


TECHNICAL PROGRESS DETERMINANTS IN CELSO FURTADO'S IDEAS: FROM *DESENVOLVIMENTO E SUBDESENVOLVIMENTO* (1961) TO *CRIATIVIDADE E DEPENDÊNCIA* (1978)

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Abstract

This paper aims to discuss the differences in the treatment of technical progress determinants, therefore, productivity and economic growth in Celso Furtado's work. Two of his major books are compared in detail: *Desenvolvimento e subdesenvolvimento* [Development and underdevelopment] from 1961, and *Criatividade e dependência na civilização industrial* [Creativity and dependency in the industrial civilization] from 1978. The general argument is that the differences in Furtado's interpretation related to technical progress determinants in these two books are an important aspect of the author's ideas' evolution and can illuminate the important changes in his theoretical perspectives that occurred during the 1970s.

Keywords: Celso Furtado; Keynesian theory; creativity; technical progress; innovation.

Classification JEL: B20, O14.

INTRODUCTION

Celso Furtado lived in Brazil between 1920 and 2004. He is one of the most renowned Brazilian economists and the author of a vast work on economics. He is well known for his contribution to the field of economic development and, in particular, for his theorization regarding the concept of underdevelopment.

In his book *Formação econômica do Brasil* (1959) [Economic formation of Brazil], he shows that despite changes in the economic cycles in Brazil during the colonization period, its structure reproduced the social inequality. In this book, the author describes the view that the profits are privatized, but the losses are shared. During the time Furtado wrote this book, he was visiting the University of Cambridge. As Bielschowsky (2014) theory, i.e., the underdevelopment argued, Furtado had applied the central characteristics of the Latin America structuralism theory, i.e., the underdevelopment in Brazil has as its main characteristics low production, lack of export diversity, and structural heterogeneity. It means that there is a sector with low productivity coexisting with a modern sector with high productivity.

Returning to Brazil, the author worked on public administration as a director at the Banco Nacional de Desenvolvimento (BNDE) [Brazilian Economic Development Bank], and became Brazil's first Economic Planning minister.

During the same period, he wrote one of the works analyzed in this paper, *Desenvolvimento e subdesenvolvimento* [Development and underdevelopment], from 1961. In this book, besides using the historical-structural method, the author begins to properly study the underdevelopment phenomenon on a theoretical level, advancing the knowledge regarding development theorists, such as Rostow (1969), Rosentein-Rodan (1969), Hirschman (1961), Nurkse (1969), Myrdal (1986) e Lewis (1969).

Furtado's 1961 book is an important source to understand his perspectives on the technological progress determinants. It is worth observing that by studying Schumpeter, he emphasizes the rule of monopoly. In this sense, the innovation process results from the monopoly process, which means that the main driver of technical progress is not innovation. To Furtado, Schumpeter is in the category of theorists who study the entrepreneur's role in capitalist dynamics. However, when analyzing the Keynesian theory, Furtado stresses the incorporation idea of technology from the core countries. He calls attention to the Keynesian (Harrod-Domar's model) notion that, in order to increase investment and hence the technical progress in the economic system, it is required to increase domestic savings.

We argue that Furtado would become properly close to Schumpeterian theory only in the 1970s. In contrast, in his book from 1961, he was, in fact, closer to the Keynesian approach, more precisely the Harrod-Domar model. However, Furtado's theory is not simply constrained by the Keynesian or Schumpeterian theory. As argued by Boianovsky (2010), Furtado's theory is related, for example, to the historical treatment of economic backwardness, developed by Gerschenkron, the dual economy, proposed by Lewis, the approach of the Center-periphery system, developed by Prebisch, besides Rosenstein-Rodan (1943, 1961) and Nurkse (1951, 1953) theory of balanced growth approach.

As shown by Cunha and Britto (2017)¹, it is possible to understand the 1970s as an important theoretical turning in Furtado's ideas, which is directly connected to his perspectives on the links between creativity, innovation, development, and dependence. The changes in his perception of the determinant of technical progress are part of this story. In the book *Criatividade e dependência na civilização industrial* [Creativity and dependence in the industrial civilization], from 1978, in a different perspective if compared with his 1961 book, creativity is responsible for generating innovations, then innovation

1 Cunha and Britto (2011) presented a preliminary version of this article.

generates technical progress, and, consequently, economic growth. This later approach to technical progress can be understood as a Schumpeterian view.

Holding positions in public administration in Brazil, Furtado experienced a sudden and abrupt change in his career. With the military coup in 1964, he had his civil rights suspended for ten years. He was then invited to work at three different United States' universities – Yale, Harvard, and Columbia. After a brief passage at the Yale University, he became, in 1965, a professor of Economic Development at the Faculty of Law and Economics of the University of Paris (Sorbonne), where he worked for the next twenty years (Cunha & Britto, 2017).

In this period, Furtado wrote his 1978 book and taken in its context, it reflects three different matters: i) the Marxist criticism made by Fernando Henrique Cardoso and Enzo Faletto to theories of underdevelopment; ii) the intellectual context in which Furtado was immersed, namely, University of Paris; and iii) the issue of dictatorship in Latin America as one of the criticisms that Furtado presents in his 1978 work is that the lack of freedom is a constraint of creativity. This book clearly states that innovation is related to creativity, which leads to technical progress, pointing to a new perspective on the technical progress causes.

Apart from this introduction and conclusion, this paper has three more sections. The first section discusses the 1961 book, in which Furtado studied the technical progress issue on classical economy authors, besides Keynes and Schumpeter. In the second section, it is analyzed how Furtado sees the technical progress determinants. In the third section, it is examined the determinants of technical progress in the 1978 book.

1

TECHNICAL PROGRESS AND CLASSICAL ECONOMISTS

Furtado's *Desenvolvimento e subdesenvolvimento* (1961) was one of the first attempts to understand the problems faced by underdeveloped countries. Right in the first chapter, his aim is to present a critical view of the classic authors, which is important to understand his interpretation of the determinants of technological progress, consequently, productivity and economic growth. Furtado (1961/2009, p. 29) defines economic development here as the process that the labor productivity increases constantly.

In this first chapter, his attempt is to understand the relationship between technology, productivity, and development. This study covers several other authors, such as Adam Smith, David Ricardo, Karl Marx, Alfred Marshall, and Joseph Schumpeter, among others.

From those authors, Furtado (1961/2009, p. 30) observes some differences between the enterprise's productivity and social productivity, as well as made several criticisms about the importance of technology, productivity, and development. To Furtado, it would be a mistake to understand the general productivity system from the firm's point of view. Even though the firm productivity increases, it does not mean that the productivity of the whole system would increase as well. For classical economists, social productivity is the total production per unit of work (in time). Therefore, the idea of development is linked to the macroeconomic system.

Furtado (1961/2009, pp. 30–31) criticizes Adam Smith, arguing that classical economists have not explained the proper reason for the development. For Adam Smith, the increase in productivity is due to the division of labor, being this division possible if the market is large enough. However, the market size depends on productivity growth.

In Ricardo and Malthus, Furtado observes that the idea of productivity is related to the rent of land. If the population increases, the rent of land increases as well. This causes a positive impact on capital accumulation, wage, and consumption. Thereby, the medium labor productivity may decrease when the rent of land increases (Furtado, 1961/2009, pp. 33–34).

The technological progress theory for J. S. Mill is a stationary theory. In other words, capital accumulation is the main factor in productivity increases. In this way, the capitalists increase productivity because they are trying to defend their profits margin from the wages growth (Furtado, 1961/2009, p. 33, 1967). Furtado (1961/2009, p. 35) argues that classical economists have a lack of theory about development. The development would be achieved from the process of capital accumulation and technical progress. In Furtado's 1967 work – *Teoria e política do desenvolvimento econômico* [Theory and policy of economic development] –, Furtado studied the classical economists. However, in this book, at least while discussing Ricardo, he focuses on the issue of productivity related to the functional income distribution.

Furtado (1961/2009, pp. 38–39, 1967) also argues that there is a logical problem in Marx's theory. The division of labor increases productivity, as Smith has already discussed. However, Marx departs from the idea that total production is the social net product sum in addition to surplus value. In this way, due to surplus value, there is a tendency for concentration in capital accumulation.

Thus, saving is the result of unpaid labor. Nevertheless, Furtado argues that, savings are important to increase productivity. Moreover, the author argues that without savings, it is not possible to increase productivity (Furtado, 1961/2009, p. 41).

Furtado argues that the logical contradiction is that, in Marx's theory, the constant capital increases faster than the population; therefore, there is a tendency to raise the wage share in the social product. However, there is the industrial labor reserve that presses the wages down. Furtado points out that it is not possible to use those two ideas: the tendency to grow wages versus the idea of an industrial reserve army (Furtado, 1961/2009, pp. 47–48).

Discussing the neoclassical theory, the author argues that neoclassical theory is a theory of stagnation. If the economy tends to achieve equilibrium in this approach, there is no place for development. In the neoclassical theory, productivity is related to equilibrium between labor supply, which is related to the workers' trade-off between work and leisure, and demand, which is related to labor productivity. Both supply and demand for labor, consequently, the labor market equilibrium, are related to the real wage (Furtado, 1961/2009, p. 62).

Furtado (1961/2009, p. 72) discussed, then, the entrepreneur theory. He studied some economists that emphasize the entrepreneur's importance for the development process, being Schumpeter and Wicksell naturally included. In which concerns his discussion about Schumpeter, Furtado observes that innovation is different from the productivity for Schumpeter. He understands Schumpeter's ideas essentially as a profit theory. The entrepreneur increases the capital investment and, therefore, the profit. In this case, the profit increases following the increase in the monopoly situation. Thus, productivity is a result of capital accumulation. In his words:

The concept of 'new combinations' or 'innovations' is hardly clear. The rise of a monopoly situation he considers as a 'new combination.' This is not a concept necessarily involving the idea of an increase in productivity, reduction in costs, technological innovation, etc. It is something broader – any doing things differently in the realm of economic life – whose sole constant element appears to be the faculty for creating for an entrepreneur a privileged situation (even momentarily) that would lead to the formation of profit. This idea could take us a long way because there are thousands of factors creating privileged situations for an entrepreneur and which bear no relationship to development inasmuch as they are almost always accompanied by an opposite situation for some other entrepreneur (Furtado, 1961/1964, pp. 48–49).

Furtado argues that innovation in Schumpeter's theory is not a theory about innovation, but a theory about the organization or a new production enforces combination. Therefore, what matters is the monopoly that emerges from a new way of organizing production.

Furtado discusses a few aspects of it in his studies related to Keynes' theory (see, for example, Furtado, 1961/2009, p. 76, 1967, p. 50). Furtado agrees with Keynes' ideas related to neoclassical theory, explaining without details the conception of aggregate demand. To Furtado, Keynesian theory is about capital accumulation. Furtado considers Keynes' ideas as part of theories about economic fluctuation and countercyclical economic policy. Moreover, if the capacity utilization level is high, it is due to a high level of investment. Furtado argues that Keynes simplified his model since that, in Keynes, theory, the level of investment is determined by the marginal capital efficiency and interest rate. In the Furtado model, it is highlighted the technical progress idea in order to explain the labor and capital increases.

In Furtado's 1967 book, a detailed explanation is related to Harrod's model (Furtado, 1967, p. 57–66). The basic idea here is that Harrod's model was the main inspiration for Furtado's underdevelopment and development economies models.

In Keynes' model, the investment creates income and also increases the installed capacity. Nevertheless, the income magnitude and installed capacity creation depend on economic structure, and this structure is related to i) the consumption function and ii) the Keynesian multiplier. It is important to highlight that the level of installed capacity determines the income level and employment. Moreover, in a full-employment scenario, an investment increase will increase savings due to the income multiplier effect. In this case, the consumption may decrease.

Furtado (1967, p. 53) argues that Keynes' idea could be applied to the short run but not in the long run. Although, as argued by Kregel (1976) and Dutt (1997), Keynes' model is a dynamic long-run model. Because Furtado views the Keynesian model as a short-term model, the author indicates Harrod-Domar's model as a solution, considering it is a dynamic model.

Harrod's model claims that capital accumulation is possible because the industry tries to adjust the stock level to demand all the time. The necessary growth rate for the production is the same as the relation product-capital. In this model, the accumulation rate depends on the proportion of the product that is saved and the relation between product and capital. The main model result is that the production growth rate is related to the technical progress

growth and population growth. However, the new technologies created by this growth process may create unemployment.

Furtado (1967, p. 65) criticizes and suggests a modification to Haraad's model. He considers the investment in both past and present periods. With this modification, the income distribution is introduced in the model. Thus, the equilibrium is achieved when the investment is sufficient to absorb the natural population growth and the underdevelopment created by the new technologies.

2

TECHNICAL PROGRESS IN *DESENVOLVIMENTO E SUBDESENVOLVIMENTO*

The historical context in which Furtado develops his ideas about development and underdevelopment economies is connected to the historical process in which the author was immersed. At the end of the 1940s, in a historical moment marked by World War II and the effort of reconstruction, the economic theories were searching for ways to explain the capitalist system periphery, which includes a new view to the Latin American countries (Mallorquin, 2005, p. 26).

Furtado's theoretical formation was based on law and administration. With the end of the war, he decided to pursue a doctorate in Economics at the University of Paris, and there, he established contacts with Maurice Byé and also François Perroux. Furtado then started his studies on the Brazilian colonial economy, combining economic reasoning and a historical research methodology.

He moved to Santiago (Chile) in 1949 to join the United Nations Economic Commission to Latin America [Comisión Económica para América Latina y el Caribe – Cepal]. Furtado worked at Cepal until 1957, holding various positions, including the one of director of the Economic Development Division. He contributed to Cepal's collective works during this period but also worked in his books and articles, including the seeds of his book *Desenvolvimento e subdesenvolvimento*. Following a period at the University of Cambridge (England) between 1957 and 1958, he returned to Brazil and, until 1964, held positions in public administration, becoming director of the Northeast Section of the BNDE, head of the Superintendence for Northeast Development [Superintendência do Desenvolvimento do Nordeste – Sudene] and, as mentioned above, Brazilian's first minister of Planning.

In his time working in public administration, the author attempts to put into practice his knowledge about economics, reflecting on the problem of underdevelopment and issues related to technology and productivity. This is particularly visible between 1955 and 1962, during the time that Furtado would be the head of a joint commission Cepal/BNDE, responsible for developing studies to support the economic development program in Brazil, and in particular, during his tenure as the head of Sudene, focussing in the concrete problems of the economic and social development of the Northeast region of the country.

The discussion about technical progress is deeply related to the issue of development in general terms. First, it is important to highlight that the anti-cyclical policies are different from policies that have the economy's development as an objective. Secondly, the idea of development for Furtado, at least in the period before the 1970s, has a direct relationship with the theme of capital accumulation, which means, in the terms that we are insisting on here, a close connection with the Harrod-Domar model.

In *Desenvolvimento e subdesenvolvimento* (1961), Furtado presents the Harrod-Domar model in a systematic form. For him, "the development process involves either new combinations of existing factors at a given technical level or the introduction of technical innovations" (Furtado, 1961/1964, p. 61). In this sense, development is related to a combination of the production factors or through technical innovation. Furtado argues that the medium productivity of the production factors is smaller in an underdevelopment economy if compared with a development economy.

Furtado started working with a concept of development similar to that found in other pioneers of economic development, being development initially connected to productivity gains associated with capital accumulation and the incorporation of new technologies of production. The process of development in this perspective was understood as a combination of existing factors of production, given technology, or through new technologies (Cunha & Britto, 2017).

To Furtado (1961/2009, pp. 86–87), physical productivity or labor productivity came from capital accumulation. Nevertheless, in underdevelopment economies, there is not an endogenous capital accumulation core, which means that the capital (machines) is imported. As a consequence of the importation of capital, the structural underemployed labor, due to the economy, is using advanced technology.

As Cunha and Britto insists, Furtado could produce a much richer view of underdevelopment. Of the process of development itself than the standard

definition thanks to a direct connection he established between these topics and his historical-structural analytical method:

[...] given that new production techniques are in reality introduced onto pre-existing economic structures, the main task of development theory becomes the analysis of the impacts of growing modern sectors and their repercussions in terms of productivity gains, distributive patterns, and use of social output (Cunha & Britto, 2017).

It is in his 1961's book that Furtado elaborates the concept of technological inadequacy. Albuquerque (2007) identifies this concept in three of Furtado's main books. Technological inadequacy means that the periphery countries have to make a huge effort to assimilate known techniques from the central countries. Moreover, "to the extent that the consumption patterns of the minority match the patterns in countries leaders in technological progress and that have a high level of capital accumulation, any attempt to adapt technology will be rejected" (Furtado, 1987, p. 211). Furtado argues that the development process consists of the introduction of a new combination of production factors that increase the productivity of the workforce.

The combination of low productivity with income concentration implies that almost all the population remains outside the exchange economy. However, different capital and labor combinations, especially those that increase the capital levels, carry technological innovations to enhance economic productivity. It is possible to see from this idea the Harrod-Domar model behind the framework of different capital and labor combinations, hence economic growth.

Furtado also discusses the developing economies' possibility of using external push. For this external impulse to be favorable to economic development, it should not be accompanied by income concentration. Since this impulse increases productivity, with positive impacts on domestic income, it will diversify the demand, generating pressure on prices, which enhances investment opportunities. "Hence the new saving is absorbed in investments supported by foreign demand and in others linked with the domestic market. The new investment also provokes productivity increases in other sectors, and the chain of reactions is repeated" (Furtado, 1961/1964, p. 66).

In case of income concentration, an increase in income generated by the external resource will not generate demand diversification. In addition, if the saving level is low, the investments also will be low, which reduces the possi-

bility of development. The idea that investment growth depends on the level of savings is compatible with the Harrod-Domar model. The capitalization rate is the proportion of current income. This is transformed into a new production capacity. Again, Furtado argues that it is necessary to increase savings to have a positive impact on investment.

The coefficient of investment reflects the intensity of the effort to grow exerted by an economy over a specified time period. It indicates that part of the product obtained during that period in question which the population does not consume but transforms into productive capacity (Furtado, 1961/1964, p. 71).

Furtado (1961) claims that economies with low productivity and income concentration make most of the population have subsistence consumption. Thus the savings level will be low because it reduces the level of investment. More intense capital accumulation is related to an increase in technical progress. Raising capital stock opens the way for scale economies and external differentiation created by the productive structure, which becomes itself a factor of productivity increase.

Furtado mentions innovation and invention. However, he argues that innovation accelerates the accumulation process. This accumulation process is made by increasing the portion of income not consumed. Also, the author argues that the production growth pressures the increase in wages. To maintain the income share, entrepreneurs will search for innovations to reduce labor costs.

Summing up, it is possible to insist that in the 1961 book, Furtado's theory was essentially based on the Harrod-Domar model rationale. In this sense, it is clear the idea that savings precede investment, leaving little space for innovation.

3

CREATIVITY, INNOVATION, AND TECHNICAL PROGRESS

The context in which the book *Criatividade e dependência na civilização industrial* [Creativity and dependence in industrial civilization] (1978) was written

is related to some events: i) Furtado was answering an important criticism made by structuralist/Marxist authors; ii) the intellectual context in which the author was involved; iii) the notion that lack of freedom could constrain creativity can be related to the fact that countries in Latin America were under dictatorships.

Between 1966 and 1989, Furtado was a professor at the University of Paris and wrote around 15 books, including *Criatividade e dependência*. It is possible to argue that during the 1970s, and in particular as presented at the *Criatividade e dependência*, Furtado changed some of his perspectives on topics such as technology and productivity. In this work, creativity generates innovation, and innovation is a key driver to capital accumulation, which is different from what he wrote on capital accumulation in the previous works, in which the capital accumulation key was the increase in the saving rate in the economy.

Albuquerque (2013) argues that the innovation process in the 1978 Furtado's book is seen as a process of multiple meanings that surpasses the notion of technological progress. Innovation in the sense proposed by Furtado is directly related to human creativity. Creativity in the context of the book leads to innovation. However, what is in the focus of the book is how creativity has made possible the existence of developed countries and how it might be the path to overcome underdevelopment. Thus, creativity/innovation are the key factors to increasing technological and, therefore, productivity in the economic system.

According to Mallorquin (2005, pp. 280–281), in *Criatividade e dependência*, Furtado takes a universal economic history approach and combines it with a speculative and philosophical written form of historical concepts. The major characters of this book are transnational enterprises and developing countries. In this sense, the work is about the effort made by developing countries for modernization and adaptation to large industrial centers.

In this book, Furtado discusses his theory based on authors such as Weber, Nietzsche, Marx, and so on. The book shows a wide variety of concepts and ideas. He manages to overcome current theories by creating a kind of “big theory” that totalizes the historical process of the emergency and development of industrial society, showing how developing countries have been inserted in the industrial process indirectly and, thereby, reproduced underdevelopment. Authoritarianism may represent the blockage of creativity, which contributes to the reproduction of underdevelopment (Mallorquin, 2005, pp. 280–281). In his analysis on this topic, Albuquerque (2013) also highlights how it is important to Furtado's argument the Nietzschean perspective that lack of freedom

could block creativity. Albuquerque (2013) interprets that human creativity is the guiding theme of the book's structure. Thus, it is the driving force of the innovation process and invention. Nevertheless, in this interpretation, the industrial civilization constrains, and limits creativity.

In an important contribution to the understanding of Furtado's ideas and his connection to the topic of creativity, Boianovsky (2015) adds that Furtado's approach was highly influenced by both Lévi-Strauss and Braudel's approaches to structure and history. Furtado combines structure and history in an economic model that interprets successive historical structures, moreover the development of the creativity notion as a link between structures and processes. Boianovsky's approach to Furtado's work deals essentially with the methodological perspective but can help us also to understand the changes in Furtado's ideas on technical progress.

It is crucial to pay attention also to the specific context in which Furtado was immersed in the 1970s, which essentially means the French academia and the importance of this context to his attempt to create a "big theory". Following here the arguments presented by Britto and Cunha (2014)², a key point here is to understand the connection between Furtado's ideas and the perspectives originally presented by François Perroux. Britto and Cunha observe that Perroux began to work with topics connected to human creativity (and human creation) in the 1960s, insisting years later that human creativity would be the main driving force behind innovation. In addition, Perroux was discussing the alienation matter in the industrial society, which Furtado also discusses in *Criatividade e dependência*.

À partir du cinquième chapitre, Furtado réfléchit sur le futur et les possibilités de transformer la réalité actuelle. Son style analytique est proche de celui de Perroux quand ce dernier traite des 'virtualités' et tous deux adoptent une attitude que l'on peut qualifier d'utopie réaliste. Le mot créativité devient dès lors le mot-clé et l'argument se prolonge dans le chapitre suivant ('Dépendance dans un monde unifié') où l'interrelation entre la dépendance culturelle et la dépendance technologique est mise en évidence (Britto & Cunha, 2014, pp. 439–440).

2 A preliminary version of this article was presented by Cunha and Britto (2012).

It is also important to note that Furtado lost his civil rights and had to leave Brazil after the military coup in 1964. For him, the lack of democracy, not only in Brazil but also in Latin America as a whole, should be understood as an important source to explain the permanence of the region in the underdevelopment. This is also essentially connected to his perspective that the lack of freedom is a blockage of creativity.

Following the conclusions reached in Cunha and Britto (2017), it is possible to insist that the 1970s were an important turning point in Furtado's ideas, which reinforces the argument here that there are substantive changes in his perspective about the underdevelopment problem if we compare the 1961 and the 1978 books. Cunha and Britto (2017) bring a few reasons for this change of perspectives, as follows:

- i) Furtado described his own theoretical trajectory (particularly in his autobiography) in very linear terms, just like a natural path that connects the evolution of his ideas. Cunha and Britto (2017) challenge this view, insisting that this is much more a problem of how Furtado himself conceived his own trajectory but that this had, in fact, contaminated much of the literature on Furtado's ideas. However, definitely, there is much room for repositioning and changes in Furtado's intellectual trajectory than it was presented in his autobiographic works;
- ii) Furtado struggles to find a new theory that could be a counterpoint to neoclassical theory. Thus,

[...] the real constant in Furtado's intellectual path is not the sustained rate of progress of a set of ideas and concepts but rather a permanent intellectual struggle with the narrow horizon of mainstream economics to encompass all the issues, as well as their interrelations, involved with underdevelopment and development proper (Cunha & Britto, 2017);

- iii) In the seminars organized by Furtado in 1964 in Chile just after having lost his civil rights in Brazil, he discussed with other names from Cepal, and this was an important moment in which he presented his perspectives on dependence and his reflection connecting culture and dependence in a new theoretical direction has probably emerged;
- iv) It is also important to pay attention to Furtado's second stay at Cambridge University in the '1970s, attending numerous seminars of discussions on the subject of economic growth and development, as an important source also in the repositioning of his ideas in the period.

It was argued above that in *Desenvolvimento e subdesenvolvimento* (1961), Furtado's interpretation regarding technology and, therefore, productivity was related to the Keynesian model. Adding to this, it is important to highlight that, for him, technology could be increased if there was an increase in saving level, which would increase investment and, thus, productivity. In this model, savings precede investment. And there is the productivity issue, which dismisses the workforce, making the development process difficult. Furtado's interpretation was challenged by Fernando Henrique Cardoso and Enzo Faletto in *Dependência e desenvolvimento na América Latina* [Dependency and development in Latin America], from 1967. This book was written at the time of the military dictatorship in Brazil. It interprets the underdevelopment and dependency process in Latin America from a perspective influenced by Marxist ideas. It is inevitable to consider that this criticism made by Fernando Henrique Cardoso and Enzo Falleto was one of the factors connected to the change in Furtado's approach to underdevelopment and, therefore, technological progress.

Furtado (1978, p. 17) argues that economic agents impose their own will, whether consciously or unconsciously, over the economic system. Then, with the creativity advent, an implicit element of power is achieved. For him, creativity breaks the macroeconomics/microeconomics logic because it gives the agent power of transformation. Thus, the meaning of creativity is closed to the concept of innovation.

Innovation, hence technical progress, is one of the spheres in which human creativity emerges. Innovation is treated in various aspects along the *Criatividade e dependência* (1978). The author discusses innovation in many dimensions, such as social, cultural, economic, and also political. For instance, on the nation and companies subject, the State and large companies have a dominant position in initiatives focused on capital accumulation and creativity. And it is at the international level that the innovative capacity of industrial capitalism shows how much can be creative and generate innovation.

Another interesting aspect related to creativity is referred to as the industrialization process. Innovations in the production methods become the fastest path to overcome competition, using the notion that creativity – or innovation – is an instrument of power. Thus, the increase of productive excess no longer depends on the trade opening of the markets. The accumulation process depends on creativity. Thus, the acceleration process of capital accumulation is necessarily an innovative activity.

To Albuquerque (2013), the industrial society is a constraint to human creativity. In this sense, due to the need of industrial society, scientific creation becomes subordinate to technical innovation, and this technological creation

becomes directed to the conveniences of the accumulation process. Therefore the industrial civilization constraints creativity because of the instrumental logic. This aspect may be understood as Furtado criticizes the capitalist society. It is clear that capital accumulation no longer depends on the savings rate, as in previous Furtado's books (more specifically, in 1961 one). On the contrary, capital accumulation is the vector that permits, through innovation, to introduce changes in the production system and in social structures (Furtado, 1978, p. 480). In his view, in dependent countries, innovations are simply not produced.

In addition to the discussion about innovation and capital accumulation in relation to nations and companies, Furtado emphasizes that innovation in the consumption sphere allows consumption diversification for the population majority. To him, the interdependence between individual consumption stimulus and innovations flow is what stimulates accumulation. It is what he calls industrial civilization, which tends to keep society split into classes of consumption patterns.

Capital accumulation releases resources to create new needs, which stimulate new inventions. In this case, scientific research was increasing in the historical process. The scientific research was put into the service of technical innovation that seeks greater efficiency of human labor and diversification of consumption patterns.

Furtado clearly changes his opinion about factors that stimulate labor productivity. Earlier in *Desenvolvimento e subdesenvolvimento* (1961), productivity would increase by an increase of machines with higher technological content, which would also increase in the presence of investments, therefore higher levels of savings. In *Criatividade e dependência* (1978), the reasoning is treated in Schumpeterian terms, more specifically investment in research and development, which increase the technology content and, consequently, the efficiency of the technique and labor productivity.

The capital accumulation process has two main pillars: i) innovation that enables to differentiate consumers, and ii) the innovation diffusion that homogenizes the consumption forms. The consumer has a passive role that consists of answering the stimulus to which he is submitted. Innovations encourage a higher spending level, which differentiates consumers. The consumption pattern is, at the beginning, restricted to some consumers. Afterward, it will be overcome and diffused, which allows the market to expand in all dimensions. Economic growth and capital accumulation will be directly linked to creativity.

FINAL CONSIDERATIONS

This paper aimed to discuss the differences in the technical progress determinants, therefore, productivity and economic growth in Celso Furtado's work. Starting with a discussion of the first chapter of Furtado's *Desenvolvimento e subdesenvolvimento* (1961), in order to verify the criticism that he made to the classic authors of economic thought, namely Keynes and Schumpeter, we pointed out how this study was important for the understanding of Furtado's interpretation on technological progress determinants, consequently, productivity and economic growth. Furtado criticized classical economists because he saw there was no space (in classical thinking) for economic development discussion. He also criticized the Keynesian approach and proposed some changes. In his proposed changes, the distribution of income becomes important in the Keynesian model. Furtado (1961) argues that innovation in Schumpeter's theory is not a theory about innovation, but a theory about the organization or a new combination of enforces of production. Thus, what matters is the monopoly that emerges from a new way of organizing production.

In the second section of this paper, it was discussed Furtado's view on technical progress determinants and which theory he used for his economic analysis. We argued that Furtado, at least partially, uses the Harrod-Domar model to analyze the underdevelopment. Technological progress would be achieved by increasing investment and domestic savings. However, domestic savings do not increase because of income concentration in Brazil (and in underdevelopment nations in general), which makes it impossible for workers to increase savings.

Finally, we approached Furtado's ideas in *Criatividade e dependência* (1978). It is argued that Furtado changed his theory about the technical progress determinant during the 1970s. Specifically, in this 1978 book, creativity is responsible for bringing innovations, and innovation generates technical progress, consequently, economic growth. This book, in the context it was written, reflects (reacts to) three different issues: i) a certain Marxist criticism made by Fernando Henrique Cardoso and Enzo Faletto; ii) the intellectual context in which Furtado was immersed, specifically the French academia; iii) the issue of the dictatorship in Latin America (especially the claim that the lack of freedom is a constraint to creativity).

DETERMINANTES DO PROGRESSO TÉCNICO NAS IDEIAS DE CELSO FURTADO: DE DESENVOLVIMENTO E SUBDESENVOLVIMENTO (1961) A CRIATIVIDADE E DEPENDÊNCIA (1978)

Resumo

Este trabalho tem como objetivo discutir as diferenças no tratamento dos determinantes do progresso técnico, portanto, produtividade e crescimento econômico no trabalho de Celso Furtado, *Desenvolvimento e subdesenvolvimento*, de 1961, e *Criatividade e dependência da civilização industrial*, de 1978. O argumento central é que as diferenças na interpretação de Furtado relacionadas aos determinantes do progresso técnico nesses dois livros são aspectos importantes da evolução das ideias do autor e podem contribuir para revelar as importantes mudanças em suas perspectivas teóricas ocorridas durante a década de 1970.

Palavras-chave: Celso Furtado; teoria keynesiana; criatividade; tecnologia; inovação.

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