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The Effects of Productivity on Growth and Welfare

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Abstract: In economies, productivity, which is defined as the proportional size between production inputs and outputs, has effects such as the growth of economies, the ability to increase the capital stock and increase their savings. Provided that the input amount is kept constant, an increase in outputs means that the economy uses its own resources more effectively and obtains more products. As a consequence, the resources kept in the economy become growth agents for that economy. Depending on the growth, the increase in gross product will also come to the fore. As a matter of fact, the increase in gross product, which is the real indicator of growth, will directly reflect on economic growth. Despite the fact that the gross product indicates the per capita amount of national income, the excess of this amount is also one of the criteria of the social welfare level. Depending on the excessive spending power of individuals, their comfort in meeting their needs determines the welfare level of that country. Therefore, increasing efficieny will need to economic growth and economic growth will contribute to an increase in welfare. However, in the case of excessive productivity, the level of welfare appears distintctly due to rising unemployment and the possibility of negative movement due to the increasing unemployment and the falling incomes.

Keywords: Productivity, Economic Growth and Welfare

Introduction

Efficiency, which is one of the main issues of economics discipline, is the term "efficiency" of the neo-classical school's economic definition, which includes "the effort to meet the endless needs by using scarce resources efficiently" and modern economics is also a component of productivity in the fields of "Growth" and "Development". Growth, which expresses the increase in the national income from production, is expressed as the product of total factor productivitiy, capital and labor parameters. (Mahiroğulları, 2009). What is meant by the growth here is the increase in production, but the increase in productivity will also bring about an increase in growth. On the basis of this increase, with the increase in productivity, national income will increase and as a consequence, opportunities for increase in consumption and savings will expand. On the other hand, with the conversion of savings in to investments, production will increase and this will accelerate economic growth. In this financial circle that continues in this way, there may

be an increase in income, and this increase will bring a positive contribution to the level of social welfare in the economic context. Therefore, it is seen that the first stage in achieving this circle is productivity increase. Rather than quantitative increase in economic growth, increases in production capacity are taken in to account. As a matter of fact, economic growth, which is one of the determinants of material welfare, is not related to the total increase, but to the amount of production and increase in output per person. Since the economic, social and political structures of countries contain certain differences, it is very difficult to base economic growth on a single criterion. The most used of these criteria is the national income per capita indicator. It is also possible to express it with different units of goods and services per person (Peterson, 1994). Economic growth includes the increase in health and education level, increase in income, technological development, increase in productivity, availability of natural resources and many other factors. The definition and measurement of economic growth indicators within the structure of economic life that includes these factors and which is becoming more and more complex has attracted the attention of development economists in recent years. The purpose of this study is to reveal the effect of productivity on economic growth and welfare qualitatively, taking into account theoretical approaches.

1. Economic Growth and Productivity Relationship

In order to determine the relationship between economic growth and productivity, it is important for the clarity of the relationship to concretize the issues related to economic growth. Economic growth implies a long-term relationship in terms of economy as well as the increase in real output per capita. For this reason, it is possible to define growth in macroeconomic terms from the supply side. For a country, issues such as technology and education policies to increase the productivity of production factors, physical capital stock and investments to increase this are among the subjects of growth theories (Mahiroğulları, 2009: 4). Although the plans for economic growth are shaped by the economic policies of the governments, many parameters are also taken into account in these plans. Accordingly, the economic growth-oriented contents of economic policies are focused on production, exchange rate, supply and demand, as well as productivity. In this context, the relationship between economic growth and productivity should be evaluated in the light of economic growth dynamics and contents. In regard to this, it is seen that the importance of productivity and productivity in production functions is pointed at the basis of growth theories. Although economists such as David Ricardo, Adam Smith, Robert Malthus and Karl Marx, the classical period theorists of growth economics, have followed different approaches to growth, each of them basically discussed the previous ones and put forward a new growth theory by updating it

according to the conditions of the period. The biggest share in the formation of the classical growth theory belongs to Ricardo. Classical theory is inherently dynamic and has structural variables focusing on social and institutional relations. Land is accepted as the fixed parameter, capital and labor force determine the classical production function. Classicalists dealt with issues such as per capita income, capital accumulation, population growth, competition conditions, expert labor force, new production methods on the basis of economic growth. Adam Smith, who has an important place in the economics literature with his work called The Wealth of Nations, explained the foundations of economic development and took an approach based on capital accumulation, labor productivity and population growth (Skoussen, 2003). Smith placed the concept of efficiency in an important position in relation to economic development. Growth, population and income will be able to increase continuously. However, he stated that the efficiency cannot be increased continuously. With the decrease in productivity, costs will increase and growth and income will also be negatively affected (Günaydın, 2007).

Therefore, although it is important to reveal the effect of productivity on growth, it would be appropriate to set the framework of productivity in this context.

1.1. Efficiency Concept

With the Industrial Revolution, developments in production systems brought the issue of productivity up to the agenda. The Industrial Revolution, which manifested itself as of the 1830s, is characterized as positive effects on productivity due to the technical and scientific advances. (Gürsoy, 1985: 12). Productivity has become an important evaluation criterion as the reason for the technological development and the increase in outputs that have accelerated with the revolution. By definition, productivity is expressed in approaches that vary depending on the type of production, economic system or political perspective. In this respect, the issue of efficiency is presented with different definitions from a company perspective, as a result of engineering practice, when it is considered economically in a national context. However, with a general definition, it can be said that productivity is accepted as a proportional relationship between the quality of the goods and services produced and the resources used in production (Tosun, 2007: 9). On the other hand, many national and international organizations generally accept the approach of “outputs’ rate to the inputs” in terms of productivity. In this context, OECD put forward a unique definition as “the division of output into one of the production elements” (OECD, 2001: 11). It was made by the Asian Productivity Organization” (Asya Verimlilik

Organizasyonu) and with the definition as "an indicator of humanitarian progress", the economic content of productivity as well as its social aspect were mentioned.

Humanitarian progress, on the other hand, has been associated with the progress in the goals set in the framework of methods and technologies that ensure sustained increase in welfare and social happiness (NPPC, 2008). As for The European Productivity Agency (Avrupa Verimlilik Ajansı), has tried to explain productivity with three criteria; *"1) It shows the effective utilization degree of each production factor. 2) It is a way of thinking that constantly tries to improve the current situation. 3) The work done or production can be done better at a later time"* based on these three criteria, productivity. In spite of these definitions, National Productivity Center (Milli Prodüktivite Merkezi) in Turkey, made definition so; "As an economic term, efficiency is a ratio, coefficient or a magnitude that defines the relationship between the production factors used in any product and service production process and the output obtained." (MPM, 2003: 25). Consequently, based on the definitions, it seems possible to make a socio-economic definition as an increase in welfare as a social reflection of the economic growth resulting from the amount of output obtained in comparison to input in the production processes of productivity and its continuity.

Productivity can be expressed with definitional differences according to the product or phenomenon whose efficiency is to be measured. In this context, productivity for a single production factor is called "partial productivity" (Bishop, 2004: 208), while the productivity is intended to be measured within the framework of all factors included in production is expressed as "total factor productivity" (Tosun, 2007: 8). Total factor productivity, which expresses the productivity of all resources in production, namely production inputs, is obtained by proportioning the production output obtained to all inputs (Tosun, 2007: 8; Mawson et al., 2003: 2-3). Changes in the factors took place in determining efficiency will also directly affect productivity in respect of the accuracy of the efficiency equation. On account of this reason, the method and parameters to be used in productivity measurements should be carefully selected. For instance, if labor is substituted for capital, it should not be overlooked that the change will be in labor productivity (Tuncer and Özuğurlu, 2004: 11).

1.2. Efficiency in Economic Growth Approaches

In the development of the literature on the relationship between economic growth and productivity, it has been formed an opinion that the differences in productivity between countries are the main factor of economic growth differences, and definitions of convergence and divergence between economies have emerged in the context of growth.

This convergence and divergence stands for the evaluations of economy levels relative to each other (Mulder and Groot, 2007: 87). Although the differences in economic levels between countries do not contain stability, they vary depending on the time. The determining criterion in the distinction between underdeveloped, developing and developed countries is the relative advantages and sizes of economies to each other. Countries defined in these groups can move to the upper group with the growth in their economies, or they can move to the lower group in case of shrinkage. The decisive criteria in these transitions are the factors that determine the level of income, and the transitions are related to the improvement or worsening of the economy. One of these factors is the productivity level, Wächter (1998) expresses the change in productivity as an important dynamic of economic growth. The relationship between the changes in the productivity levels of the countries and the economic situation is established through the differences that will occur in the amount of output obtained with the use of the country's resources in production. Accordingly, in case of an increase in productivity, the economy of that country will also save its resources and its economy will be able to move up to an upper group.

For this reason, it can be said that developed countries take part in the class of developed countries because their skills to turn production inputs into more output is higher than developing and underdeveloped countries. As for underdeveloped countries are countries that are not as skillful as the developed countries in terms of resource use and have not been able to establish efficiency in their production processes. If these countries make progress in terms of productivity, since the difference between economic levels close, their economies will converge to an upper/higher economy and on the contrary, divergence will ocur. (cited in Saygılı et al., 2001). In this context, it is clear that the convergence also exhibits an important profile in reduction of poverty along with national welfare and income differences between societies. In case of convergence to upper economic groups, in a similiar way, income levels will also converge to the upper group (Baumol, et al., 1994: 4) and productivity will become one of the important factors that support and maintain social welfare by contributing to the development of economic growth. Depending on this relational result, it is also evident why developing and underdeveloped countries' focus on convergence will be important in productivity perspective. In this context, Talmon-Gros (2014), in his analysis of convergence levels and effects, states that small rates of economic growth can have great effects on welfare levels, and that increase in productivity has a multiplier effect here. Bilgic-Alpaslan (2015), on the other hand, discussed convergence as an approach to combating poverty

and revealed that it produces significant effects in increasing social welfare depending on economic growth.

2. The Relationship Between Productivity and Welfare

Although the relationship between productivity and welfare does not have a direct link, some parameters in which productivity is directly related exhibit a direct or indirect relationship with social welfare. In the literature, these parameters manifest themselves in the most general way as economic growth and employment.

2.1.The Effects of Productivity Economic Growth Relationship on Prosperity

There are many empirical studies in the literature regarding the fact that productivity growth is a critical issue in terms of national economies. In these studies, the relationship between productivity, economic growth and productivity growth with parameters affecting economic growth has been discussed. Fagerberg (2004) analyzed the relationship between the growth performances of countries and productivity and revealed the positive linear relationship between them.

On the other hand, the relationship between productivity growth and foreign trade (Wolff, 2001), productivity growth and export performance (Fagerberg, 2004; Greenhalgh, 1990) are examples of these studies (Saygılı et al., 2001). Depending on the increase in productivity, the ability of enterprises to produce more output than the current input levels manifests itself, and this manifests itself as a situation that increases economic and resource utilization efficiency. Economic efficiency brings along an increase in income that can be used for improvements in social conditions in return for additional consumption in every field from the enterprise level to the national economy level. (Link and Siegel, 2003:1). If the continuity of this process is maintained due to the increase in productivity with the increase in productivity, economic prosperity, which can provide an increase in living standards and quality of life, will occur spontaneously, and therefore the importance of productivity increase will be more pronounced. The issue of productivity increase contributes to the progress of the production efficiency of a country's economy, which enables its competitive power in the international arena as well as its financial and economic strategic positions to higher levels. On the other hand, in relation to the developing conditions, it can be argued that the conditions such as poverty, environmental pollution, quality of life in the social context have impressive aspects depending on the development of income. It can contribute to the formation of economic stability by regulating inflationary pressures and stimulate competition as well as being an advantage in competition between economies. This will manifest itself as a

mechanism of action in improving resource utilization (Link, 1987: 3-4). As a result, productivity increase can be considered as a factor of similar nature in positioning global economies as well as being a factor in determining the position of national economies in global markets. As a matter of fact, it will reduce costs, increase profitability and contribute to economic growth in this respect, with the effect of improving resource allocation and utilization (Link andSiegel, 2003:1). In McKinsey (2001) report, the process of transformation of business-based productivity increase into growth is discussed. Lower labor / capital costs or higher value added considerations form the basis of creating surplus value in this process. Businesses can reduce costs and increase profit margins as well as preventing cost increases with high efficiency. However, if product prices can be maintained, higher levels of residual value can be produced. These resources are shared among the remaining employees after the labor force that has decreased due to the increase in productivity with the transformation of the savings into resources. In case of a decrease in prices, it gains an advantage in price competition in the market and it is possible to reach the target audience with lower costs and to expand the target audience.

This can be portrayed as high incomes for business employees and low costs for customers. This two-sided advantage not only contributes greatly to sustainability in businesses, but also activates the dynamics of growth. In other words, increasing productivity means preventing supply-side inflation triggers together with decreasing costs in the economic context, and in addition creates a ground on which the emerging conditions can support the increase in welfare. As a matter of fact, it is quite possible to talk about the existence of a causal link between living standards and productivity, as pointed out by Keynesian economics (Suiçmez, 1999:137). In general terms, since productivity is the ability of the economy to transform inputs into outputs, the high ratio that determines this capability is regarded as an indicator of productivity and therefore the growth capability of the relevant economy. On the other hand, while inputs refer to the resources of the country's economy, the fact that they can be used effectively and spending less and obtaining more output also points to productivity capacity. Inputs such as raw materials, labor, energy and time also represent the capital of that economy. In this respect, the less capital is spent and the more output is obtained, the difference will return to the economy as capital. This will contribute to the strengthening of the economy, not weakening. On the other hand, as the time and effort that employees spend in this process decrease, this time can be an input for other production processes, as well as transforming it into a potential that can be directly used by the employees in their social lives and will contribute to social welfare in this respect.

2.2. The Effects of Productivity-Employment Relationship on Welfare

In general, the existence of an economy management style focused on productivity increase is seen in the world. Accordingly, the issue of the effect of productivity on employment is important in the context of economic systems. In general, the existence of an economy management style focused on productivity increase is seen in the world. Accordingly, the issue of the effect of productivity on employment is important in the context of economic systems. Ultimately, the increase in the amount of output or the savings in inputs alone is not the solution to these problems that arise in the global economy. In addition to these, examining the effects of productivity growth on employment growth is another issue that economy management should take into account. Labour supply is discussed in the literature with a lower effect than income and substitution effects, the efficiency of which is opposite. In other words, labor supply occurs depending on the income and substitution effects the producer creates on the labor force.

While wage increase creates an expectation of an increase in the labor supply in general, analysis of the effect of productivity increase on wage increases will also produce healthy clues in evaluating the productivity-employment relationship. Generally, it is uncertain how the productivity increase affects the labor supply, but it may have an effect in both directions. (Stiglitz and Driffill, 2000:165). It is stated that the correlation between productivity increase and labor supply flexibility is negative and weak, in studies conducted in this direction, that is, the labour force responds to productivity growth with opposite and small reflexes. (Bulutay, 2005: 5). There are also studies involving different examples suggesting that the effect of productivity gains on employment is not constant. In this context, the expectations that the productivity decrease experienced in the USA in the 1970s will bring about an increase in employment have come to naught. This expectation was formed in parallel with the employment-reducing effect of labor productivity. This expectation was formed in parallel with the employment-reducing effect of labor productivity. However, employment also increased in the USA due to the increase in productivity as of the third quarter of the 1990s. When these two conditions are taken into account, it is revealed that the arguments about the employment-reducing effect of productivity increase cannot always be valid (Baily and Lawrence, 2004: 267-268). This expectation can be interpreted as a sign of an employment profile associated with increased productivity based on the increase in mechanization and technological production. Increasing mechanization will increase productivity as well as reduce the need for manpower, thus employment will decrease. Increasing mechanization will increase productivity as well as reduce the need for manpower, thus employment will decrease. However, as stated in the previous chapters,

it may be possible to mention that labor opportunities will increase if total factor productivity is taken into account rather than partial productivity. As a matter of fact, depending on the total factor productivity, economic growth can be achieved, as well as savings will turn into investments and production areas will expand. It is seen that an approach similar to the expectations for this event in the USA has emerged in OECD countries. At this point, in the approach where productivity is calculated as product per hour worked, it is seen that if productivity increases, working hours per worker decreases (OECD, 2004: 28-29). This effect is described by Bulutay (2005) as a decrease in the labor supply. In other words, the labor supply has also decreased due to the income effect. On the other hand, productivity growth may increase the employment rate. Bulutay (2005) evaluates this situation as a statistically insignificant and not very strong effect. Although there has not been a significant decrease in unemployment rates from the 1970s until the 2000s, as of the 1990s, a significant increase in productivity with the effect of technology stands out. Investigating the relationship between these two variables, Trehan (2003) focused on technology as an incoming factor and examined the relationship between productivity and unemployment in an empirical approach. While theoretical approaches focus on the effect of technological development on increasing unemployment, the researcher analyzed the technology shock as a factor reducing unemployment in the long run (Trehan, 2003: 14). When these findings are evaluated for the relavant period, the controlling and intermediate regulating function of the manpower has been not eliminated in this automation, although production has been automated in the 2000s, when automation in production areas has increased rather than the robotic technologies demonstrated by today's technologies. Therefore, as the increasing technology triggered more production efforts, the amount of production investments increased and accordingly, more employment was required. However, if these developments are evaluated for the coming years, it can be said that the workforce that will be needed with the inclusion of artificial intelligence in production systems will be more towards technological applications and engineering. In this respect, the negative effects of developing technology on employment are likely to be in question for today's and future technologies. On the other hand, the decrease in the need that technology will reveal in the workforce will bring leisure time in terms of the workforce. Considering leisure time, as an input to production in the economy, on the one hand, the increase of leisure time will show a positive effect on the welfare of the worker as a social capital, while on the other hand, the decrease in income due to the decrease of work will bring out the effect of a decrease in income and the resolution of such a paradox will be important in the context of productivity-labor. OECD (2004) reports a decrease in the use of workforce, not as a social welfare factor, regarding the decrease

in the use of labor due to the increase in productivity at macro levels (cited in Bulutay, 2005: 6). As a result, the use of technology not only increases productivity but also creates a situation that decreases the demand for labor. In addition, the use of technology has a cost minimizing effect (Temel, 2001: 8). In countries where capitalism is at advanced levels, wages are considered as items that need to be reduced among cost items and accordingly, the importance given to mechanization increases in parallel with technological innovations. This situation not only brings employment deficit, but also increases profitability for economies and businesses, but also causes a decrease in social incomes. Therefore, the unemployment-increasing effect of mechanization finds more supporters and suggestions are made that the demand for re-employment of the unemployed labor force should be increased in order to find a solution to this. In the expansion of these proposals, it is stated that the economic policies of the governments can turn to demand-increasing applications and thus unemployment can be solved (Savaş, 2000: 171-172). In another study, it is stated that the increase in labor productivity can increase employment if there is a significant level of accumulation in the amount of capital. This situation seems more possible for the economies of developed countries, and it is seen that economies that import technology in today's economies can increase their capital accumulation more rapidly. On the other hand, increasing production for technology imports to developing and less developed countries will also contribute to increasing employment (Başkaya, 2001: 138-140). Otherwise, it does not seem possible to talk about the fact that technology development can increase employment with productivity in underdeveloped economies and in the vast majority of developed economies. Therefore, if the increase in the welfare level is associated with employment, it is possible to talk about the existence of an inverse correlation between technology-based productivity and welfare level.

Conclusion

Changing production systems and economic goals brought new problems along with new approaches after the Industrial Revolution. With mechanization, production capacities have increased and machines have started to replace manpower. In this sense, new concepts have begun to show themselves with systems in economics. One of them is efficiency. While countries are trying to bring the ways of economic growth to higher capacities with new production methods, the determinants of economic growth have also been rearranged. Productivity, which is one of these, has become the most important criterion in production economies over time, and micro-level enterprises and country economies at macro level have brought productivity to the forefront in all economic stages. Efficiency is summarized as the improvement in the amount of output

obtained depending on the inputs, but it is defined as the ability to get more output depending on the fixed input amount. Over time, in researches on productivity, ways to reduce inputs and increase the amount of output have been sought, and the saved inputs have been evaluated as the residues that provide growth in the economy. Productivity is a process that maximizes production quantities and profitability while minimizing costs arising from inputs in production processes. Thus, the savings obtained based on productivity will remain in that economy and will provide economic growth. On the other hand, together with the increase in production, these savings will increase the capital stock, and this capital will turn into investments and increase employment and the amount of gross product per capita in the country's economy, activating the demand mechanism as well as increasing the level of social welfare. On the other hand, recovery in demand will trigger an increase in supply, as well as the country's economy will grow and reach a higher level in development. This cycle will make it necessary to ensure the continuity and sustainability of efficiency. Otherwise, as savings will turn into expenditures, growth in the economy will be negative. It is not possible for productivity to display a constantly rising curve, and it is necessary for the continuous development of the economy to keep it stable at the maximum level in terms of the country's economy. On the other hand, the continuous increase in productivity brings along a decrease in the demand for the labor force, which is the production input. Discussions about the labor-reducing effect of productivity, which is frequently encountered in the literature, become possible with the ever-increasing productivity. With the emergence of productivity shocks by technology shocks in today's economies, the demand for the labor force is gradually decreasing and unemployment increases.

Accordingly, the income level decreases and consumption decreases. In the next breath, creating new markets or reducing production will come to the fore in order to prevent excess supply. Contraction in supply may bring about shrinkage in the economy. Unemployment, which is one of the inevitable consequences of high technology, may bring differentiation in the employment structure. Thus, employment could shift from industrial production to agricultural production. This is possible as a reverse course of the return of agricultural employment to industrial employment in the rise of the industry. As a result, productivity can positively affect economic growth and increase the level of welfare in terms of gross product arising from this. However, as excessive productivity will reduce the need for manpower gradually, the level of welfare will decrease with unemployment, and the workforce will seek different sectors. In this context, it can be said that empirical studies on the transition of the labor force between sectors depending on the increase in productivity will produce very important results for

future projections. Based on the results of this research, it is recommended to conduct longitudinal studies on the mobility of the workforce.

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