

$$g = f(L^n)$$

Assuming Access to a "New" Market

In the model presented above, exchange relationship assumed that the exchange-partners consisted of only two individuals who were both producers as well as consumers. Now, we assume that additional items supplied by Leyla are sold to a new individual in another market, while the exchange relationship between Leyla and Maria are assumed to remain the same.

Assume that Leyla exchanges the additional 4 units of $\mathbf{X_1}$ with a third person and receives 3 units of $\mathbf{X_3}$ in return. Under the new circumstances, the total output of the community, consisting of Leyla and Maria will increase, along with Leyla's output and consumption, while the consumption of Maria remains unchanged.

Leyla's output	$8\ \mathbf{X_1}$
Maria's output	$2\ \mathbf{X_2}$
Total output	$\mathbf{Q_{t+1} = q^L_{t+1} + q^M_{t+1}} = 8\ \mathbf{X_1} + 2\ \mathbf{X_2} = 20$ hours/day

After trade with a third individual:

Leyla's consumption	$\mathbf{C^L_{t+1}} = 2\ \mathbf{X_1} + 1\ \mathbf{X_2} + 3\ \mathbf{X_3}$
Maria's consumption	$\mathbf{C^M_{t+1}} = 2\ \mathbf{X_1} + 1\ \mathbf{X_2}$
Total consumption	$\mathbf{C^{L,M}_{t+1}} = 4\ \mathbf{X_1} + 2\ \mathbf{X_2} + 3\ \mathbf{X_3}$

In other words.

$$Q_{t+1} > Q_t$$

$$C^L_{t+1} > C^L_t$$

But.

$$C^M_{t+1} = C^M_t$$

Under the new circumstances, Leyla's consumption along with the total consumption of the community increases (grows) because of Leyla's creative mental contribution. As for Maria, who made no additional contribution at all to the growth process, consumption remains unchanged.

The “egalitarian” exchange relationship in terms of labour-time employed principle is not valid anymore. The new exchange relationship seems to be more rational and more realistic promoting further innovations which would facilitate further economic growth. This is what really happens in actual economies.

However, the "given" product has an upper limit to the growth. Thanks to the new method, no matter how much the unit cost and/or price of the product decrease, the markets will reach saturation in time and the production will be only as much as necessary to replace the old products. This result is inevitable in societies where the product is “given”, i.e., there are no “new” products.

A Simple “Long-run” Growth Model: „New” Product

In the simple model presented above, we studied how growth occurred and how it affected exchange relationships, with a “given” product. Now, we shall assume that Leyla, by utilizing her “creative” mental labour, develops a “**new product”** denoted as $\mathbf{X_4}$, highly likely produced by a “new production method”. Let us first analyse the barter exchange relations between Leyla and Maria.

There are two producers and two consumers, along with as in the previous models, no lack of demand.

The production function is:

$$Q = f\,(L^{n}_{L};\, L^{b}_{M})$$

10 units of the new product ($\mathbf{X_4}$) are produced, and the entire output is consumed in a domestic market consisting of Leyla and Maria. As before, Maria will be the major beneficiary of growth because of egalitarian exchange based on the labour-time employed, although she has made no contribution at all.

Leyla’s output $\quad \mathbf{4\,X_1 \quad + 10\,X_4}$

Maria’s output $\quad \mathbf{2\,X_2}$

Total output $\quad \mathbf{Q^T_{t+1} = 4\,X_1 + 10\,X_4 + 2\,X_2}$

The outcome of the “fair” barter-exchange based on the "labour-time employed" approach would be as follows:

Leyla's consumption $\quad \mathbf{C^{L}_{t+1} = 2\,X_1} + 5\,\mathbf{X_4 \quad + 1\,X_2}$

Maria's consumption $\quad \mathbf{C^{M}_{t+1} = 2\,X_1} + 5\,\mathbf{X_4 + 1\,X_2}$

Total consumption $\quad \mathbf{C^{L,M}_{t+1} = 4\,X_1} + 10\,\mathbf{X_4 + 2\,X_2}$

The output as well as the consumption is higher. That means that growth has occurred.

“New Markets” for the “New Product”

Assuming a situation where half of the new product is exchanged in another market for a product demanded by Leyla. Thus, Leyla's consumption level will be improved, while Maria's will remain the same.

Let’s the following explanatory example: Assume that Leyla’s “new” product, $\mathbf{X_4}$, is used in trade with a third party and 5 units of $\mathbf{X_4}$ is exchanged in return of 6 units of $\mathbf{X_5}$. The new production and consumption relationships will be as follows:

Leyla’s output	$4\,\mathbf{X_1} + 10\,\mathbf{X_4}$
Maria’s output	$2\,\mathbf{X_2}$
Total output	$\mathbf{Q_{t+1} = 4\,X_1 + 10\,X_4 + 2\,X_2}$

The outcome of barter-exchange:

Leyla's consumption	$\mathbf{C^{L}_{t+1} = 2\,X_1 + 1\,X_2} + 5\mathbf{X_4} + 6\,\mathbf{X_5}$
Maria's consumption	$\mathbf{C^{M}_{t+1} = 2\,X_1 + 1\,X_2}$
Total consumption	$\mathbf{C^{L,M}_{t+1} = 4\,X_1 + 2\,X_2} + 5\mathbf{X_4} + 6\,\mathbf{X_5}$

To summarize.

$$\mathbf{Q_{t+1} > Q_t}$$

$$C^{L,M}_{t+1} > C^{L,M}_{t}$$

$$\mathbf{C^{L}_{t+1} > C^{L}_{t}}$$

But.

$$C^{M}_{t+1} = C^{M}_{t}$$

Now the output as well as the consumption is higher implying that growth has occurred due to a new product developed by creative faculties of Leyla.

We have argued that when it comes to “given” products, after a while, the markets will reach satiation and hinder continuous growth while at the same time, a decrease in profit rates will be inevitable.

However, the situation will be very different when it comes to the "new" product because the new product also means the creation of a new wave of demand, that is, new markets. With the formation and increase of demand, total production, and consumption as well as the welfare level of societies will increase. The new product need not be a completely new product. For example, telephone tools have been known and used for a long time, but since mobile phones are "new" products, there has been a new demand for telephones.

Since there is no limit to human creativity, new products and production methods will always be injected into the economies and there will be **no upper limit to growth**.

Lessons to be Drawn from the Simple Growth Models

The simple growth models studied above clearly show that the cause of all productivity increase (growth) is (technological) innovations which are the product of creative mental labour. Along with the increase in **productive knowledge** or, synonymously **knowledge on production** not only economy grows but also individual and total wealth increases. Since there seems to be no upper limit to the creativity of the human mental abilities, there seems to be no barriers, for now, for the long run growth of any economy.

Accordingly, **the average profit rates do not tend to fall towards zero, in the long run**.

Environmental negative issues may reduce or exhaust completely the quantity of the necessary inputs of production, which, in turn, would bring an end to the growth process. But it would not be irrational or illogical to expect that the necessary new technologies developed by creative mind would be introduced to prevent such a disaster.

On Short-Medium Term Growth in Actual Markets

In the barter economies, which we analysed in the previous sections, we saw that, given the product(s), the growth would come to an end in the short and medium term, because of the saturation of the markets. In these cases, the average rate of profit in real economies tends to decrease towards zero, i.e., the problem of limit to growth arises. Despite this inevitable result, businesses do not give up, or rather, cannot give up their efforts to reduce the unit costs of "given products" through innovations. The reason for this is to make more profit, or rather to maximize the rate of profit.

Assume that a firm produces goods (**X),** and all resources, human, physical and financial, are employed at an optimum level, that is maximum technical efficiency (**TE**[7]) prevails and profits are maximized while costs are minimized (**EE**[8]). What are the options for firms if they desire to increase their profits?

1- **Horizontal expansion:** "Given" the products, one of the options is to find **new markets** for their products. To meet the demand for "given" goods from the new markets, the firm may have to make "expansive" investments abroad" or increase the exports. If demand grows, the income and thus total profits of a firm will continue to increase, cet. par. However, given the product, there is always an upper limit for demand. **As the market for a given product begins to saturate, the strength of demand will begin to decline and eventually halt**. After that point, the output could only aim to meet a demand caused by depreciation and population growth. The

[7] **Technical Efficiency (TE)**: maximizing the "quantity" supplied while minimizing the quantities employed.
[8] **Economic Efficiency (EE)**: maximizing the difference between total "value" of inputs and total value of outputs.

impact of population growth on output growth can only be marginal. Thus, the growth process without “new products” is sooner or later bound to come to an end.

And the inevitable end occurs: **the profit rate starts falling towards zero.**

2- **Wage cut:** Another option for a firm to increase its profits is to reduce the wages paid to employees, cet. par. Thus, the share of wages in the added value accrued will drop and the share of profits increases, while the total added value remains unchanged. This option may prove beneficial for the wage-reducing firm, but if all the firms introduced wage cuts at the same time it would likely produce opposite results for the economy. It would reduce the total demand and the total added value produced, implying a negative growth. Therefore, what is beneficial for one firm is not necessarily beneficial for the other firms or the economy. Eventually the markets will satiate.

   And the inevitable end: **the profit rate starts falling towards zero.**

3- **Reducing the cost of imported inputs:** Given the technology and an optimum efficiency level in production, the only possibility left to reduce costs seems to be paying less for the imported inputs of production. But the suppliers of these inputs would naturally be reluctant to sell their inputs for a lower price, which would lead to their profits being reduced, cet. par. But irrespective of imported cost, the markets are bound to satiate in time.

   And the inevitable end occurs: **the profit rate starts falling towards zero.**

There is always a limit to growth with “given” products because as the markets approach saturation point, the strength of demand is bound to decline and eventually stop.

For the long run growth and to prevent falling rate of average profit towards zero, the introduction of “**new products**” is imperative.

Conclusions

According to the findings of this work, labourer appears as the only production factor capable of adding value, given the supplies from nature (the basic inputs of production). Labour transforms nature’s supplies into useful products to be sold in the markets. All "physical means-of-production" such as tools, machinery, are transformed natural inputs aimed at increasing labour-productivity. Therefore, the labour is the source of all the added value of a product as well as all new technology required for any growth to take place.

As to the qualification level of the labour force (human capital); it is proportional to the technological development level of the country in which they live and to the quality of the education acquired. The increase in the number of technological innovations and in the level of general welfare of a nation is

only achieved by the contribution of the labour or to be more specific, the **creative mental abilities** of the human being.

In any theory regarding value-creation and growth, it is essential to distinguish between the qualified and non-qualified laborers about their contributions to production. Laborers endowed with qualifications (human capital) may be "**technology-using**", which is important for the efficient use of any given technology. If the qualification level of labourer falls short of expectations, the outcome would inevitably lead to inefficiency and a waste of resources. In other words, given the technology, there is a direct relationship between the capabilities of the labourer and the level of advancement of a country.

In summary: Technological innovations that help to produce the "given products" at cheaper unit cost can only contribute to economic growth in the short and medium term. As the markets reach saturation, **average profit rates and output begin to fall**, moving towards the limit of growth.

It is not possible to sustain long-term growth and prevent the average profit rate from falling to zero without technological innovations that introduce **"new products**". And the source of "new products" is "**creative mental labour**".

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