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**Raúl Prebisch and Economic Dynamics:
Cyclical growth and center-periphery interaction**

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Abstract

Prebisch believed that understanding the evolution of capitalist economies over time and in different contexts required a general cycle approach, which he labeled ‘dynamic economics’, encompassing all the different areas of economic activity. His dynamic economics stemmed from a critique of both neoclassical and Keynesian theories, which Prebisch viewed as static representations of capitalism. His dynamics was first applied to a closed economy and then to a center-periphery context. These combined the notion that profit is the driving motive of economic activity with a process of forced savings and the idea that the time lag between income circulation and the derived demand, and the time taken in the productive process was the main source of cyclical fluctuations. Prebisch’s dynamic theory, which he never completed, influenced his Development Manifesto (1949).

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Introduction

Raúl Prebisch (1901-1986) believed that understanding the evolution of capitalist economies required the development of a general cycle approach encompassing all the different areas of economic activity including production, employment and distribution. Following his departure from the Central Bank in 1943, Prebisch set himself this task and began pulling together the main blocks of a general cycle theory, which he termed ‘dynamic economics.’

He developed his views through a series of lectures in Buenos Aires beginning in April 1945 under the title Political Economy (Economic Dynamics), which continued until October 1948. The first lectures dealt with a critique of classical economics and Keynes’s *General Theory of Employment, Interest and Money* (1936) (GT). These lectures bore the title “The Crisis in Political Economy. Keynes and the Classics.”² For Prebisch, the state of crisis of classical (neoclassical) and Keynesian theories referred to the fact that these were unable to explain and account for the cyclical growth pattern of capitalist economies as both were stuck in a timeless equilibrium analysis of capitalism. As part of his development of dynamic theory, his analyses of Keynes led him to publish his *Introduction to Keynes* (1947A), which constituted an exposition of the main ideas of the GT.

Moreover, these views also shaped the understanding and analysis of the cycle in the periphery, which was, according to Prebisch, precarious. The countries of the periphery needed to elaborate their own cycle theory with its particular specificities in order to design policies for ‘orderly growth and maximum use of resources and human capital (Prebisch 1949A in R.P.O., Vol. IV., pp. 413-414).

Prebisch further developed his views first during his stint in Venezuela as an advisor to the government on monetary affairs, and later on in a series of eight lectures delivered between February and March 1949 at the National School of Economics in Mexico City.³ By then, the title of the course had changed from ‘Political Economy (Economic Dynamics)’ to ‘Economic Dynamic Theory (with particular application to Latin American economies)’.

Prebisch’s dynamic analysis is presented in terms of a model of an economy producing final consumption goods mainly with circulating capital and including two social classes, workers and entrepreneurs. Worker’s wage bill is entirely spent on final consumption so that entrepreneurs recoup the money flows spent on production. In the model, production is not instantaneous, it takes time; and with the introduction of time the model becomes dynamic. Prebisch further assumes that the time period for the circulation of incomes exceeded the time period that it takes for final goods to be brought to the market. Finally, the model includes a banking system responding passively to entrepreneurs’ credit demands.

The description of the workings of the model begins at the start of an upturn in economic activity, with the banking system advancing loans to entrepreneurs to carry out their production plans. The latter distribute incomes to the hired labor force which are then spent on the consumption of final goods. Due to the assumption of different time periods between circulation of incomes and production, the increased expenditure translates into higher prices and profits, which provide, in turn, an incentive to entrepreneurs to expand production. As profits swell, entrepreneurs have less recourse to external funding and money creation, and finance their production plans with retained earnings. As the production process comes to an end and final goods are brought to the market, output increases, which jointly with a slower rate of growth of the money supply reduces prices and profits, and with it the incentive to expand production. A process of inventory accumulation ensues. This signals the beginning of a downturn in economic activity, which continues until inventories are depleted and the stage is set for the start of another upward phase of the cycle.

Prebisch’s dynamics includes a combination of orthodox and heterodox economic ideas. On the one hand, he adhered to a quantity theory framework in the explanation of the workings of the cycle. In line with the loanable funds theory, he maintained that savings determines investment and that in the upward phase of the cycle, investment was financed through a process of ‘forced savings.’ His interpretation and use of forced savings revealed the deep influence of Ralph Hawtrey.⁴

At the same time, Prebisch understood that ‘profits’ (i.e., exchange values) is the driving motive of capitalist development, very much in line with Karl Marx. He also assumed, following Kalecki (1971) albeit inadvertently, that entrepreneurs recouped, through increased demand, their expenditure on investment and that workers’ marginal propensity to consume equaled one (‘capitalists get what they spend and workers spend what they get’).

His dynamic analysis is meant to show that if correctly understood, economic forces would never lead to an equilibrium point, but rather to a series of upturns and downturns within which the economy was growing. This is his understanding of cyclical growth. He extended his dynamic analysis to include the relations between center and periphery. The analysis of center periphery within his dynamic theory was introduced in the fourth lecture on dynamics in Mexico 1949 and was developed in the three remaining lectures.⁵

Prebisch was convinced at the end of his lectures on dynamics, in March 1949, that his theory was general rather than specific to a particular setting and circumstance. However, probably due to time constraints and pressing commitments, he never fully developed his dynamic theory. In 1949 he joined the then named ECLA, first as a consultant and then in 1950 as its Executive Secretary. By then his interest had turned to the industrialization problem of Latin America, as attested by the publication of the ‘Development Manifesto’ and ‘Growth, Disequilibrium and Disparities’, which nevertheless were clearly influenced by his cycle and dynamic analyses.

Following the introduction, the paper is divided into four sections. The first discusses Prebisch’s critique of the neoclassical theory and Keynes GT as static representations of capitalist development. Sections two and three lay out the building blocks of Prebisch’s dynamics and its development. The fourth follows Prebisch’s application of his dynamic theory to the center and periphery, and argues that Prebisch thought of his dynamic theory as a general rather than particular theory, capable of incorporating different assumptions, varying parameters and situations without changing its core analysis and foundations. The final thoughts are found in the concluding section.

Neoclassical Theory and Keynes' General Theory: Two static representations of capitalism

Prebisch thought that the growth process of capitalist economies was eminently cyclical. As he puts it (1948A in R.P.O., Vol. III, p. 499): "The cycle is the typical form of growth that capitalism has had historically and continues to have. Economic activity...expands and contracts continually in an interrupted succession of phases of growth in incomes, in employment, and in production, followed by phases of decline, with the consequent decrease in production and employment."⁶ His understanding of capitalism is typical of many authors in this period. For Prebisch, the cyclical reality of capitalist growth undermines the whole notion of equilibrium, understood in the Smithian sense as a center of gravity, and even more so, if one thought in terms of the neoclassical notion of allocative efficiency. As he argued (Ibid): "There is no point of rest: ascending to descend and descending to ascend again.' And further (Ibid.): "In this movement there is no point of equilibrium; this movement is a continual succession of disequilibria." This applies to both static and dynamic equilibria.

Prebisch became highly critical of economic theory at the time, precisely for the reason that it was anchored and stuck in equilibrium analysis and thus divorced from capitalist reality. In this regard he makes no distinction between 'neoclassical' and Keynesian theory. Both are guilty of the same flaw.

Prebisch's critique of neoclassical theory is aimed at the marginal productivity theory (MPT). Prebisch argued that MPT implies that the evolution of a market economy could only be characterized in the form of a regular line of advance, and in more modern terms, that it is only compatible with 'Steady State Growth,' a concept and expression that became a fundamental part of the mainstream toolkit only a decade later. And he correctly understood that Steady State Growth is determined by the rate of growth of population and technical innovation.⁷ As such, the notion of steady growth precludes the very nature of capitalist evolution.

Prebisch illustrates his point with an implicit model comprising investment and consumption goods sectors. The application of MPT to this type of model meant that if output expands in a steady state form, both investment and consumption also have to expand at a steady state growth rate and thus maintain over time a given ratio. In other words, MPT presupposes a balanced process of growth, which implies that competitive conditions ensure that the output of capital goods relative to consumption goods must keep a given relationship determined by the rate of growth of population, technical innovation and preferences. Any

divergence from that investment/consumption ratio is eliminated through changes in the quantity of capital goods demanded due to the differences between marginal product of capital relative to the rate of interest. As put by Prebisch (1948F in R.P.O., Vol. IV, p. 349):

“The logical relationship between capital and consumer goods industries is given by the rhythm of growth of population, technical innovation and the savings preferences of the community. Thus if for any reason in a given industry, there had been created a greater capacity than that justified by consumption...the productivity in the increment of capital brought about by this excess, would be below the rate of interest, and this would eliminate the excess... Thus neither in particular cases or economic sectors can there be conceived an excess capacity in the production of capital goods.”

In this view, the rate of interest is the central coordinating mechanism of economic activity and more precisely of productivity (investment) and thrift (savings). Prebisch viewed the rate of interest, as defined by the neoclassical authors, as an artifice, albeit a useful artifice, for it allowed neoclassical theory to remain within the confines of timeless equilibrium theory even when analyzing a capitalist-production type economy. For Prebisch, the process of production requires the passage of time or a period of time during which savings must be generated and transformed into capital. As he puts it (1948B, in R.P.O., Vol. IV., p. 272):

“...there elapses a more or less long period of time between the initiation of operations and the termination of the final product...meanwhile the factors of production occupied in this intermediate production that creates the final product, need to consume, and if they don't save, other factors...must forego consumption...Foregoing consumption is to save and transfer what these do not consume to those working in intermediate production...It is investing savings into the formation of capital...since intermediate production- all that is in the process of being transformed into final products, more or less a long process – is capital.”

Classical theory allows the process of transformation of savings into capital to be perfectly synchronized by changes in the rate of interest. The rate of interest is the ‘theoretical artifice’ as Prebisch termed it for the required synchronicity. According to Prebisch, neoclassical theory holds that it was: “...not possible to invest without having an equivalent and simultaneous quantity of savings” (Ibid. p. 274). In other words,

the rate of interest regulates savings in such a way as to make the act of saving and that of investing a simultaneous act.

After laying out his critique of neoclassical theory, Prebisch turns the focus of his analysis to John Maynard Keynes. Prebisch argues that Keynes was never able to fully disentangle himself from the fetters of the classical theory and remained attached to the neoclassical notion of equilibrium. Having disparaged with the neoclassical theory of the rate of interest, which he criticized profusely in the GT, Keynes used an alternative artifice to dispense with time, i.e., the multiplier and the associated changes in income to generate the required savings to ‘finance’ investments. Prebisch interprets the multiplier as an ‘instantaneous multiplier.’ As he puts it: (Prebisch, 1948A in R.P.O., Vol. III., p. 505):

“...the revolutionary part of Keynes, from the theoretical point of view, is his famous theory of the multiplier...which is another theory of economic equilibrium very similar in its structure to the old quantity theory of money...Such is the vigor of that mental habit, from which Keynes would never emancipate himself. He thus followed the classics where he should have followed them the least, precisely in the search for equilibrium laws, which is from my point of view the most considerable obstacle faced by political economy to progress from the theoretical point of view; in such a way that if these obstacles are not vigorously removed we will continue to make constructions that are alien to reality.”

And in 1948B in R.P.O., Vol. IV, p. 277:

“That is given an increase in investments, incomes will grow in the required measure to produce...an increase in savings equivalent to the increment in investments... It is clear that such as reasoning can only come from a theoretician that dispenses with time. Why? Because time is indispensable for the increment in investment to provide the increment in incomes...that is...Keynesian thinking means saying: to undertake investments today, we will use as savings that which is done in the future... This reasoning can only be undertaken if the future is confused with the present eliminating completely the time factor in the process. This is one of the great logical inconsistencies, which invalidates Keynesian theory.”⁸

In spite of doing away with the notion of voluntary savings, Prebisch still maintains that savings predated investment. However, the process through which savings ‘finances’ investment is one of ‘forced savings.’ More to the point, he argues that during the expansionary phase, an increase in credit increases prices and acts as a transfer between consumption and investment goods. As he puts it (Prebisch, 1948C in R.P.O., Vol. IV., 300):

“...the greater part of investments in fixed capital are covered by an increase in credit rather than by having recourse to the market, in accordance with the laws of supply and demand as traced within classical economics...How does the increment of credit act?...the increase in money put in circulation...to pay for investment make prices increase...The increase in prices imply a fall in real wages...to compel those who pay the highest prices to save, transferring this flow of savings to the entrepreneur in the form of consumption goods; the entrepreneur in turn transfers it to the producers of capital goods...the greater part of savings is not a result of a mechanism of incentives and preferences but rather of a mechanism of compulsion. In so far as voluntary savings are insufficient, savings become compelling.”

Prebisch views the notion of forced savings as incompatible with neoclassical orthodoxy of savings, because the latter conceives savings as the result of individual preferences. As he puts it: (1948B in R.P.O., Vol. IV, p. 276): “A great part of the investments that have been undertaken historically and that continue to be undertaken by a mechanism very distinct from the supply and demand for savings; and a great part of savings that is invested is not the result of what the collectivity spontaneously decides given its inclinations and tastes and the rate of interest.” At the same time, Prebisch argues that classical theory cannot accommodate ‘forced savings’ because its equilibrium foundations are tantamount to dichotomizing between the real and monetary spheres.⁹

Yet the fact that Prebisch attributes such an important role to forced savings reflects the fact that he firmly believed that savings preceded investment, that the undertaking of investment necessarily requires a prior act of savings. As he argued (Prebisch, 1948C in R.P.O., Vol. IV, p. 299): “I am convinced that foregoing consumption is essential to capitalize investments. In this I agree with the reasons espoused by the Classical theory and I am in disagreement with Keynes”.

The forced savings doctrine allowed, in fact, Prebisch to place profits at the center of the explanation of the cyclical reality of capitalism and open up the way for a theory of dynamics.

Prebisch's Dynamic Theory and Its Main Elements

Having argued that the timeless constructions of the neoclassicals and Keynes are irrelevant to the understanding of capitalism, Prebisch emphasizes the need to construct a dynamic theory capturing its time dimension and its growth cycle motion with the understanding that this process embedded the entire spectrum of economic activity. In his own words (Prebisch, 1949A in R.P.O., Vol. IV, p. 414):

“Increasingly I am more convinced that the cycle is the way through which a capitalist economy grows. A capitalist economy expands only in wave motion and any perturbation...can only give rise to a wave motion movement...If the cycle is the way to grow...and if the economy moves incessantly in this manner, it would seem that all the joint events of the economy, not only those of production and employment, but also those of distribution, must be integrated into a general dynamic theory.”

Prebisch understands dynamic theory, as one that introduces historical rather than logical time as a variable in the analysis,¹⁰ which is why in part he dislikes the logical multiplier (Ibid, p. 415). A dynamic theory should explain, not only the rationale for the alternating phases of prosperity and depression that characterize capitalist economies but also the processes of production and distribution.¹¹ Hence, he sustains that dynamic theory also plays a fundamental role in the analysis of three of the main characteristics of a free market economy including the instability of the economic system, the inequality in the distribution of income and the persistent level of unemployment.¹²

His dynamic theory is founded upon a simple fact, namely production is not an instantaneous process. Rather, production takes time. Between the start of any production process and its end result (i.e. the output of finished goods), at every interval, a value is added to the production process, so that the whole production process consists of a sum of values added. Corresponding to the process of creation of value added (a productive process) is a process of generation of incomes. Means of production have to be purchased and participants in the process of production receive an income for their contribution to

production. By definition, the sum of the value added must be equal to the sums of incomes. That is formally,

$$\sum_{i=1}^t VA_i = \sum_{i=1}^t (W_i L_i + \Pi_i) \quad (1)^{13}$$

Where, VA = value added, WL = wage bill and Π = profits.

Wages and profits are not distributed at the same time as final goods are produced. A part of wages and profits are distributed prior to end of the production process. This difference between the time-period during which incomes are distributed (circulation sphere) and that which is required to complete the production process (production sphere) created a disparity between aggregate demand and supply and is the source of profits and of the cycle. Or in other words, the fact that the monetary and real sphere operate in different time periods is the cause of the fact that economies, rather than tending towards an equilibrium position, evolve through a series of disequilibrium positions (Prebisch, 1948A in R.P.O., Vol. III, p. 502).

The upward phase of the cycle is characterized by an excess of incomes over value added, i.e. an excess of aggregate demand over supply. This in turn translates into higher expenditure, prices (P), profits (Π) and investment expenditure (I). Then the flow of investment expenditure eventually returns to the entrepreneur in the form of profits (Π). Thus as Prebisch developed his dynamic analysis, it became clear that there was a two-way relationship between profits (Π) and investment (I). That is:

$$\sum_{i=1}^t VA_i < \sum_{i=1}^t (W_i L_i + \Pi_i) \Rightarrow \Delta P \Rightarrow \Pi \Rightarrow I \quad (2)$$

And,

$$I \Rightarrow \Pi \quad (3)$$

In the downward phase of the cycle, as aggregate supply exceeds aggregate demand, prices and profits decline leading to a process of disinvestment. As upward and downward phases alternate, Prebisch sustained that (1949B in R.P.O., Vol. IV, p. 425): "...a capitalist economy is characterized by a continuous process of investment and disinvestment, with this particularity: that in general in the process of

disinvestment not everything that has been invested is disinvested; otherwise there would be no economic growth.”

Note that the interdependency between investment and profits underscores the tension and coexistence in Prebisch’s thinking of both orthodox and heterodox elements. Heterodox, or Keynesian and Kaleckian thinking shows a clear preference for making profits a function of investment rather than the opposite. This was argued at the time as illustrated in Kalecki’s work (e.g. Kalecki, 1971) and also in Keynes’s GT.

Prebisch’s exposition of dynamic theory is founded upon certain premises including (1949D in R.P.O., Vol. IV, pp. 445-454): (i) the existence of unemployment and excess capacity at the beginning of the upward phase of the cycle; (ii) wages and expenses with means of production financed by increased money supply rather than voluntary savings; (iii) in this sense, investment is undertaken mainly by circulating capital; (iv) fixed capital is considered but it is a minor part of total investment and is financed by voluntary savings; (v) there are no limits to the creation and lending of money by the financial system and the financial system responds to real activity, i.e., money supply is endogenous; and (vi) the existence of perfect competition, in the sense of free entry and that agents are price takers.

Prebisch’s assumptions are meant, on the one hand, as an expository device. On the other hand, these also illustrate and highlight two key points of his approach.

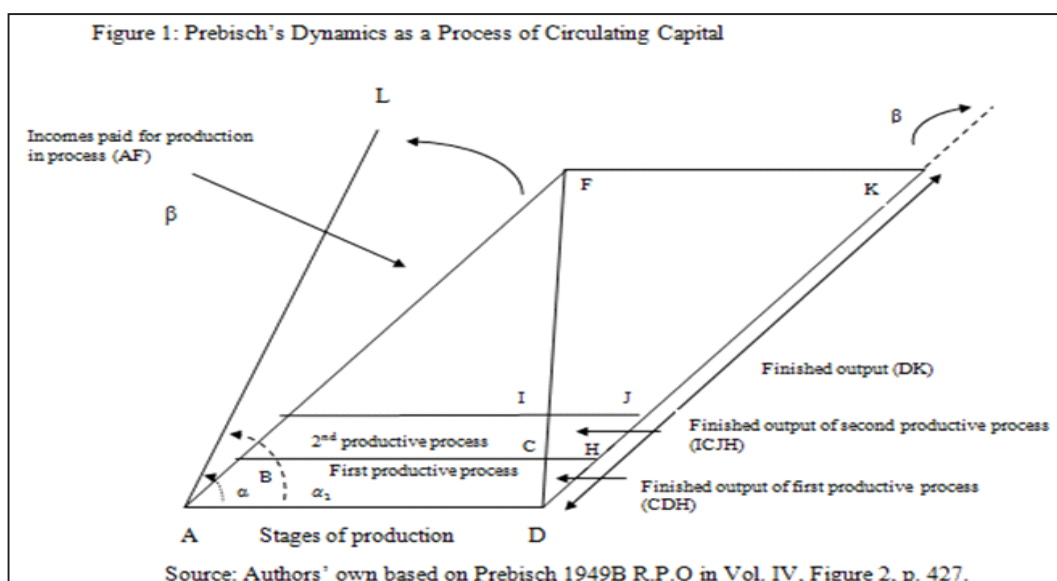
The first is that capitalism growth cycles occur as a ‘natural’ feature of capitalism and do not depend on the existence of full employment, overheating, imperfect competition or any other ‘auxiliary hypothesis’. The second is that it underscores the fact that the wave motion of capitalism originates in the accumulation of circulating capital rather than in that of fixed capital as presumed by most economists (see, Ibid. p. 451). As he puts it (Prebisch, 1949B in R.P.O., Vol IV., pp. 424-425):

“...the key to the wave phenomenon lies in the disparity of time between the process of circulation of incomes derived from production and the own productive process... The difference between the production in process and finished production represent investment in circulating capital... in the upward phase of the cycle there is a process of accumulation of circulating capital as a result of the difference between production in process and finished production, and in the downward phase of the cycle, the opposite occurs: within a process of liquidation of circulating capital.”

Prebisch expands his analysis of dynamics through a graphical representation consisting of a plane divided into two triangles of two equal areas. The first triangle (ADF) represents production in process. The second triangle represents (FDK) represents finished production. Prebisch considers at this stage only circulating capital. The two triangle plane is meant to capture three dimensions of the production process: the time elapsed for the production process, the real output both as production in process and final production ('the mass of production'), and the money incomes paid to the factors of production. Prebisch assumes that there are nine productive processes and that each of the productive process takes nine months to produce a unit of final production.

Further he assumes that only wages are paid during production in process and that these are spent on final consumption goods (finished production) and that there are no profits. Entrepreneurs recapture the incomes they paid to workers (wage bill) through the sale of final commodities. Prebisch assumes, furthermore, that entrepreneurial incomes are in turn re-invested in the productive process.

The base of the first triangle (ADF), that is AD, represents the stages of production of a productive process, which Prebisch divided in nine equal time periods (or months). The hypotenuse of the triangle (ADF), that is AF, represents both the incomes paid for production in process and the sequential start of each series (or nine stages) of the nine productive processes. The hypotenuse of the second triangle (FDK), that is DK, represents the incomes paid for the finished output (produced commodities; see Figure 1).



At the end of the first nine months, the first productive process (denoted by ABCD in the first triangle (AFD)) produces a unit of finished output denoted by CDH in the second triangle (FDK) and which is equivalent to ABK. The finished output is sold and the proceeds are then reinvested and added to the production in process (ADF). At this point, entrepreneurs begin the second production process, which itself will take nine months. After the time for the completion of the second process has elapsed, the finished output appears as ICHJ in the second triangle (FDK). ICHJ is the equivalent of the sum of proceeds reinvested (CDH) plus the addition to final output of the second productive process, in absence of the proceeds reinvested from the final output of the first productive process, that is, ICHK. Thereafter, the process is repeated until the completion of the nine processes of production, and each productive process contributes the same mass of production in process to final output. At the end of the entire process, total income paid for the production in process equals total income received for the output of final production ($AF=DK$ or $\alpha = \beta$).

This stationary state system (comprised of workers who receive wages which are then paid to entrepreneurs for the purchase of final commodities, and entrepreneurs that reinvest these proceeds), can only expand if the incomes paid for production in process exceed the incomes received by entrepreneurs for the sale of final output. This is shown by the displacement of AL to AF, which leads to an increase of incomes paid to factors for the production in process over and above the final output (DK) ($\alpha = \beta$ and $\alpha_1 > \alpha = \beta$).

In a further stage, Prebisch proceeds to introduce profits into his analysis. Profits result from an excess of demand over supply and materialize from the beginning until the end of the productive process. The profit transmission mechanism includes the spectrum of different entrepreneurs involved from the beginning until the end of the productive process: raw material producers, industrialist, wholesalers and retailers. Prebisch assumes that retailers face fixed prices while wholesalers, manufacturers and raw material producers face flexible prices. In addition, retailers target a certain normal level of inventories.

Faced with an increase in the demand for final products, retailers reduce their inventories below their normal level, which leads them to expand their demand to wholesale producers, materializing in higher prices and profits. In turn, wholesalers, in view of the higher prices and profits, expand their operations and their demand to the industrialist. The same mechanism leads the industrialist to expand its demand to the raw material producer. In this way, the rise in demand accompanied by higher prices and profits are thus

transmitted throughout the chain of the productive and distribution process. Note that at every stage the rise in demand, process and profits is accompanied by a concomitant increase in the wage bill (Prebisch, 1949B, pp. 431-433 and 1949C, pp. 436-433 and p. 443 in R.P.O., Vol. IV). This process will produce a higher level of wages and profits, which are then incorporated in the prices charged by every type of entrepreneur to each other and to final consumers. That is, the primary products sold to the industrialist, the wholesale products sold to the retailer or the final product sold to consumers will have incorporated the new profit level, itself the result of an imbalance between aggregate supply and demand.

Prebisch thought that once a higher level of profits was incorporated into the whole production process, these cannot be squeezed and act as the adjustment leverage in the face of a decline in demand. Thus in the same way that profits and the anticipation of profits acted as the trigger to further increase production and incomes, they were also an important source of rigidity in the system, which prevent it from operating in the way the classical economists portrayed it. As he puts it (Prebisch, 1949B in R.P.O., Vol. IV, p. 433):

“...profits that have been accumulating in the production process are irreversible, so that if the conjectures made by entrepreneurs regarding future demand and that have provoked and anticipated crystallization of profits in the productive process, result negated [disappointed] by reality, the product that is offered in the market has already incorporated those profits, in a such a way that they cannot be reduced because these have been paid [realized] in the different stages... Thus by virtue of the crystallization of profits, the values of the supply in the productive process acquire such rigidity that will provoke... the cyclical contraction, when demand... is insufficient to absorb supply.”

Following this reasoning, the level of profits per unit produced for each category of entrepreneurs with the exception of raw material producers is determined on the one hand, by the profit margin between the different stages in the chain of the production process, which depends, in turn, on the degree of competition (or as Prebisch textually puts it: “competition and mobility” 1949C in R.P.O., Vol. IV, p. 437).

On the other hand, the level of profits is determined by the time elapsed between desired demand and the time it takes for a product to be brought to the market. For commodity producers, the level of profits depends only on the duration of the time interval between purchase of a product and its sale. Note that in

the case of retailers and wholesalers, the time elapsed between purchase and sale occurs in the circulation sphere of the productive process, not in production sphere per se as in the case of manufacturing (i.e., industrialist) and raw material producers.

To put it more specifically, the level of profits of the retail traders (π_{RT}) will be determined by a profit margin over the profit level of wholesale traders (π_{WT}) and the time elapsed between purchase of products from wholesale traders and sales to the final consumer. The level of profits of the wholesale traders (π_{WT}) will be determined in turn by a profit margin over the profit level of industrialists (π_I) and by the duration of time between purchase and sale. The level of profits of industrialists (π_I) will be determined by a profit margin over raw material producers and by the duration of the manufacturing production process. In the case of raw material producers, profits are determined only by the time elapsed between the start of the production process, planning and extraction of raw materials, and their sale to the manufacturer. Formally,

$$\pi_{RT} = \mu_1 \pi_{WT} + \theta_{RT}$$

$$\pi_{WT} = \mu_2 \pi_I + \theta_{WT}$$

$$\pi_I = \mu_3 \pi_{RM} + \theta_I \quad (4)$$

Where μ_i ; θ_i equal the respective margin profits and duration of production processes for each entrepreneur or producer category (retail traders, wholesale traders, industrialists and raw material producers). Successive substitution yields that the level of profit in the retail sector depends on the different markups applied at each stage of production and distribution compounded by the time elapsed between purchase and sale in raw materials, manufactured products and wholesale trade, and by the time required to ‘bring raw materials to the market’ for sale. That is:

$$\pi_{RT} = \mu_1 [\mu_2 \mu_3 \theta_{RM} + \mu_2 \theta_I + \theta_{WT}] + \theta_{RT} \quad (5)$$

In the limit under perfect competition, $\mu=0$, and the existence of retailers’ profits is only explained by θ . In the opposite case, $\mu=1$, profits arise out of the time elapsed for all productive and distribution processes. As Eq.(5) illustrates, the retailer (under the assumption that he realizes his planned sales) obtains his own profits and recaptures all the other profits made and paid at each stage of the productive process. Even

prior to the final sale of a product by the retailer, profits are anticipated and incorporated in the price charged by every entrepreneur that intervenes in the process. As retailers face fixed prices, an increase in the demand for final consumer goods will reduce the retailer's inventory. As explained above, this will trigger an increase in demand from retailers to wholesale traders, from wholesale traders to manufacturers, and from manufacturers to raw material producers. As these entrepreneurs operate in flex-price markets, the rise in demand will result in a price increase and a profit expansion throughout the production chain. Higher profits (and profit expectations) will result in increased investment demand, demand for labor and all the types of goods used in the process from raw material producers to wholesale traders. Greater demand for labor and all goods will translate into higher wages and goods-prices.

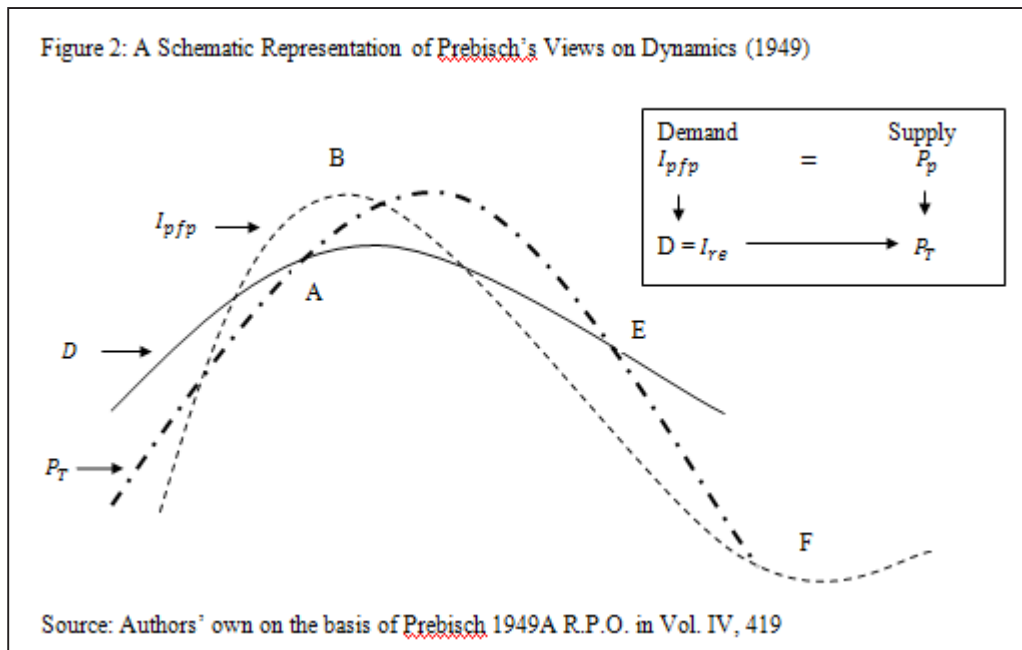
Prebisch explains it in the following way (Prebisch 1949C in R.P.O, Vol. IV, p. 443):

“We already know that during the different stages of the production process profits have been anticipated. When the retailer acquires from the wholesale trader the respective products, it pays all the profits that have been anticipated; and when these articles are sold, the retailer recovers all these profits...and obtains in addition his own profit...In other terms, the consumer pays to the retailer his profits and moreover returns all the other profits that were anticipated [and realized] before in the productive process...in the upward phase at the same time that the retailer recover the profits that he paid previously, he is paying a greater profits; there is thus an increase in profits. This [profit] expansion will give rise to a readjustment as during the change in the mass of production from entrepreneur-to-entrepreneur each receives their corresponding part of the increment [in profits].”

Prebisch's Dynamics: An overall view

Prebisch's overall view of dynamics can be summarized with the aid of one of the figures found in Prebisch 1949A in R.P.O., Vol. IV, p. 419 (see Figure 2). It shows the demand and supply side of the production process and their interaction in the upward and declining phases of the economic cycle. Demand is determined by incomes earned and spent. Supply is determined by the output of production (be it production in process or final production). Figure 2 shows three curves of parabolic form, incomes paid to the factors of production by entrepreneurs of final goods; finished production (finished output of goods) and demand

(D) for final goods. The three curves rise and evolve at different speeds meant to illustrate the time structure of production.



On the demand (income) side, the incomes paid to the means of production (I_{pfp}) give rise to the demand curve for final goods (D). And in turn, the demand for final goods curve (D) translates into incomes that return to entrepreneurs (I_{rs}) in other words, demand (D) is equivalent to incomes returning to entrepreneurs (I_{rs}). During the production process, entrepreneurs paid wages and profits for production, which in a circular flow manner return to them as entrepreneurs' income (i.e. as profits). On the supply side, production in process (P_p) gives rise to the finished production (P_T) curve and by construction P_p is equivalent to the incomes paid to the factors of production (I_{pfp}) by entrepreneurs of final goods.

According to Figure 2, starting with upward phase of the cycle, incomes are paid to the means of production (I_{pfp}) and, thus, production in process (P_p) tend initially to out pace finished production (P_T) due to the lag in the structure in production up to point A. As a result, during this time, demand (D) is greater than finished production or supply. At point A, demand (D) and the output of finished production (P_T) intersect. Yet, according to Prebisch, A is not an equilibrium point. This is due to the fact that entrepreneurs are still undertaking production in process (P_p) and, as a result, even at the point of conjunction of both curves (A),

finished production (P_T) is increasing at a faster rate than demand (D) (i.e., the slope of the curve at A is steeper than that of D). Finished production surpasses D and continues to expand even after demand has begun its decline.

The end result is the accumulation of inventories on the part of entrepreneurs and, thus, the reduction in their production in process plans. This is illustrated by the decline in the steepness of I_{pfp} , and thus, of P_p . Its point of inflection at B is the beginning of the downward phase of the cycle. As I_{pfp} slows down so does P_p and D follows suit.

The decline in D, I_{pfp} and P_T continues up until the ongoing depletion of inventories leads again to a point of conjunction (E) between demand for final goods (D) and finished output (P_T). Again E is not an equilibrium point, for demand (D) declines at a slower pace than finished production (P_T). The depletion of inventories will slowly lead entrepreneurs to renew orders for their production process, putting a break on the decline in P_p and I_{pfp} , and on demand. Eventually, P_p will witness a turnaround (point F) and will pull I_{pfp} and thus D towards a new upswing of the cycle.¹⁴

Prebisch's schematic representation illustrates, once again, that the evolution of capitalist economy is eminently marked by recurrent positions of disequilibrium rather than by a converging process towards equilibrium. Disequilibrium is continuous and a situation in which supply exceeds demand leads to one where demand exceeds supply (Prebisch, Vol. IV, p. 421). In addition, there is nothing to guarantee that the fluctuations occur around an optimal level of utilization of the means of production. As relevant and original as Prebisch's analysis of cyclical dynamic was, it is important to note that his extension of capitalist dynamics to deal with center and periphery interaction was unique, and makes him one of the most innovative authors on cycles and growth during the 1940s.

From the Closed Economy to Center-Periphery Dynamics

Prebisch uses the above framework to analyze the relations between center and periphery. He had made extensive use of this analytical dichotomy when during his earlier analysis of the Argentine economy, he realized that the cycle was part of a global process comprising a cyclical center and a periphery.¹⁵

The center-periphery dynamic theory assumed that the periphery is fully specialized in the production of raw materials, which are exported to the center in exchange for manufactures. Profits in the final, retail and wholesale sectors are earned and spent in the center. Profits in the production of raw materials are realized in the periphery and spent (i.e., transferred) in the center. As a result, entrepreneurs in the center face a demand originating in the center and one originating in the periphery. In addition, he assumed that the center issued the reserve currency, which constituted the only currency in the periphery. In other words, the periphery is 'dollarized,' which would be an extreme assumption, but that reflects the fact that peripheral countries' imports must be paid in the key currency of a central country. In so far as the periphery does not have any policy autonomy, it plays a passive role and constitutes the space for the circulation of incomes sent from the center (Prebisch 1949G in R.P.O., Vol. IV, p. 479). Prebisch thought that the assumption of the passivity of the periphery was a realistic one.

Prebisch applies to the center-periphery area his dynamic analysis for a closed economy according to which, in the upward phase of the cycle, demand tends to outstrip supply due to the difference between the time period it takes for incomes to return to entrepreneurs (as demand) and the time period it takes for output to be finished (supply), which resulted in price and profit expansion, which warranted, in turn, more production commitments.

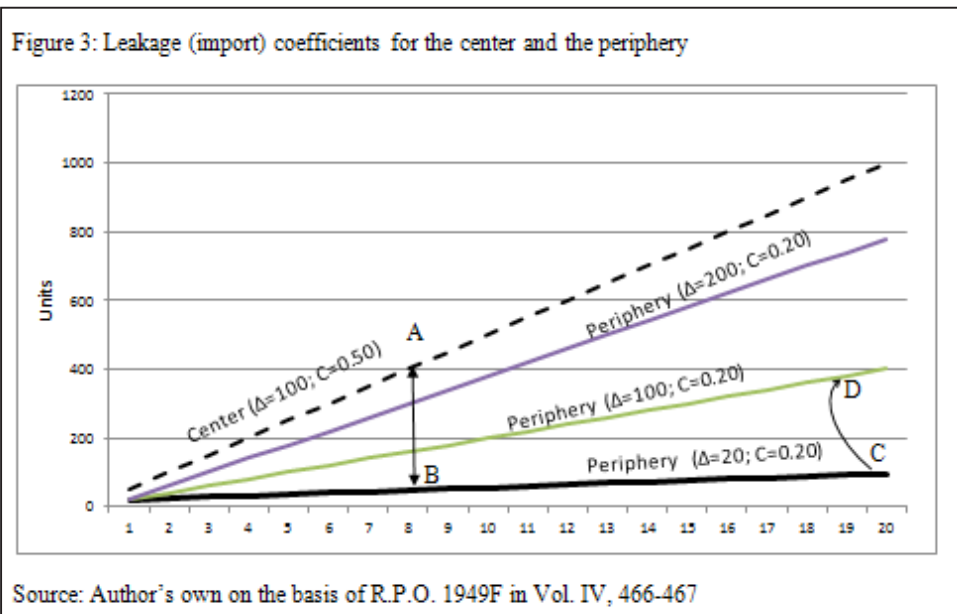
The application of this framework to a center-periphery model implies that the undertaking of the productive process by the center necessarily implies a positive net demand (an injection) in the center. Hence, the center faces an excess demand. However, at the same time, the center faces leakages equivalent to the value of imports of raw materials from the periphery. Equivalently, this constitutes the income flow paid to entrepreneurs and workers of the periphery for the production and export of raw materials sold to the center. In turn, entrepreneurs and workers of the periphery purchase the final goods produced in the center. Hence the flow of income spent by entrepreneurs of the center in the periphery returns back to the center itself. However, Prebisch postulates that the time period for incomes to return from the periphery to the center (and hence the demand from the periphery) was less than the time period it took for the final production in the center to be brought and sold in the market (in the center) (Prebisch 1949E in R.P.O., Vol. IV, p. 459).

As a result, at the same time that there is an excess demand originating within the center, there is an insufficiency of demand for final goods originating in the periphery. The interplay between the forces and factors determining the excess demand in the center and the insufficiency of demand in the periphery constitute the core of Prebisch's dynamics applied to the center-periphery dichotomy. At the beginning of an ascendant phase, demand exceeds supply leading to an increase in prices and profits. Concomitantly, part of the increased income leaks out to the periphery reigning in the pressure on net aggregate demand. The greater the leakage coefficient, the smaller is the net excess demand, and hence, the smaller are the profit and the incentives for continued expansion in the center.

Prebisch sustains that the net excess demand would wane over time due to an increase in the income elasticity of imports for products demanded by the center from the periphery. The flow of profits (from the center to the periphery and back) acted as the equilibrating force between demand and supply in the center. As he puts it (Prebisch 1949E in R.P.O., Vol. IV, pp. 460-461):

“...the excess of net demand over supply in the cyclical center has the consequence of diminishing the inventories of entrepreneurs of final goods causing in demand among entrepreneurs to increase production, that brings as a consequence an increase in profits, that in the hypothesis we are considering go to a great extent to the periphery. That is, until the point of conjunction is reached there will be a continuous depletion of inventories, a continuous ascent of demand among entrepreneurs, a continuous expansion of profits and a displacement of profits to the periphery. Profits will continually be displaced in greater and greater measure to the periphery, until their quantity creates an insufficiency equal to the excess. It is a spontaneous game of the system.”

This mechanism is reinforced by the assumption that entrepreneurs recoup their earnings from the periphery at a slower pace than it takes them to bring and sell their final production to the market. Precisely for these reasons, Prebisch argues that the point of conjunction or equilibrium between the excess demand in the center and the insufficiency of demand in the periphery would be very hard to reach, especially when as he assumed within his ‘model’, the leakage coefficients in the center is significantly greater than that of the periphery. He provides a specific example, where the leakage coefficient took on a value of 0.50 and 0.20 for the center and the periphery (Prebisch, 1949F, Vol. IV., p.466: “The leakage coefficient...is much higher in the mass of income of the center, than in the mass of income of peripheral origin”).



He further assumes that incomes in the center increased by a constant 100 units, whereas in the periphery incomes rose by 20 units (see Figure 3). The result is a widening gap between the amount the center spends in the periphery and that the periphery spends in the center, denoted by the distance between the dotted and highlighted continuous line (between points A and B). The dotted line shows the evolution of leakages for the center, successive increases in income of 100 and an import coefficient of 0.50. The continuous highlighted line plots leakages for the Periphery under the assumption of successive increases in income of 20 and an import coefficient of 0.20. But even if incomes in both the center and the periphery expanded by the same amount, say 100 units, the gap would still increase (albeit to a lesser extent) (In Figure 3, this is noted by the difference between the dotted line and the two lines below). The two lines below plot leakages for the periphery under the assumption of successive increases in income of 100 and 20, with an import coefficient of 0.20 for both.

The fact that Prebisch assumes—at least until lecture VII on dynamics, that the import coefficient was larger in the center than in the periphery seems in stark contradiction with his thinking. A key tenet of Prebisch and of the Structuralist school is that the import elasticity of income in the periphery is higher than in the center (see for example, Prebisch, 1950). From our point of view, this contradiction can be explained using two hypotheses.

First, Prebisch was aware since around 1926 that developing countries had experienced declining terms of trade. And this was a relative price effect. But he did not specifically address the differences in income effects between center and periphery, even when he addressed the issue of trade between a developed and developing country in 1948 in the lecture, “The Classical Scheme of International Trade and Gold in Reality,” as part of his course on dynamic economics.¹⁶ Perhaps Prebisch began to be explicitly aware of the importance of income effects in the external sector around the time he was developing his dynamics so that at this stage these were not fully incorporated into his model.¹⁷ The second hypothesis, a less credible one, is that Prebisch uses the example of a greater coefficient of imports in the center than in periphery only as an expository device to facilitate the presentation of his theory. Still, when Prebisch dropped this assumption, he did not develop in detail the opposite case (i.e. the case of a higher import coefficient in the periphery than in the center).

The widening expenditure gap leads eventually to a greater re-distribution of profits to the periphery, and hence to an increase in incomes in the periphery and a narrowing of the gap. That is, starting from a situation where the ‘leakage coefficients’ are 0.50 and 0.20 in the center and periphery with increases in income of 100 and 20 as denoted by the black and green lines, the widening gap would set in a motion, via the re-distribution of profits to narrow the gap (i.e. shift from C to D in Figure 3).

Prebisch thought that this dynamic process would lead to a greater profit and income expansion in the periphery than in the center (Prebisch 1949E in R.P.O., Vol. IV, p. 460). This, in conjunction with smaller leakage in periphery incomes to the center (relative to the leakage from the center to the periphery), will eventually more than offset the net excess demand in the center creating a situation of net excess supply. As final goods producers find themselves with a greater than planned level of inventory, they will reduce orders and demand, which will cascade to the chain of producers. Lower demand, prices and profits will cause a recession in the center. In turn, lower demand from the center for products from the periphery will contract profits and the level of activity in the periphery.

As put by Prebisch (1949F in R.P.O. Vol. IV, p. 469):

“When there was a net excess demand, inventories declined...and this leads entrepreneurs to first increase demand among them, and then increase production. And when there is an insufficiency of

net demand, unsalable inventories in the hands of entrepreneurs increase... and these are led to contract production. If we admit this relationship between variations of inventories and in the conduct of entrepreneurs, it is not conceivable that entrepreneurs will continue to pay to the factors of production in the center and buying in the periphery the same quantities, when production is accumulating without being sold.”

The relationship between inventories and demand is a crucial link in the transmission mechanism and a fundamental element of dynamics and of his arguments against ‘equilibrium economics.’ Prebisch explains it in the following way (Ibid, p. 470): “If we could eliminate completely the action of inventories on demand, we would arrive at an equilibrium position. But this would be to suppress the only means of action that the entrepreneur has in a capitalist regime; it would be to subtract one of its vital parts. As long as this vital part exists and the reaction of entrepreneurs... occurs the system will not reach equilibrium.” As well, inventory buildup (reduction) reflects in turn the importance of expectations as a determinant of decisions to expand (contract) production. In the upturn when as a result of increased demand: “...entrepreneurs see a decline in inventories, not only are they concerned with increasing production to attend the new level of demand they calculate, but also they anticipate possible growth rhythm in accordance with the circumstances of the market... The same occurs in the downturn” (Ibid).

Prebisch argues that his theory was general, and not confined to specific cases and assumptions. To this end, he makes three modifications in his model: the introduction of fixed capital, allowance for an autonomous expansion of demand in the periphery via credit creation, and a higher import coefficient in the periphery than in the center.

The use of both circulating and fixed capital goods in the production of final goods lengthens the production process relative to using only circulating capital goods. Prebisch assumes in his model that the creation of credit (‘forced savings’) finances the production of circulating capital and that ‘voluntary savings’ in the form of funds hoarded during the contraction finances the investment of fixed capital goods. As a result, the introduction of investment in fixed capital in Prebisch’s model adds an additional source of demand to that originating from investment in circulating capital. Incomes and profits paid in the course of the production of fixed capital are superposed to those distributed in the process of the production of circulating capital (Prebisch, 1949D in R.P.O., Vol. IV, pp. 453-454). The additional source of demand and incomes and

profits will be tempered by the extent of their leakage to the periphery. As put by Prebisch (1949G in R.P.O., Vol. IV, p. 478):

“Investments are also undertaken taking raw materials and articles in process from the periphery. So that, only a part of the profits of the cyclical center will become incomes of the factors of production of the center: the other part will become payments for articles in process in the periphery. That is, when using profits in fixed investments, a part of these profits will exit immediately to the periphery and that part will remain subject to the rhythm of return of the periphery.”

Prebisch assumes furthermore that initially total investment runs ahead of profits, until entrepreneurs exhaust the hoards used for financing capital goods. Thereafter, entrepreneurs only invest in circulating capital goods using savings and disparege with the creation of credit to finance new investments, and profits exceed investment needs. The ‘excess profits’ can either be consumed as final goods, or saved and re-invested to increase circulating capital. In so far as excess profits are saved and re-invested, entrepreneurs no longer count on credit creation. Since a part of profits are spent in the periphery, this slows the demand for final goods. Nonetheless, by the mechanism described before, the point of conjunction between the excess demand originating in the center and the insufficiency of demand would be eventually reached. The introduction of fixed capital does not alter the basic premises of Prebisch analysis; it simply provides a detour to reach the point of conjunction.

The second modification introduced by Prebisch implies that the periphery does not have a passive role and does not depend completely on the currency of the center, but instead relies to some extent on its own increase in credit creation to finance its production activities. In this case, relative to the one where the periphery plays only a passive role, demand will be greater in both the center and the periphery. However, he did not develop this case in detail. He thought it more of a curiosity than a case with a practical application or one that reflected capitalist development (1949H in R.P.O., Vol. IV, pp. 485-488).

The final modification, that the periphery has a higher import coefficient than in the center, simply shortens the time period to reach the point of conjunction. Prebisch did not consider it an important assumption, even though it played a crucial role within the logic of “The Economic Development of Latin America and Some of its Principal Problems” published a few months after completing his last lecture on dynamics.

Conclusion

The long process of development of Prebisch's economic ideas from the 1920s, which did not stop with his famous Development Manifesto in 1949, culminated in the late 1940s with his dynamic theory. The essence of Prebisch's dynamic analysis, in which cycle and growth go hand in hand, is the introduction of time lags in a process of continuous disequilibrium. In his model, fluctuations result from the difference in the time period for incomes to circulate within the productive process with the time period required for final production to be brought and sold on the market. In this respect, he is part of a broad tradition of authors trying to formalize macrodynamics in the wake of the Keynesian Revolution. He maintains elements that were Keynesian in spirit with others that were decidedly neoclassical, while at the same time introducing elements of the old classical school, as it should be expected in a period of transition in the economic profession, and also in an author who was brought up intellectually in a rather eclectic environment.

More importantly, Prebisch stands alone among his contemporaries in trying to explain the cyclical growth of the global economy as the result of the interaction of center and periphery, in which the international division of labor matters. Not only does Prebisch introduce the specificity of the problems of managing the peripheral economy, but he is also unique among the economists dealing with cyclical growth to discuss the importance of the change in the global center in the inter-war period from the United Kingdom to the United States.

His conception of the institutional and historical specificity of economic dynamics would eventually develop into what Structuralists at ECLAC would refer to as the Historical-Structural method of analysis, which analyzed the process of structural transformation of underdeveloped economies in historical perspective. In this sense, his understanding of capitalist dynamics, right before he wrote the Development Manifesto and became the Secretary General of ECLAC, was based on a theory that purported to be general and encompassing well beyond the problems of peripheral countries with declining terms of trade, which became the trade mark of his contributions to economic analysis.

Notes

- ¹ The opinions expressed here are the authors' own and may not coincide with those of the institutions with which they are affiliated. All English translations of sources in French and Spanish, including Prebisch's Works (Vols. I to IV), are by the authors of this paper. Brackets in quotes and highlights were introduced by the authors. Throughout the paper, Prebisch's Works are cited as R.P.O. with the respective volume and page(s) numbers. The authors would like to thank Robert Blecker, Mario Cimoli, Gabriel Porcile, Wilson Peres, Mark Setterfield and the students of the ECLAC Summer School 2011, for providing useful comments to an earlier version presented at the ECLAC International Seminar for Growth and Development (August, 2011), and to Ivo Maes and other participants at the ESHET conference in Buenos Aires (November, 2012).
- ² In 1947, the program for the course on Political Economy (Economic Dynamics) included 11 separate sections. The first four sections focused on the gold standard, Bretton Woods and on the value of money and inflation. Sections six to eleven dealt with the theories of the cycle, their empirical verification with a focus on Argentina including the policies followed by its Central Bank under Prebisch's leadership. See Prebisch (1947B).
- ³ The first lecture in Mexico was given on 18 February, 1949. His last lecture was delivered on 1 March, 1949 (RPO, Vol. IV., pp 410-489. See footnotes to Theory of Economic Dynamics (I) (1949A); Introduction to the Course on Economic Dynamics (1948A). The analysis presented in this paper focuses on Prebisch's Mexico City Lectures.
- ⁴ Many of the proponents of the forced savings doctrine often held a real approach to the business cycle; e.g. Wicksell. Hawtrey, who championed a monetary approach, did not agree with the notion of forced savings (See Hawtrey, 1937). Prebisch had a role for forced savings within a monetary approach to the cycle.
- ⁵ This aspect of his dynamics was also included in his 1948 Buenos Aires lectures.
- ⁶ See also Prebisch (1948H).
- ⁷ See, Prebisch, 1948F in R.P.O., Vol. IV., p. 349 and 351.
- ⁸ Schumpeter (1946) raised a similar critique of Keynes' GT.
- ⁹ At the more general level, he views classical theory as consisting of three planes of analysis (monetary, real and international trade) with no analytical relationship between them. He sustains the impossibility of maintaining the independence of these areas of analysis in the face of capitalism's cyclical reality (Prebisch, 1948D in R.P.O., Vol. IV, pp. 324-325).
- ¹⁰ For a discussion of historical and logical time, see Termini (1981).
- ¹¹ As he puts it (1948I, p. 2.): "The theory of economic dynamics purports to explain this [cyclical] way in which phenomena occur and to search to their uniformities, in order to formulate the principles or laws that rule movement."
- ¹² Prebisch shares some of Keynes's views on investment and on the flaws of capitalism ("its failure to provide full employment and its arbitrary and inequitable distribution of wealth and incomes" Keynes, 1936) (See Prebisch, 1948B, pp. 301-303; 1948E, p. 344; 1948F, p. 351 in R.P.O. Vol. IV; and 1947A, p. 137). Prebisch adds instability as another flaw of capitalism (Prebisch 1948E in R.P.O. Vol. IV, p. 344; 1948I 2).
- ¹³ All of the equations and identities are our own construct. Their purpose is to clarify and shed light on Prebisch's thoughts on dynamics.
- ¹⁴ In Prebisch's drawing (op.cit. p. 419), finished production (P_T) and ($P_{I\dot{p}} = I_{I\dot{p}}fp$) has a similar slope in their decline, but D has a shallower slope. The authors of the paper believe that this is a slip on the part of Prebisch. The depletion of inventories (which is considered production in process) will lead entrepreneurs to expand orders for production in process inputs before final production recovers. Moreover, since the demand (D) curve

is derived from the production in process curve (P_p) and D declines at a slower rate than finished production (P_T), so must production in process (P_{ip}). Hence in Figure 1 above, P_p declines at a lower rate than P_T .

- ¹⁵ See Prebisch 1946B in R.P.O, Vol. IV, p. 224; 1949A in R.P.O., Vol. IV, p. 413-414 and Pérez Caldentey and Vernengo, 2011.
- ¹⁶ This text appears with the title ‘Technical Progress and International Trade’ in Prebisch’s Works (Prebisch 1948G in R.P.O., Vol. IV, pp. 363-374). Nonetheless, he was well aware of the import dependency of developing countries as his analysis of the effects of the Great Depression demonstrates. Following the Great Depression, he focused on income effects, arguing that imports increase because: “a considerable part of the direct consumption in the country, or machinery or materials for its industries, comes from abroad, the increase in income is reflected in higher levels of imports” (Prebisch, 1932 in R.P.O, Vol. II, p. 74).
- ¹⁷ See Mallorquín’s interview with Ifigenia Martinez, a collaborator of Prebisch between 1949 and 1950. She mentions that when Prebisch visited Mexico in 1949, he was very much concerned with the external sector and the tendency towards disequilibrium in the external sector as a country develops and changes its economic structure. She also sustains that the ECLAC development model, especially regarding the external sector, was based on the Mexican experience. See Mallorquín, (1998, p. 147).

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