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Technical Progress In Classical Economics: Adam Smith, David Ricardo And Karl Marx

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Abstract:
Background*: This paper represents an attempt to organise the contributions of classical thinking around a central question for the theory of economic growth: technical progress. The problem of productivity increases in the classics is related to capitalist accumulation and the demand for labour. It is also sought to connect the different authors, pointing out the different views with the respective references. In cases where there are divergent interpretations, we analyse the pertinence of the arguments in the face of the original text. Eventually, references to the actuality of the thoughts of Smith, Ricardo, and Marx are pointed out.*
Methodology*: This study critically analysed the works of Adam Smith, David Ricardo, and Marx through a bibliographic review and critical interpretation of the concepts to confront the different perspectives. The bibliographic reading consisted of reviews of articles, books, and essays dealing with the subject. The study identified the authors' conceptual points of agreement and disagreement on technical progress.*
Results*: Smith saw technical progress as an element that increased the economy's well-being. He believed that technological advancement and innovation were key to driving economic growth. Smith argued that companies could increase productivity and reduce costs by introducing new technologies and more efficient production methods. In Ricardian theory, two readings concerning technical progress's effects on Ricardo's labour demand can be performed. One reading suggests that technical progress can create new job opportunities and increase the demand for skilled labour. In this way, the demand for labour has no reason to decrease. However, another reading argues that technical progress leads to a decrease in the demand for labour as it increases the productivity of machines and reduces the need for human labour. This perspective argues that machines replace workers, resulting in unemployment and a wage decline. In Marx, as in Ricardo, there is also the mechanism in which the confrontation between supply and demand for labour governs wages. Marx treats technical progress as an endogenous element of the capitalist system. Entrepreneurs, to thrive, need to conquer consumers and pay lower wages to be prompted to invest in technology. Commodity prices fall due to the use of technology by one company and subsequent competition between several business owners. In the face of this dispute, companies introduce technological innovations that reduce labour demand, ultimately allowing lower wages to be paid.*
Conclusion: *There are several similarities in the classic economists about technical progress. In general, there is consensus on the effects of technical progress on productivity, the bargaining of products, and their effects on profits and accumulation. Classical thinkers agree that technical progress leads to increased productivity as it enables the production of more goods and services with the same amount of resources. However, to Adam Smith, technical progress benefits all; for Ricardo and Marx, it creates unemployment and wage falls, at least in the short term.*
Key Words*: Adam Smith, David Ricardo; Karl Marx; Technical Progress; Unemployment; Wages;.*

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I. Introduction

With the passing of time and several centuries of scientific achievements, we see technology as an essential and modifying factor in production and social relations. Technological growth leads to increased unemployment, putting low-skilled workers on the margins of society. We see that unemployment has increased significantly in several sectors of the economy, but mainly in industry, where new ones quickly replace technologies before they become obsolete. This work represents an attempt to organise the contributions of classical thinking and Marx around a central issue for the theory of economic growth: technical progress. The problem of productivity increases, which is related to capitalist accumulation and demand for labour, is discussed. It seeks to connect the authors, pointing out the different views with their respective references. In cases with divergent interpretations, the pertinence of the arguments to the original text is sought. In the work structure, we have four sections, including the introduction and the final considerations. Section 2 deals with the technical

progress of Adam Smith. The third discusses the understanding of the technical progress of David Ricardo, and the fourth addresses the positioning of Marx.

II. Technical Progress in Adam Smith

It is not meaningless that Adam Smith (1983) devoted the first three chapters of the book *The Wealth of Nations* to the division of labour. According to Adam Smith, the division of labour is responsible for the significant productivity increases observed and, consequently, for the greater wealth of nations. Technical progress, resulting from the division of labour, is an essential factor in explaining economic growth.

"It is the great multiplication of the production of all the technical consequences, as a consequence of the division of labour, which causes in a well-governed society that universal opulence that extends to the lower classes of the people." (SMITH, 1983, p. 45)

The division of labour consists of gradually reducing the number of operations a single worker performs throughout production. The advantage that it represents is due to three circumstances: perfection of skill, savings of time, and the use of appropriate machinery invented by the workers or the manufacturers of machines and researchers, as described below.

1. Improvement of skill. There is an increase in skill on the part of the worker as he can devote himself to fewer operations, and frequent repetition makes him skilled.
2. Time savings. Reducing the number of operations a worker performs reduces the transition time from one operation to another. Thus, there is a saving of time and less dispersion.
3. Using suitable machinery invented by workers or machine manufacturers and researchers.

Workers contribute to introducing technical innovations to achieve the proposed objectives more quickly. However, this process of innovations and technical improvements depends on more than just workers' initiative in facilitating their working methods for Smith. The author highlights the initiative of the machine makers, the so-called "philosophers", a kind of scientific class, who developed methods to obtain greater skill from the workers in the production process.

Smith (1983) wrote *The Wealth of Nations* at a time when capitalism was just "starting" and when society was no longer merely commercial and became eminently capitalist. It explains, therefore, why the innovation process at this stage takes place both at the workers' level and a class of *thinkers*. In any case, Smith anticipates a process in which workers are no longer the holders of control over production but only an integral part. More and more, there would be a separation between manual and intellectual work, between doing and knowing to do, to rationalise production further. It is the idea of what we now understand as research and development (P&D).

Industrial growth causes a re-release of this separation between conceiving and executing, now at the country level. It would be the international division of labour: on the one hand, manufacturing-producing economies hold a wide range of production information; on the other hand, primary-product-producing economies.

Smith notes the advantages of introducing division of labour in specific manufactures, such as producing pins at the level of sectors and countries. The ultimate consequence of a greater division of labour is more enormous wealth at any level of aggregation. Thus, Smith observes that the division of labour is larger in the more developed countries. At the sectoral level, it also notes that industry has a predominant role in determining growth, compared to agriculture, because the nature of the latter does not allow so many subdivisions of work, and the seasons of the year are subordinate. Bringing the discussion to the current level, we know that the great agricultural revolution is now biotechnology, where the division of labour is again present.

Thus, the wealthiest nations stand out more in manufacturing than agriculture because although their productivity is higher in both sectors, the difference to the poorest countries is higher in manufacturing.

Therefore, wheat from the richest country, of the same quality, does not always arrive on the market at a lower price than that from the poor country. (...) although a poor country, despite its inferiority in the cultivation of land, may, to some extent, compete with the rich countries in terms of low prices and quality of wheat, it will never be able to face competition for its manufactures. (SMITH 1983, p.43)

According to Smith, the division of labour would originate from a natural propensity that exists only in man and would lead him to exchange one thing for another, making the differences in talent useful. The skill differences between people would be much more effective than the division of work because the skill differences acquired through training are more important than the natural differences.

Smith also draws attention to the fact that the extent of market power limits the division of labour. Various occupations can only be exercised in cities or when maritime transport facilitates trade, expanding the market. Thus, the coastline also develops more and faster than the interior. In this sense, demand is important because it makes no sense to produce a thousand nails if there is no one to sell them. Smith managed to make predictions about the functioning of a capitalist economy. Today, it is known that Brazil can develop much more than other countries in Latin America and has the scale to form an industry because of its much larger domestic market.

With regard to the effects of the division of labour on wages and prices, Smith emphasises the importance of the distribution aspect. If everything belonged to the worker, real wages would rise along with productivity due to the corresponding price reduction.

Given the above, Smith saw technical progress as an element that increased the economy's well-being. He believed that technological advancement and innovation were key to driving economic growth. Smith argued that companies could increase productivity and reduce costs by introducing new technologies and more efficient production methods. This introduction of technical progress, in turn, would result in a greater supply of goods and services, benefiting both consumers and producers. Therefore, Smith saw technical progress as essential for economic development and improving society's living conditions.

III. Technical Progress in Ricardo

In the first chapter of the Principles of Political Economy and Taxation, Ricardo defends a theory of value according to which the value of commodities is determined exclusively by the amount of labour necessary to produce them. Later in the same chapter, this theory is modified when it is considered that the proportions between fixed and circulating capital tend to change over time, affecting the relative value of commodities.

In each stage of society, the tools, implements, buildings, and machinery employed in different activities can have various degrees of durability and require different amounts of labour for their production. Moreover, the proportions between the capital employed to sustain labour [roughly speaking, circulating capital] and what is invested in tools, machinery, and buildings [fixed capital] can be combined in various ways. [These factors introduce another cause, besides the greater or lesser amount of labour necessary for the production of commodities, of the variations in their relative value: this cause and the increase or decrease in the value of labour. (RICARDO, 1982, p. 23)

Ricardo believes that when wages change, commodities will also have their relative value altered because they are produced based on different proportions between fixed and circulating capital. However, Ricardo (1982, p.25) *notes that this cause of variation in the value of commodities is comparatively small in its effects"*. This change in value is because wages and profits vary inversely, and *the profits would probably not, under any circumstances, be able to withstand a general and permanent fall greater than that [of 1%]*. (RICARDO, 1982, p. 25–26).

In the Ricardian theory, technical progress is identified as the primary driver of fluctuations in commodity value. This is attributed to its labour-saving nature, which leads to substantial increases in productivity. As a result, society benefits from reduced exchange values for goods. This effect becomes more pronounced with the greater utilisation of fixed capital.

A change of any magnitude in the current rate of profit and effect of causes that only operate over the years, while changes in the amount of labour necessary to produce the commodities occur daily, Any improvement in machinery, in tools, in buildings and the obtaining of raw materials saves labour, allowing us to produce more easily the commodity to which the improvement was applied and, consequently, its value changes. In assessing, therefore, the causes of the variations in the value of commodities, it would be wrong to omit entirely the effect produced by the heightening or lowering of labour. However, it would also be incorrect to attach too much importance. Thus, although I mention this cause only occasionally in the rest of this work, I will consider all the great variations which occur in the relative value of commodities as being produced by the greater or lesser quantity of labour, which, at different times, is necessary to produce them. (RICARDO, 1982, p.26)

In the chapter concerning the income of the land, Ricardo distinguishes the increase in productivity resulting from a mere increase in the productive capacity under the same technical conditions from that resulting in qualitative changes, only the latter being characterised as technical progress.

But improvements in agriculture are of two kinds: those that increase the productive capacity of the land, and those that allow us, by improving the machinery, to obtain the product with less labour. (RICARDO, 1982, p. 40)

In the argument that follows, we discuss only the effects of introducing technical progress as such, that is, introducing more efficient machinery, which is not necessarily associated with increases in productive capacity.

Still, in the chapter on land income, Ricardo postulates that introducing technical progress in agriculture or manufacturing saves labour, increases productivity, and reduces commodity prices. Ricardo now seems to share Smith's view that these productivity increases benefit society as a whole, allowing individuals to increase their real income and acquire an additional amount of goods. Thus, consumers and all individuals benefit from reducing the price of any commodity. This is true of the income that the landowners receive, the profit that the capitalists make, and the wages of the workers.

It was the view that introducing machinery in any branch of production that would save labour constituted a benefit for all (...). It seemed to me that, if landowners were to receive the same income in cash, they would benefit from the reduction in the prices of some of the commodities on which that income is spent, whose reduction could only be a consequence of the use of machinery. I thought that the capitalists would eventually benefit in the same way. (...) I also thought that the working class would also benefit from the use of machinery, insofar as it had the

means to buy more goods with the same salary in cash. He also believed that no reduction in wages would occur since the capitalist would have the power to demand and employ the same amount of labour as before, though he needed to use it in the production of a new or at least different commodity. (RICARDO, 1982, p.210)

There is thus a long-term tendency to increase the land income that the introduction of technical progress would stop because it *has the power to reduce the need to cultivate poorer lands or to employ the same amount of capital in the cultivation of the less fertile ranges*. (Ricardo, 1982, p. 40). Therefore, Ricardo's introduction of technical progress gives rise to new theoretical complications and affects all natural trends because it slows down their performance.

The natural price of all commodities, except agricultural products and labour, tends to fall with the progress of wealth and population; on the one hand, they are increased in real value by the increase in the natural prices of the raw materials from which they are made; this is more than offset by the improvements in machinery, by the better division and distribution of labour, and by the increased skill, both in science and in art, of the producers. (RICARDO, 1982, p. 48)

Also, in Pasinetti's interpretation, "the final result (the stationary state) is delayed by new inventions and discoveries, which raise the productivity of work, but Ricardo's opinion is that it will finally be achieved." (Pasinetti, 1977 p. 8). In this context, the long-term downward trend in the rate of profit depends on the rise in wages, which in turn increases the consumption and production of agricultural goods and, consequently, the use of less fertile lands. It is known, however, that the introduction of innovations lowers the prices of agricultural products, stopping the rise in wages and, consequently, the fall in profits. In the case of the private capitalist who introduces innovation, he can, even temporarily, make greater profits—that is, as long as technical progress is not spread.

It is necessary to highlight the effects of introducing technical progress on labour demand. The introduction of machines substitutes people for work, reducing the need for people to do the work. Thus, fewer workers produce the same product level as the employed capital. Thus, fewer workers produce the same level of product. Thus, there is a reduced need for workers relative to the employed capital. The decreased capital used and an even more significant reduction in labour employed increase the labour-capital ratio.

However, with regard to the overall demand for labour, there is no reason to assume that it will decrease because the reduction in wage spending in which there has been technical progress can be applied in other sectors. Applying these resources and maintaining employment is possible because, in Ricardo's economy, the entrepreneur has no reason to hoard resources. Thus, as an increase always follows capital employment in labour, the decrease in labour demand in a specific sector is offset by the increase in demand in other sectors. This maintenance of employment is possible because the capitalist would have the power to employ the same amount of labour previously employed in producing other goods.

If, due to the improvement of machinery and the employment of the same amount of labour, the number of socks quadrupled and the demand for socks only doubled, some workers would necessarily be fired from the socks industry. But as the capital that employed them had not ceased to exist, and as it was in the interests of its owners to employ it productively, it seemed to me that it would be employed in the production of some other commodity useful to society, for which there could be no demand. (Ricardo, 1982, p. 211)

Moreover, Ricardo (1982) contemplates a second effect by thinking dynamically. The increase in productivity, by increasing profits, positively affects accumulation and increases the funds available to produce and employ the increased demand for labour. At first, the higher demand for labour, compared with a given supply, causes the wages paid on the market to rise. Rising wages stimulate population growth, commodity demand, and cultivation in a chain reaction.

(...) *the reduction of the price of the commodity as a consequence of the introduction of machinery could not but result from the fact that the capitalist, while keeping his needs invariable, would have increased his means of saving; that is to say, he would have greater ease in converting income into capital."* (RICARDO, 1982, p. 212)

In this case, technical progress is stalling the increase in land income since, at first, it is reduced after the demographic increase has increased again. As far as wages are concerned, one can never expect a fall but an initial increase due to the increase in demand for labour, which over time tends to be corrected to its natural level, thanks to the action of the population mechanism.

The chapter on machinery and technological unemployment, which Ricardo adds to the third edition of Principles of Political Economy and Taxation, is a revision of the argument. He argues that introducing machinery would be responsible for a global reduction in demand for labour, generating technological unemployment. With greater use of machinery, the work used in production is reduced. Ricardo (1982) then explains that one can increase the net income without the same occurring together with the gross income:

My mistake was to assume that its gross income would also increase whenever a company's net income increased. I have sufficient reason to think that the fund from which landowners and capitalists obtain their income may increase while the other, the one on which the working class depends, may decrease. Consequently, if I am sure,

the same cause that can increase the net income of the country can at the same time increase the surplus population and deteriorate the living conditions of the workers. (RICARDO, 1982, p. 211)

It is noted, however, from the passage above that this would not necessarily occur: *If the improvement of the means of production, as a consequence of the use of machinery, increased the net product of a country with such intensity that the product did not decrease (I always mean the quantity of commodity and not the value), then the situation of all classes would improve.* (RICARDO, 1982, p. 213)

So there would be two Ricardos? The first would have considered that at no time does the introduction of machinery reduce the overall demand for labour, as outlined below:

With each increase in capital, more workers will have to be employed, and therefore a part of the staff laid off at first would be subsequently employed. And if the increase in production were so great that it would provide, in the form of net production, a quantity of food and primary necessities as large as previously existed as a gross product, the capacity to employ the entire population would be the same, and there would therefore be no surplus population." (RICARDO, 1982, p. 212)

The second Ricardo, the precursor of Marx, defended the idea that increasing machinery use would reduce labour demand by creating technological unemployment while increasing net income.

But I am convinced that the replacement of human labour by machinery is often very detrimental to the interests of the working class." (RICARDO, 1982, p. 211)

For Pasinetti (1977), Ricardo's real thinking does not consider technological unemployment. Although he acknowledges that changes in production function over time, resulting from improvements in production conditions, are present in Ricardo's theory, the effects of capital accumulation, without considering qualitative changes, seem much more important to him.

Ricardo does not consider the first type of change—technical progress—in a systematic way (a characteristic which only today can be found in models of economic growth). He only points out that improvements in technical conditions postpone in time the effects of the changes of type (ii). Since he thinks that these changes (capital accumulation) are, - in order of magnitude - the most relevant ones, he concentrates his analysis on them, with the qualification that the effects he shows might be delayed, though not modified, by technical progress. (PASINETTI, 1977, p. 15–16)

Casarosa (1978) presents another interpretation of the Ricardian thought envisaged in Pasinetti. In this alternative interpretation, the effects of the introduction of technical progress on labour demand will depend on the adjustment rates between the rate of capital accumulation and the population growth rate. Ricardo's words seem to confirm the analysis of Casarosa's dynamic balance:

In a developing society, although wages tend to adjust to their natural rate, their market rate may remain above this level indefinitely. Unless the impetus given by an increase in capital increases the demand for labour, a new increase that produces the same effect may arise. So if capital growth is gradual and constant, labour demand can be a continuous stimulus for population growth." (RICARDO, 1982, p. 49)

However, according to Pasinetti, the fundamental contradiction between "the two Ricardos" remains.

"*...it is assumed that all sectors of the economy use fixed and circulating capital at the same time and in the same proportions. This is, in fact, the crucial assumption—the determination of the Ricardian system depends on it in an essential way. (...) But when the assumption conditions are not fulfilled, total employment varies according to the way in which demand (and therefore capital) is distributed among the luxury sectors. Having understood this, Ricardo frankly admitted, in the chapter, that he had been wrong earlier when he extended the introduction of machinery (i.e., to the case where the proportions of fixed and circulating capital vary) and his general conclusions about total employment depend only on the total capital and not on how and where this capital is employed*." (PASINETTI, 1977, p. 24)

The answer to this question lies in the evolution of wages. It is the increase in wages that causes the machine to replace the worker. According to Eltis (1984), there would be no fundamental contradiction in Ricardian thought because the ideas defended in the chapter on machinery were indeed implicit in the first editions of the Principles in an embryonic form: employment grows more slowly than the stock of capital because the already mentioned long-term trend of raising wages—as a result of the exploitation of successively less fertile lands, which raises the price of food—increases the cost of employing labour. The same does not affect the cost of employing machines. Moreover, as the amount of capital and population increased, this trend would intensify, and the constant competition between these factors would justify the replacement of labour by machinery. It is, therefore, reasonable to admit that Ricardo considered the replacement of labour by capital and, thus, the creation of technological unemployment.

In the first two editions of the Principles, Ricardo concluded that an increase in wages would not increase the cost of machines and, of course, made it very clear (after Chapter 1) that the actual cost of producing livelihoods and thus employing labour would tend to rise as capital and population grew." (ELTIS, 1984, p. 265)

The position of Schumpeter (1982) on this matter is timely. For the author, the technical progress can be described, in the short term, as *creative destruction* due to the rise in unemployment and the fact that many

entrepreneurs lose them. However, in the long term, technical progress can improve society's well-being by increasing the supply of goods at lower costs.

In sum, it is possible to perform two readings concerning technical progress's effects on Ricardo's labour demand. One reading suggests that technical progress can create new job opportunities and increase the demand for skilled labour. In this way, the demand for labour has no reason to decrease. However, another reading argues that technical progress leads to a decrease in the demand for labour as it increases the productivity of machines and reduces the need for human labour. This perspective argues that machines replace workers, resulting in unemployment and a wage decline. This perspective emphasises the importance of adapting to technological advancements and acquiring new skills to remain employable in a changing labour market. This approach is closer to the Marxist view: labour demand decreases, giving rise to what Marx called a reserve industrial.

IV. Technical Progress in Marx

The treatment of technical progress in Marx (1983) has many similarities with the approaches of Smith and Ricardo. Marx agrees with Smith about technical progress's ability to increase the system's productivity. Like him, Marx also notes the importance of large-scale cooperation. What gives rise to the introduction of technical progress, however, is not the mythical desire for exchange but the logic of the capitalist system, whose driving force—the struggle for competition—finds its place in the pricing of commodities, which depends on labour productivity.

(...) *machinery is intended to sell goods and to shorten the part of the working day that the worker needs for himself.* (MARX, 1983, p.5)

According to Marx, technical progress allows for significant productivity increases, but this depends on the production scale. For the author, primitive accumulation is the starting point, the historical foundation of specifically capitalist production. As capitalism develops, however, the larger capitals defeat the smaller ones, and the individual minimum size grows. The smaller capitals then go on to dispute areas of production in which the great industry has yet to take possession, only sporadically or incompletely.

Given the dispute between large and small enterprises, Marx distinguishes concentration from centralisation. In the concentration process, new capitals are formed, and old capitals are fragmented. The increasing concentration of social means of production in the hands of individual capitalists is limited by the degree of growth of social wealth. Furthermore, the concentration of already-constituted capital is the expropriation of capital by capitalists. With centralisation, capitalists can expand the scale of their operations. Credit is the lever of centralisation because it allows firms to expand their investments beyond their level of savings, widening their scale and ability to invest in more technical progress.

Moreover, the more significant accumulation in a sequence of periods increases productivity. On the other hand, when productivity increases, the volume increases, and the value of the means of production falls, generating higher incentives for replacing workers with machines. So, the finding that technical progress in Marx (1983, p.185) is endogenous is appropriate: *Productivity development is the most powerful lever of accumulation.*

In chapter 23, “The Capital”, Marx analyses the effects of capital increases on demand for labour. It is part of the distinction between capital's organic and technical components. The organic composition is a category that expresses value; therefore, it is the constant capital—the value of the means of production—and the variable capital—the total sum of wages. The technical composition refers to quantity: the amount of the means of production used and the required labour.

Marx notes the same functional relationship analysed by Ricardo, according to which a capital increase necessarily determines an increase in employment—albeit not proportionate—in Marxist theory. According to Marx, variable capital also increases when capital increases since a share of the surplus value must be employed in the labour force.

In Marx, as in Ricardo, there is also the mechanism according to which wages—called “markets” in the Ricardian theory—are governed by the confrontation between supply and demand for labour. Suppose there is an organic and constant composition. In that case, as there is an accumulation of capital—of which part is added to the original capital—the need for accumulating capital can outweigh the growth of the labour force or the number of workers. If the demand for work exceeds the supply, the wage rises. In a chain reaction, when wages increase, profits decrease, and the number of workers and capital increase. A large capital, even with smaller profits, usually grows faster than a small capital with large profits. Conversely, if accumulation decreases, the cause of its decrease disappears, that is, the disproportion between capital and the exploitable labour force, and wages are reduced.

Marx denies Malthus's law of population as Ricardo. Marx notes that it is not the increase in the absolute or proportional growth of the labour force or of the working population that makes capital insufficient. Nevertheless, on the contrary, the decline of capital makes the labour force exploitable. According to Marx, this is because, with the reduction of capital, there is an increase in the surplus population and the labour supply. Therefore, the decrease in capital leads to increased unemployment and employers' power to impose lower wages,

thereby increasing the exploitation of the labour force. This view of Marx contrasts with Malthus's theory, which attributes capital scarcity to overpopulation.

Meanwhile, replacing workers with machinery does not reduce exploitation. Exploitation becomes extensive; wages always condition the worker's supply of a certain amount of unpaid labour. According to Marx (1983, p. 191): *An abstract population law only exists for plants and animals, as long as the human being does not interfere historically*." (Marx, p.191). Thus, for the author, the progressive production of a relative superpopulation or industrial reserve army is a condition of the existence of the capitalist mode of production. The labour supply is not regulated by the law of population but by the purely social mechanism of capital accumulation. The movement of wages is given by the "pulse" of the reserve industrial army, which expands and decreases according to capital accumulation.

In line with what was envisaged in Marx and Ricardo, Nike and Reebok have decided to produce in the Asian market at reduced prices for resale in the world at more competitive prices, aiming to maximise profits in the long term. Where there is a labour shortage, there will be jobs and higher wages. Where there is plenty of labour, as in Brazil and some Asian countries, there will be lower wages and higher unemployment. According to Salm and Fogaça (1998: p. 112): *the employers... stick to the old methods, which require only unskilled workers (...) and which can be hired for low wages*(...) .

Governments understand that it is up to the country that wants to attract investment to offer an attractive environment. This generally implies the existence of political stability and economic advantages, such as cheap labour and exploitable natural resources. National governments are making legislation more flexible in pursuit of employment expansion in their countries. Labour laws are ineffective, do not prevent discrimination based on sex and ethnicity, and sometimes do not even enforce the observance of scheduled hours and overtime payment.

Governments argue that direct investment contributes to reducing poverty in their countries. Indeed, wage increases were observed in the first countries to receive direct investment from Nike and Reebok, leading companies to migrate to China.

In summary, Marx treats technical progress as an endogenous element in the capitalist system. Entrepreneurs, to thrive, need to conquer consumers and pay lower wages to be driven to invest in technology. Commodity prices have decreased due to one company's use of technology and the subsequent competition between various business owners. It is noted that production expands as technology is employed.

V. Final Considerations

There are several similarities in the classic economists about technical progress. In general, there is consensus on the effects of technical progress on productivity, the bargaining of products, and their effects on profits and accumulation. Classical thinkers agree that technical progress leads to increased productivity as it enables the production of more goods and services with the same amount of resources.

In Smith's original formulation, technical progress is the primary cause of the growth of nations. He believed that advancements in technology and innovation would lead to increased productivity and economic prosperity. Smith argued that by continuously improving machinery and tools, nations could produce more goods and services, leading to higher living standards for their citizens.

It is possible to perform two readings concerning the effects of technical progress on labour demand in Ricardo. In the first vision, the demand for labour has no reason to decrease. According to this perspective, new technologies are replacing human labour, decreasing demand for workers in specific industries in the short term and leading to technological unemployment. In the meantime, these workers can be recruited using capital by the capitalists. In this way, technological innovations would not cause unemployment in the long term.

The prevailing understanding in literature is that Richard's second vision corresponds to his thinking. According to this interpretation, technical progress leads to a decrease in demand for labour as it increases the productivity of machines and reduces the need for human labour. In this perspective, machines replace workers, resulting in unemployment and a wage decline. This conclusion is closer to the Marxist view, in which demand for labour decreases, giving rise to what Marx called a reserve industrial army.

According to Marx, the accumulation process generates technological unemployment. This joblessness is because as capital accumulates and businesses strive for efficiency, they replace workers with machines to cut costs. Marx believed that this technological unemployment exacerbated the exploitation of the working class, leading to a surplus of labour and, subsequently, lower wages.

The study of the view of classical economists on technical progress is broad and can be deepened for a greater understanding of the subject with new publications. Classical economists, such as Adam Smith, David Ricardo, and Marx, have had different perspectives on technical progress and its economic impact. There are several topics to be explored for greater discussion of the view of classical economics on technological progress. It would be interesting to look at the contributions of these economists, their differences, and the implications of this vision for the modern economy. Furthermore, it is also essential to explore how the theories of classical

economists relate to current technological advances and how their ideas can be applied to the modern economy. In short, a wide field of study and analysis exists to understand the perspectives.

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