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## When the history of ideas meets theory: Arthur Lewis and the classical economists on development

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**WHEN THE HISTORY OF IDEAS MEETS THEORY:  
ARTHUR LEWIS AND THE CLASSICAL ECONOMISTS ON  
DEVELOPMENT**

BY

MAURO BOIANOVSKY

CHOPE WORKING PAPER No. 2017-08

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# *When the History of Ideas Meets Theory: Arthur Lewis and the Classical Economists on Development*

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**Abstract.** Lewis argued that his 1954 model of economic development in a dual economy was based on the classical framework originally advanced by Smith, Malthus, Ricardo and Marx. The present paper provides a detailed investigation of how Lewis adopted and adapted classical concepts such as productive/unproductive labor, economic surplus, subsistence wages, reserve army, capital accumulation etc. The Lewis 1954 model is set in the context of other growth and development models put forward at the time by Harrod, Domar, Swan, Kaldor, Solow, Nurkse, Rosenstein-Rodan, Myint and others. The heuristic role of the history of economic thought in Lewis's works is examined, as well as the influence of his LSE background. Lewis elaborated models of dual economies on both domestic and international levels, with distinct aims and results.

**Keywords.** Lewis, classical economics, dual economies, terms of trade, economic development

**JEL classification.** B12, B29, B31

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This essay is written in the classical tradition, making the classical assumption, and asking the classical question (Lewis 1954)

## **1 Development economics in the “golden age” of the history of economic thought**

### **1954**

1954 was a particularly good year for development economics and the history of economic thought. Arthur Lewis (1954) put forward his model of development in dual economies with perfectly elastic labor supply, which, as he would recall thirty years later, brought about a “growth industry, with a stream of articles expounding, attacking, testing, revising, denouncing, or approving” it (Lewis 1984a, p. 133). Lewis (1954, pp. 139-40) maintained that, unlike the neoclassical and Keynesian approaches, the “classical framework” – including not just Smith, Ricardo, Malthus and J.S. Mill but also Marx and occasionally Hume – provided the necessary analytical foundations to interpret the growth dynamics of underdeveloped economies with excess labor supply and capital shortage. Simon Kuznets’s (1955) empirical investigation, presented at the 1954 American Economic Association meetings, paralleled Lewis’s concern with the long-term association between income distribution and economic development. Kuznets’s result of an inverted U shaped relation between inequality and income per capita over time was compatible with Lewis’s theoretical model. In July 1954 Lewis completed his *Theory of economic growth*, the first comprehensive treatise on the subject since J.S. Mill’s *Principles*, he claimed (Lewis 1955, p. 5). At the same time, and from another perspective, J.A. Schumpeter’s (1954, pp. 570-74, section on the “‘classic’ conception of economic development”) posthumous *History* criticized classical economists – a group that, in his classification, excluded Smith and Marx – for focusing on the tendency to the

stationary state and turning economic development into an “appendix to economic statics” (p. 573).

Along similar lines, Celso Furtado (1954), director of the development division of the United Nations Economic Commission for Latin America (CEPAL), regretted in his essay on the history of growth theories the prevalence, throughout 19<sup>th</sup> century classical economics and later, of the notion of a declining rate of profit and convergence to the stationary state, which rendered economics largely useless for the study of economic development. In that same year, Adolph Lowe (1954, pp. 116, 142) claimed that, whereas modern economic dynamics could receive little help from the *substance* of the classical theory of development – based on a “closed” circular mechanism – it could nevertheless benefit from the dynamic *method* applied by classical economists (and Marx) to enlarge the scope of endogenous variables (such as population and technical change). Trygve Haavelmo’s (1954, pp. 6-14) suggested formalization of classical economics as early models of “economic evolution” represented a step into that direction, with only limited success though.

While classical economics in general (except for trade theory) pertained to the history of ideas, Malthus’s population theory remained at the core of contemporary demographic investigation, as illustrated by another instance of the 1954 vintage: Harvey Leibenstein’s (1954) monograph on population dynamics, with its notion of a low-level equilibrium trap caused by the positive effects of economic growth on population increase at relatively low income levels. A different concept of low-level trap, only indirectly associated to classical economics, was discussed that year in Tibor Scitovsky’s (1954) paper on balanced growth and external economies. Lewis would stay away from both notions of poverty traps. Like neo-Malthusian population doctrine, classical trade theory was conspicuous in theoretical and policy debates in the 1950s. Brinley Thomas’s (1954, p. 11) pioneering study of migration and growth brought to the fore the static nature of the classical doctrine of comparative costs and its neglect of the dynamic interrelations between international trade and the movements of factors, a comment Lewis (1966, 1978a) would take on.

The International Conference on Underdeveloped Areas held in Milan in October 1954, one of the first of its kind, featured a paper by Nicholas Kaldor ([1954] 1960) which borne some striking similarities to Lewis’s essay published that same year. Kaldor argued that in underdeveloped areas the capitalist (industrial) segment of the economy had remained small due to low productivity in peasant agriculture. The

matter of the “agricultural surplus”, a concept first emphasized by Adam Smith, would become prominent in both Kaldor’s and Lewis’s works on uneven development in the 1960s and 1970s. Amyia K. Dasgupta’s (1954) short piece on the relevance of the classical approach to capital accumulation and employment in India and other dual economies was also very close to Lewis (1954). Although Dasgupta hinted at the notion that full capacity capital stock is unable to fully employ available labor, and that the demand curve for labor (that is, its marginal productivity schedule) shifts upwards due to capital accumulation, he came short of developing a full-fledged growth model based on the interaction between the capitalist and subsistence sectors along Lewis’s lines. In particular, unlike Lewis, Dasgupta did not show how the economic surplus in the modern sector – and therefore capital accumulation and growth – originated from a difference between the average productivity of labor in that sector and in the traditional (non-capitalist) one.

### **LSE and Manchester**

Dasgupta did his PhD at the London School of Economics (LSE) in the mid 1930s. He probably met Lewis, who arrived at that institution in 1933 as an undergraduate student of economics, coming from the island of St. Lucia in the British West Indies, where he was born in 1915. According to Lewis’s biographers (Tignor 2006, p. 83; Ingham and Mosley 2013, p. 111), Lewis’s knowledge of classical economics should be traced to Lionel Robbins’s LSE lectures in the 1930s. However, as recalled by Lewis (1986, pp. 14-15), he had to break an “intellectual constraint” to develop his 1954 model. Instead of the infinite labor supply assumed in that essay, “in all the general equilibrium models taught to me the elasticity of supply of labor was zero, so any increase in investment increases the demand for labor and raises wages”. Moreover, Lewis’s modeling of the capitalist and subsistence sectors was built on the classical distinction between productive and unproductive labor, deemed largely irrelevant by Robbins ([1932] 1935, pp. 7-8) and his LSE predecessor Edwin Cannan ([1898] 1917, chapter 1, section 7). The issue was investigated in detail by Burmese economist Hla Myint (1948, chapters 4 and 5) – based on his 1943 LSE PhD thesis – who criticized Robbins and others for missing the point that Smith’s concept of productive labor was relevant for the study of capital accumulation and growth, not for the static competitive allocation mechanism. Robbins (1952, p. 16) took that piece

of criticism onboard in his Simon Lectures, delivered at the University of Manchester in 1950 and attended by Lewis (see Howson 2011, p. 703).

Lewis took up the Stanley Jevons Professor of Political Economy chair in Manchester in 1948, where he stayed for ten years, after being turned down in 1947 at Liverpool purely on grounds of race. Before leaving for Manchester, he had lectured on several topics at the LSE from 1938 on, including a course on “colonial economics” (the British name for development economics at the time) after 1944. His 1940 PhD thesis, supervised by Arnold Plant and published in revised form as Lewis 1949a, dealt with industrial organization (Lewis 1980; 1986; Howson 2011, p. 652; Ingham and Mosley, chapters 2 and 3). In the academic year 1947-48 William Baumol, under Robbins’s suggestion, gave a series of lectures on economic dynamics at the LSE, which Lewis probably attended. Baumol’s (1951) lectures became the first introduction to economic dynamics, with special attention to the new field of growth economics started off with models put forward by Roy Harrod and Evsey Domar between 1939 and 1948. Baumol (1951, part I, p. 11) coined the term “magnificent dynamics” to describe attempts by classical economists, Marx and Schumpeter to “ambitiously analyze the growth and development of entire economies over relatively long periods of time – decades or even centuries”, including the eventual tendency to the classical stationary state, which Baumol (p. 18) illustrated by means of a well-known diagram.

Lewis (1955, p. 18) was not really interested in “magnificent dynamics” and predictions about long-term economic evolution. “We do not believe”, he pointed out, “that it is possible to say how any particular social system is going to develop, and we do not, therefore, like Ricardo, Marx or Toynbee or Hansen or Schumpeter set out a theory of the laws of evolution of society.” The kind of prediction that interested him was on the “much more pedestrian level” of investigating how changes which took place in rich countries as they developed may be expected to happen again in poor countries *if* they develop. Growth models and process analysis, of the kind discussed in most of Baumol’s book, did not provide the theoretical instruments to tackle that issue. As Lewis pointed out, some of the “most elegant work” in economics at the time was about the stability of economic growth interpreted through mathematical models that oscillate according to the assumed values of the coefficients and parameters. This work was in the area of “consistency rather than evolution”, with no discussion of what decides the values of the coefficients and how they change over



time (Lewis 1955, p. 13). Lewis granted the relevance of such models for short-term analysis, but

If we are concerned with long-term studies of changes in propensities, or if we wish to account for differences between groups or countries, we have usually to look for beyond the boundaries of contemporary economic theory (ibid).

### **Back to the classics and to List**

From Lewis's perspective, the classical economic system, with its simultaneous determination of economic growth, capital accumulation and income distribution, provided the framework to investigate how shifts in income distribution bring about changes in saving in economies with unlimited labor supply and a given wage rate. Neoclassical 1950s models of the consumption function (e.g. Duesenberry, Modigliani or Friedman) combined long-run saving ratio constancy with short-run oscillation, which was of no use for Lewis (Lewis 1954, p. 139; 1972, pp. 75-76; 1984a, p. 132). By invoking classical concepts in order to model economic growth, Lewis was going against the stream, as represented by Harrod's 1948 *Dynamic economics*, based on lectures delivered at the LSE in February 1947. Baumol (2000, p. 1038) recalled the "chaotic discussion in a seminar that followed Harrod's famed lectures", in which Lewis, Robbins, Hayek, Kaldor, and Baumol himself participated. Harrod (1948, pp. 15-20) remarked that economic dynamics had died out after neoclassical theory replaced classical (Ricardian) economics. His goal was to bring dynamics back to center stage, but this time built on Keynesian foundations and removed from two classical propositions that, in his view, did not apply to developed economies: the Malthusian population doctrine – the concept that the "supply of labor is infinitely elastic at a certain real wage ... corresponding to the minimum standard of living" (p. 19) – and the law of diminishing returns from land as a primary determinant of economic growth.

Harrod's model was about growth and fluctuations in industrialized economies. Underdeveloped areas were deemed more suitable for the classical approach. There were "vast regions to which the old classical analysis still applies, the regions in which population is pressing upon the means of subsistence. Fertilize these with new capital and the population merely expands", with nil impact on income per capita (Harrod 1948, p. 114). Harrod's neo-Malthusianism illustrated the widespread

opinion that population control was a key to economic development of poor countries. Against that view, Lewis's call for a return to the classics did not entail support either for the Malthusian population principle or for diminishing returns from land as a decisive growth constraint. Average productivity in the production of food would, however, play an important role in both his closed and open models of economic development.

Lewis's 1954 (section II) extension of dual domestic underdeveloped economies to duality on the international level allowed him to solve the "mystery" of why, despite long-term economic growth in some developing countries (e.g. Sri Lanka), the standard of living of workers remained so low (Lewis 1986, p. 14). He found the explanation in the disparity in labor productivity in food production in "temperate" and "tropical" countries, which decided the factoral terms of trade between the two regions. Friedrich List had introduced the division of the international economy between temperate and tropical areas back in 1841. Lewis's open growth model did not attract much attention until Lewis (1969) restated it in his Wicksell Lecture and Marxian economist Arghiri Emmanuel ([1969] 1972) used it as the starting-point of his own model of "unequal exchange". Although dimly inspired by Ricardo's comparative advantages model, Lewis's formulation led to conclusions distinct from classical trade theory and policy.

Whereas Lewis's closed model was an attempt to interpret "industrial revolution" episodes (such as British and Soviet growth acceleration in the first half of the 19<sup>th</sup> century and between 1929 and 1939, respectively) in terms of the fast increase of the saving ratio, his open model tried to make sense of the growth pattern of the international economy after trade between industrialized and tropical countries expanded after the 1870s, due to lower transportation costs among other causes (see Figueroa 2004). Upon his move to Princeton University in 1963 (where he stayed until his ultimate death in 1991), Lewis set the focus of his research agenda on the international aspects of economic development. Instead of restricting the analysis to over-populated economies with high demographic density like Egypt, Jamaica and India or early 19<sup>th</sup> century Great-Britain (as in section I of his 1954 essay; see Lewis 1954, p. 140), Lewis would discuss the dynamics of "tropical" countries in general, including large parts of Africa and Latin America, where an "unlimited" supply of tropical commercial goods could be produced due to abundant natural resources. Together with his Wicksell Lectures, this led to pioneering historical studies of

tropical development in the period 1870-1913, when international trade became the “engine of growth” in those countries (Lewis 1970a, 1970b, 1978a, 1978b; see Williamson 2011). Lewis’s change of focus reflected to some extent his reading of Myint’s (1958) rediscovery of Adam Smith’s “vent-for-surplus” approach to trade and development, which posed an alternative argument (to Lewis 1954) about the pertinence of classical economic theory for development economics.

### **History of economics and heuristics**

Lewis (1954, 1955, 1958) and Myint (1948, 1958) illustrate how the history of economics was still regarded in the 1950s an important heuristic device to cast light on current economic research. That was the end of the period, started after the First World War, named by Craufurd Goodwin (2008) the “Golden Age” of the history of economic thought (HET), when economists were committed to understanding problems through the use of HET as an analytical device instead of a separate sub-discipline. Apart from Robbins, Hayek, Hicks and Kaldor (who all taught Lewis at the LSE), Goodwin’s list includes Commons, Dobb, Galbraith, Haberler, Keynes, Knight, Mitchell, Patinkin, Samuelson, Spengler, Schumpeter, Stigler, Sraffa and Viner, among others. Lewis may be added to the list, at a time when signs of the end of the HET Golden Age were starting to show – as witnessed by Robbins’s (1952, p. 1) complaint that the knowledge of the history of economics had come to be regarded in many British economic departments as an “unimportant embellishment, inessential to the economist”, unlike the senior generation of Marshall, Edgeworth, Foxwell and Cannan.

As Lewis (1954, p. 140) pointed out, his was not an essay in the “history of economic doctrine”, but an attempt to bring the classical framework “up-to-date, in the light of modern knowledge” in order to shed light on the contemporary problems of vast areas of the world. Hence, he did not on that occasion provide any quotations from the classics (or any references, for that matter), although he did mention them throughout the paper. This did not change in the 1955 book, but in his 1958 “Further notes” Lewis discussed in detail classical concepts of productive/unproductive labor, economic surplus, technological unemployment, and the rate of profit in a dual

economy setting.<sup>1</sup> Those notes reflected Lewis' critical reaction to what he saw as Schumpeter's (1954) and others' "distorted" treatment of classical economics. Modern economists had given the classics "marks for intelligent anticipations of the neo-classical theory of value (as if they were primarily value theorists, and as if the neo-classical assumptions applied in their day), and dismissed everything else, especially the theory of development in which they were chiefly interested" (Lewis 1958, p. 1). "It is time", Lewis claimed, that classical economists "had a square deal".

## 2 Models of growth, models of development

### Is development economics different?

Lewis (1954, 1958) was probably reacting to L. Robbins ([1932] 1935) as well. According to Robbins (p. 68), the central achievement of Smith ([1776] 1976) was his demonstration of the market equilibration process through changes in relative prices, in harmony with Walrasian general equilibrium analysis. Robbins (ibid), of course, did not deny that the *Wealth of Nations* addressed growth issues, but that was relevant for the "history of applied economics" only, not for the history of economic theory. Robbins would change his mind after the 1950s, when development and growth economics took the economic profession by storm, as witnessed by his 1966 Chichele Lectures on the history of the *theory* of economic development, which were mainly about contributions by classical economists (Robbins 1968). That book's organization bears a significant similarity to Lewis's (1955) *Theory* (despite absence of references to Lewis), with its chapters on "population and returns", "accumulation", "education and knowledge", "policy", and a concluding one on "the desirability of economic development" (cf. Lewis's 1955 appendix titled "Is economic growth desirable?"). In his last LSE lectures on the history of economics, delivered in 1979-81, Robbins (1998, p. 129) acknowledged that the "main content" of the *Wealth of Nations* was the "theory of the causes of economic growth", and warned against focusing too much on the value and distribution side, as "I may have done in earlier lectures".

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<sup>1</sup> Lewis (1976a; 1988) would produce two other historical essays on classical economics, both with emphasis on Adam Smith. The 1988 piece was his last published work.

Robbins (1968, pp. 1-2) distinguished between two sorts of question addressed by the theory of economic development: (i) the fundamental causes or conditions of economic development (*why* development takes place); and (ii) the path development will take, given a particular configuration of these conditions (*how* it happens). Whereas the *why* question dominated the earlier literature examined by Robbins (deemed relevant for policy issues and the interpretation of economic history), the *how* question was the focus of more recent abstract growth models, as he illustrated by referring to J. Hicks's *Capital and Growth*.

Hicks (1965, pp. 3-4) observed that the appearance of growth theory as a new branch of economics in the 1940s and 1950s, when underdevelopment was a major concern of economists, had made it look as if they were connected. But they were not. Growth theory deployed the method of dynamic economics – introduced by Gustav Cassel around 1918 and fully developed in the 1940s and 1950s by Harrod, Domar, von Neumann, Solow, Swan, Kaldor and others – in the sense of conditions in which variables are growing at the same rate along a steady state equilibrium path (see also Boianovsky 2017). From that perspective, stated Hicks (p. 1, n. 1), Lewis (1955) may be regarded an “admirable work on underdevelopment economics”, but lacking any concern with growth theory. Echoing Robbins's ([1932] 1935) remarks about Smith, Hicks (op. cit.) claimed that (under)development economics, unlike growth economics, is “not a formal or theoretical subject”, but a “practical” one, which is expected to make demands on any branch of economic (particularly international trade, as Alfred Marshall had observed long ago) or non-economic theory.

A clear distinction between growth and development economics – in the sense of the study of the obstacles and incentives to the economic growth of relatively poor countries – had not been established yet in the mid 1950s, as the title of Lewis's 1955 book indicated. Moreover, as Lewis (1955) clarified in the introductory chapter, most of the book was about economic transitions represented by “industrial revolutions” that had transformed currently developed (not underdeveloped) economies, with emphasis on the role of capital accumulation. From Lewis's standpoint, classical economics mattered mainly for its analysis of the accumulation process in capitalist economies going through growth acceleration. He showed little interest in what

classical economists had to say about underdeveloped regions, such as large areas of Asia, Latin America or some European countries (e.g. Ireland and Poland).<sup>2</sup>

### **Dealing with the Harrod-Domar model**

Lewis (1954, 1955) wrote when the influence of the Harrod-Domar model was at its peak, just before the formulation of neoclassical growth theory by Trevor Swan (1956) and Robert Solow (1956). Having attended Harrod's LSE 1947 lectures, Lewis was familiar with the Keynesian pedigree of the Harrod-Domar framework. Lewis never referred explicitly to that model, but he was clearly aware that both Harrod and Domar were concerned with business cycles caused by divergences from equilibrium rates of growth, not with long-run growth (Lewis 1955, p. 287). In particular they shared the Keynesian notion that economic growth is generally "embarrassed not by a shortage but by a superfluity of saving" (Lewis 1954, p. 140), in contrast with Lewis's own classical model. When commentators (e.g. Tignor 2006, p. 97) suggest that Lewis's model fit comfortably with the Harrod-Domar *model*, they probably have in mind the so-called Harrod-Domar (tautological) *equation* for the rate of growth of income  $g = s/v$ , where  $s$  and  $v$  are, respectively, the saving and capital-output ratios.

That equation was applied for the first time to development planning by Hans Singer ([1952] 1958), who expressed it in per capita terms:  $D = s/v - r$ , where  $D$  is the rate of increase of income per capita and  $r$  is the rate of population growth. That was not just an innocent algebraic modification. It represented a curious mix of classical (Malthusian) and Keynesian insights (see Boianovsky 2015). Singer contemplated the possibility that a high  $r$  may have an effect on  $s$  and especially on  $v$ , but did not pursue it. The idea behind the formula was that increased population, while requiring capital for its productivity, would not in itself contribute to production and capital accumulation. Because of the assumption of a given exogenous capital-output ratio, the "static" formula disregarded the "dynamic" possibility that additional labor, without additional capital, could yield significant (but not proportional) increases in output through induced innovation and factor substitution. That was consistent with

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<sup>2</sup> As pointed out by Spiegel (1955, p. 534), Mill ([1848] 1909, pp. 12, 113, 189-90, 701) provided a first interpretation, scattered throughout his *Principles*, of underdevelopment as result of the effects of weak institutions on accumulation (see also Boianovsky 2013a, pp. 81-82).

the widespread view that the marginal productivity of labor was zero in traditional activities (especially agriculture), generally called “disguised unemployment” (Lewis 1954, p. 141). Indeed, as suggested by Hirschman (1982, p. 377), rural unemployment was seen as the “crucial theoretical underpinning of the separateness of development economics” at the time.

Singer’s reformulation of the Harrod-Domar equation was behind Lewis’s (1954, p. 155) oft-quoted statement that the “central problem of the theory of economic development” is to understand the process by which an economy modifies its rate of saving and investment from 4 or 5 per cent to 12 or 15 per cent – a change that, he claimed (1955, p. 208), had been recorded in all developed countries when they went through their “industrial revolution” phases. Lewis (1955, pp. 201-13) noted the “remarkable” stability of the observed value of the incremental capital-output ratio in developing countries (between 3 and 4). From a mathematical perspective, the (average) ratio was a function of the rate of investment, the rate of growth of income and the average life of capital goods. Assuming, moreover, a typical value of the rate of investment (or saving) between 4 and 5 per cent, the corresponding rate of income growth is about 1.25 %, which corresponded to India’s demographic growth at the time. Hence, in order to increase India’s income per capita at the same pace as the U.S. (between 1.5 and 2 per cent), it would be necessary to raise the rate of investment to about 12 per cent, which was Lewis’s magic number. Lewis’s model was designed to show how the increase of the share of profits in income brings about such changes in the rate of saving and investment and accelerated growth in the first stage of economic development.

Harrod’s distinction between the actual, warranted and natural growth rates (and its dynamic implications) played no role in Lewis’s (or Singer’s) framework. In particular, unlike Harrod’s exogenous “natural growth rate” – equal to population growth plus labor-augmenting technical progress – Lewis’s model featured endogenous labor supply from the subsistence sector, determined by labor demand in the capitalist sector. These conditions of unlimited labor supply are in principle temporary, since surplus labor is eventually all absorbed and economic duality eliminated during the development process. In later stages of capitalism, as indicated by data for advanced industrial economies since the last quarter of the 19<sup>th</sup> century, the rate and share of profits become relatively stable, contrary to the predictions of classical economists and Marx. The same applies to the saving ratio (Lewis 1955, p.

238; 1958, p. 27). Lewis's (1954) development modeling, together with its further discussion in pp. 233-39 and 281 of his 1955 *Theory*, attracted the attention not just of development economists, but of growth theorists as well.<sup>3</sup>

### **Growth economists and Lewis**

In fact, growth model-builders Solow (1956), Kaldor (1955-56) and Swan (1956) read Lewis carefully, and used his texts as a starting-point for their own models. In a way, they started where Lewis (1954, 1955) ended. Solow (2005, p. 663) recalled that the first reason why he became attracted to growth economics was that “in the 1950s everybody was interested in economic development” as most of the population lived in poor economies. He knew he would not work on development issues, but he “got thinking about [it] and I had read Arthur Lewis ... famous 1954 paper”, which got him interested in the general area of growth (other influences were Ramsey's and von Neumann's models of optimal growth, and the Harrod-Domar growth model). As he wrote then, “there still remains to be done a full-dress treatment of the sources of growth in the developed economy, the sort of thing that Arthur Lewis has done for the case of the primitive economy” (Solow 1957, p. 612; on Solow and development economics, particularly at MIT, see also Boianovsky & Hoover 2014, pp. 204-207). This is what Solow set out to do in his theoretical and empirical models. The view that Lewis's classical model mapped out the growth process in underdeveloped pre-industrial economies, and that economic growth in advanced countries should be

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<sup>3</sup> Lewis's 1954 model is discussed in only a few pages out of his 450 pp. long volume. The main purpose of the book, Lewis (1955, p.5) explained, was to present a general framework for studying development, not to introduce original ideas, “whose place is articles in technical journals”. Reviewers, however, expressed their disappointment at Lewis's (1955) limited attention to (or lack of further elaboration of) his growth model. Furtado, who had reacted enthusiastically to Lewis (1954), described the book as a loose formulation of the development process full of pieces of “amateur sociology” (see Boianovsky 2010, p. 252). Scitovsky (1957, pp. 258-59) regretted the lack of purely analytical arguments from an author who had shown elsewhere his ability to do so, and suggested it should be titled “Principles” instead of “Theory” of growth. Bauer (1956, p. 633) argued that, despite Lewis's (1955) modesty claims, the book did include a particular model (he called it the “Lewis' model”), from which the main theme of the emergence and growth of a capitalist sector springs. Cairncross (1956, p. 694) complained that there were “no pauses for model-building” in the book, but welcomed chapter V on capital accumulation as its core.



modeled in the way of contrast with that approach, is also clear in both Kaldor (1955-56) and (particularly) Swan (1956). They probably paid attention to Lewis's (1954, p. 176) remark that once the labor surplus disappears his classical model "no longer holds" and must be replaced by another – possibly but necessarily a neoclassical – one.

In July 1956 a series of interdisciplinary seminars took place at the Australian National University to discuss chapters of Lewis's (1955) *Growth*, about effort, knowledge, institutions, population, government and capital. Swan was asked to do the seminar on capital (see Pitchford 2002), which resulted in his 1956 article, a co-founder of neoclassical growth economics. Swan (1956, p. 334) opened with a section titled "from Adam Smith to Arthur Lewis". The aim of the paper was "to illustrate with two diagrams a theme common to Adam Smith, [J.S.] Mill, and Lewis, the theory of which is perhaps best seen in Ricardo: namely, the connection between capital accumulation and the growth of the productive labor force".

Swan (pp. 338-39) showed that – whereas an increase in the saving ratio had only transitory effect on the rate of economic growth in the neoclassical model, due to diminishing returns to capital – an increase of capital accumulation did affect permanently the rate of growth in the classical model of Lewis, Ricardo and Mill (assuming away the existence of a fixed factor such as land). The distinct outcome stemmed from the classical assumption of high elasticity of labor supply in the vicinity of a certain output per capita. This could be explained by the Malthusian population mechanism (as in classical economics), or by disguised unemployment "with unproductive labor kept in reserve (by sharing with relatives, etc.) at a minimum living standard" in the subsistence sector (as in Lewis). In an open economy it could also reflect a potential supply of migrant labor. Lewis's model was seen as vindicating J.S. Mill's ([1848] 1909, book I, chapter V, section 9) famous proposition that "demand for commodities is not demand for labor", in the sense that the growth of productive labor force depends on the rate of capital accumulation. As Lewis (1958, p. 18) pointed out, with unlimited labor at constant wages, "no 'deepening' of capital takes place; only 'widening'". Writing before Solow and Swan, he observed that

In the neoclassical model capital grows faster than labor, and so one has to ask whether the rate of profit will not fall, but in the classical model the unlimited supply of labor means that the capital/labor ratio, and therefore the rate of

surplus, can be held constant for any quantity of capital (i.e., unlimited “widening” is possible). (Lewis 1954, p. 154)<sup>4</sup>

Hence, in the early stage of growth, when there is excess supply of labor available, capital accumulation does not change the capital-labor ratio and the rate of profit in the capitalist sector. In the latter stage, however, when labor becomes scarce, the rate of profit would fall “if innovation did not constantly provide new opportunities for investing capital” (Lewis 1955, p. 297). This is precisely the conclusion reached soon after by Solow (1956) and Swan (1956) about steady-state growth in a neoclassical setting, when technical progress must make up for diminishing returns to capital in order to bring about increasing income per capita. In Lewis’s model, on the other hand, the wage rate and output per head of productive workers, as well as the capital-output ratio in the capitalist sector, do not change during the accumulation process (although they increase in the economy as a whole). This “classical view” was “unfortunately perhaps more relevant [than the neoclassical one] to many contemporary problems of population pressure and economic growth”, asserted Swan (1956, p. 339), echoing Lewis (1954, p. 139). The increase in labor productivity in the economy as a whole was due not to higher capital intensity or technical progress, but to the transfer of labor from the low marginal productivity subsistence sector to the higher marginal productivity capitalist one (see also Ros 2001, chapter 3). The main beneficiaries of growth acceleration are the capitalists, who capture the effects of higher productivity in the form of increasing profit shares and margins at constant real wages, which leads to higher saving ratios (Lewis 1958, pp. 18-19).

Kaldor (1955-56) did not refer to Lewis in his post-Keynesian model of distribution and growth. Nevertheless, Kaldor’s (pp. 85 and 97) clear-cut distinction between two different growth stages – with “infinitely elastic supply curve of labor” and a ceiling given by Harrod’s natural rate, respectively – was very likely built on Lewis (1954), as pointed out by Pasinetti (2000, pp. 396-97) and Kriesler (2013, pp. 545-47). In the first stage the classical (Ricardian) distribution theory applied, with

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<sup>4</sup> By “neoclassical model” Lewis probably meant models of accumulation and capital deepening à la Wicksell ([1901] 1934), not growth models. Wicksell was widely read at the LSE in the 1930s, when Robbins (who wrote the introduction to the 1934 translation of the *Lectures*), Hayek, Hicks and Kaldor took his works as the foundation of neoclassical theory of capital and distribution.

profits determined as a residual arising from the difference between the marginal product of labor and the rate of wages, decided according to the Malthusian population principle. This was illustrated by Kaldor's (p. 85) well-known diagram depicting factor income shares in Ricardo's corn economy. Kaldor's post-Keynesian model, on the other hand, assumed that the saving ratio is a weighted average of the propensity to save of capitalists and workers. Given an independent investment function, the rate of profit is equal to the quotient between the (exogenous) rate of growth of output and the propensity to save of capitalists. Distributive shares are determined as a by-product of that equation. Like classical (or Lewis's) model, growth and distribution are interconnected, in Kaldor's formulation, but in a sequence that is logically opposite, as wages (instead of profits) become the residual and growth is not determined by the saving ratio as in Lewis-Ricardo.<sup>5</sup>

Lewis (1958, pp. 26-27) agreed that the classical economic framework, as restated by him, was unable to explain income distribution when labor supply is not perfectly elastic in the "second stage" of growth, an issue never dealt with by classical economists. At the same time, he was skeptical about the ability of modern distribution theories – such as marginal productivity and "Keynesian equilibrium between investment and saving via the profit ratio" – to do so, as "their very profusion shows how unsatisfactory they all are".

Lewis did not mention J. von Neumann's (1945-46) highly mathematical model of existence of a general equilibrium of balanced growth, which belonged in the classical tradition despite the lack of references to classical authors. Like Lewis, Von Neumann assumed that labor supply is perfectly elastic at given subsistence wages, profits are entirely saved and re-invested, and production processes face constant returns to scale (and, therefore, that diminishing returns from land scarcity are absent). The production processes consist, from this perspective, of goods producing goods, where some are the wage goods consumed by workers. Von Neumann's assumptions led to his conclusion that the rate of profits (or interest) is equal to the rate of economic growth, which depends on the rate of expansion of those goods that can be expanded least rapidly. Lewis's and von Neumann's models shared

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<sup>5</sup> Kaldor's familiarity with Lewis's work may be inferred from the fact that they were together at the LSE in the 1930s and were both members of the Fabian Society. The Lewis Papers, held in Princeton, contain correspondence between the two men, mostly about tax issues.

with classical economics the view that wage goods are fed back into the productive process as inputs, the supply of which determines the size of labor supply. Nevertheless, von Neumann (1945-46) tackled a distinct issue, unrelated to Lewis's concern with growth acceleration and changes in income distribution in a dual economy.<sup>6</sup>

### **A modified classical model**

A main novelty of Lewis's (1954, p. 157) "modified classical model", compared with the original classical formulation, is the demand curve for labor featured in the capitalist (profit maximizing) sector, drawn as the marginal productivity curve NR in figure 1. The demand for labor determines, for a given short-run capital stock, the amount of labor absorbed in the modern capitalist sector at real wages OW set in the subsistence traditional sector. Unlike the modern segment, the subsistence sector does not use capital and, therefore, is not organized according to profit maximizing principles. The capitalist sector is that sector of the economy "where labor is employed for wages for profit-making purposes" (Lewis 1958, p. 8). Its output per head is higher than in the subsistence sector, because the latter is "not fructified by capital" (Lewis 1954, p. 147). The economic surplus WNP results from the difference between the average productivity of "productive" workers employed in the capitalist sector and "unproductive" labor absorbed in the other sector. The non-capitalist sector works as a reservoir from which the capitalist one draws labor, as illustrated by the perfectly elastic labor supply curve WP.

[insert Figure 1 around here; now at the end of the paper]

In this version (called "model one" by Lewis 1972, p. 83), the two sectors produce the same commodity (or composite commodity), so that their only economic transaction is the labor flow from the traditional sector to the capitalist one. This is close to the Ricardian corn economy depicted in Kaldor's (1955-56) diagram, with the

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<sup>6</sup> It may be also explained by Lewis's dislike of highly formal models. "By 1880 the economists' long march into algebra had already begun, and with it, until the temporary glamour of the Keynesian system, disappeared their intellectual prestige" (Lewis 1978a, p. 28).

significant differences that land rent is not depicted in Lewis's diagram, and the classical wage-fund mechanism is also conspicuous by its absence. As von Neumann, Solow and Sawn, Lewis assumed constant returns to scale (see also Ros 2001, chapter 3). The marginal product of labor equals the real wage in the capitalist sector, with no role for Ricardo's and S. Mill's wage-fund approach as a short-run determinant of the wage rate.<sup>7</sup> Economic duality follows from the assumption that capital is insufficient to employ productively the whole potentially available labor at a wage rate above subsistence.

The fact that there is not enough capital to provide employment for everybody is a vital distinction between this [classical] model and neoclassical analysis. (Lewis 1958, p. 3)

In the early stages of economic development there is not enough capital to provide employment for everybody in the capitalist sector ... capital accumulation makes it possible to increase the ratio of workers inside the capitalist sector to workers outside, and so raises national income. (Lewis 1958, p. 9)

Under these circumstances, the whole economy cannot operate on capitalist basis, as labor marginal productivity would be too low to sustain workers.<sup>8</sup> There must be a non-capitalist sector where workers earn more than their marginal product, as argued by Lewis (see also Little 1982, p. 94). Lewis (1954, p. 148; 1958, p. 20) claimed that – since generally the bulk of the subsistence sector is formed by peasant agriculture – the wage floor in the economy is set by the *average* labor productivity and consumption of small farmers, through income sharing. He offered that “objective index” as an alternative to classical (Ricardian) “subjective” conventional standard of living at which population is kept constant. Lewis (1954, p. 143) acknowledged population increase as an important source of labor supply and as a “cornerstone of

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<sup>7</sup> As Lewis (1988, p. 32) would express it later, “the wages fund model spurred a lot of argument among the classical economists, but it was confusing and did not contain any useful insight. The fact that it survived into the second half of the 19<sup>th</sup> century is rather surprising”.

<sup>8</sup> Wicksell ([1901] 1934, pp. 135-42) had envisaged, as part of his treatment of Ricardo's machinery question, the possibility that marginal productivity of labor (but not its average productivity) becomes lower than subsistence level. He suggested the problem could be solved through wage subsidies paid out of taxes on profits (cf. Lewis 1966, p. 61).

Ricardo's system". However, he was critical of the Malthusian law of population and did not incorporate it into his model. Lewis (p. 144) refused on that occasion to delve into the large literature on "what Malthus really meant". He investigated the matter further in section 6.1.a ("Population growth") of his 1955 book, with the verdict that "it is simply not true that subsistence determines the rate of population growth" (1955, p. 319). In practice wages in the capitalist sector must be higher than earnings in the subsistence sector, because of (real and psychological) costs of transference to the urban environment, as illustrated by figure 2, where WS is the gap between real wages in the two sectors.

That margin was an important element, as indicated by Domar's (1953) remarks made before Lewis's model came out. Domar (1953, pp. 562-63) suggested, like Lewis, that in primitive agriculture the member of a peasant household is rewarded according to his average instead of marginal product. If he moves to town, he must cover the higher costs of urban life, but his wage cannot exceed the marginal product of industry, which must then be considerably higher than average agricultural product. Hence, "he is apt to stay home and as a result the marginal product in agriculture can be very close ... or even below zero". Unlike Lewis, Domar saw the costs of transference to the modern sector as perpetuating labor surplus. Surely, this reflected the fact that Domar described what he perceived as the current economic situation of underdeveloped areas, not the "industrial revolution" modeled by Lewis.

[insert Figure 2 around here; now at the end of the paper]

### **Growth and the agricultural surplus**

The curves N1Q1, N2Q2 etc. represent shifting labor demand as the amount of capital changes due to reinvestment of most of the economic surplus. Classical economists had assumed that saving comes out of the surplus over wages, which in their system included rents and profits. Lewis (1958, pp. 17-18) commented that Hume, Malthus and Marx had asserted that saving is done out of profit, but that Smith<sup>9</sup>, Ricardo and

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<sup>9</sup> In 1954 (p. 159) Lewis, however, wrote that "18<sup>th</sup> century British economists took it for granted that the landlord class is given to prodigal consumption rather than to productive investment, and this is certainly true of the landlords in underdeveloped

J.S. Mill had remained silent on that – which he interpreted as endorsement of Malthus’s assumption by Ricardo. Excess labor and economic surplus are “permissive rather than initiating” in Lewis’s model, as Kindleberger (1967, p. 14) pointed out. The process of growth needs an autonomous shock (such as innovations or international trade) to get started, external to the model itself. Lewis (1954, p. 160; 1955, pp. 274-76) acknowledged as much when he discussed the “points of departure” of the growth process.

Lewis’s model, together with the formulations by classical economists (with the possible exception of Malthus) and Marx, did not feature an investment demand function distinct from saving, in the Keynesian or Wicksellian sense. Capitalists are supposed to automatically transform their saving into capital formation (see also Taylor and Arida 1988, pp. 174-75). The crucial economic decision was the allocation of the economic surplus between productive (saving) and unproductive uses, which depended on investment opportunities and the political security of capital investment (cf. Smith [1776] 1976, IV.v.b.43, p. 540). Saving rates were low in some countries or periods not because of poverty or absence of a surplus, but because the surplus, instead of going as profits to capitalists and to productive accumulation of capital, was “used to maintain unproductive hordes of retainers, and to build pyramids, temples and other durable consumer goods” (Lewis 1955, p. 236; see also Lewis 1954, p. 153). The lack of new opportunities to invest shows up as a low propensity to save. From that perspective, “saving is a function of the opportunity to invest” (Lewis 1978a, p. 155).

The process of increase in the capitalist surplus, rate of investment and rate of economic growth depicted in figure 2 stops when labor surplus is all absorbed and dualism eliminated. Labor becomes scarce and wages are no longer set by subsistence level but share the benefits of technical progress, which decides the (steady, non-accelerating) pace of economic growth in the second unclassical stage. However, real wages may rise before that; the labor supply curve, instead of perfectly elastic, becomes upward sloping after some point, with a corresponding squeeze of profits and savings. This may come about for two main reasons. First, as capital accumulation is going on faster than population growth and the labor force in the

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countries”. He seemed to include Smith in that group of economists, which is consistent with the secondary literature (see e.g. Avila 1976, who compares Smith to Lewis in that regard). See also Lewis (1988, pp. 32-33) on Hume.

subsistence sector is coming down, earnings per capita in that sector rise, which ensuing increase of wages in the capitalist sector (Lewis 1954, p. 172).<sup>10</sup> The economy will still reach its second stage with no surplus labor, but at a decreasing rate.

Second, if the two sectors produce different commodities and trade with each other (called “model two” by Lewis 1972, p. 91), capitalist expansion may be checked by adverse terms of trade. This is the case if the capitalist industrial sector produces no food but gets it from subsistence peasant agriculture at increasing relative prices and falling profits. Lewis (1954, p. 173; 1955, pp. 230, 278-79; 1972, pp. 92-93) approached the issue as an exercise in unbalanced growth in a closed economy (see also Dutt 1990). The terms of trade between agriculture and industry will be constant if the relative growth rates of the two sectors are the same as their relative income elasticities. Since the income elasticity of demand for food is typically less than one, economic growth requires that average agricultural productivity per head increases, to provide a growing food surplus (beyond farmers’ consumption) per head to feed industrial workers, and to enable farmers to purchase manufactured goods. This is unlikely to happen, as peasants were supposed to be irresponsive to economic incentives and innovations, a clear case of market failure (Lewis 1958, p. 23).<sup>11</sup>

Current underdeveloped countries beset by labor surplus have had their expansion checked by “unbalanced development”, argued Lewis (1958, p. 26). They lacked an “Agricultural Revolution” as experienced by Great Britain in the 17<sup>th</sup> and 18<sup>th</sup> centuries (see also Kaldor [1954] 1960, and 1967, pp. 54-59, for the same argument). Relatively slow growth of agricultural productivity provided the main explanation for the relative 19<sup>th</sup> century economic stagnation of France compared with Great Britain, or of China compared with Japan, Lewis (1955, p. 279; 1958, pp. 28-29) claimed. The notion that the size of the industrial sector in a closed economy depends on the size of the agricultural surplus goes back to Smith ([1776] 1976, III.i. 2, p. 377), who made it a key to understanding the “Natural progress of opulence”, as

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<sup>10</sup> This may happen either because the production function in the subsistence sector features diminishing returns due to land scarcity, or because the marginal productivity of labor is zero in that sector (see Ros 2001, chapter 3).

<sup>11</sup> However, the effects on the capitalist sector of rising peasant productivity move in opposite directions. Real wages rise (and profits fall) in the capitalist sector as traditional productivity rises, “but this is counteracted by the improved terms of trade”, and the net effect on the wage rate is unpredictable (Lewis 1979, p. 214; 1954, p. 174).



Lewis (1978b, p. 9; 1984a, p. 121; 1988, p. 29) would point out. Smith's stress on the agricultural surplus was shared by other 18<sup>th</sup> century economists (such as James Steuart, mentioned by Lewis in that connection), which indicated signs of Physiocratic influence on the key role of agriculture vs. industry. Lewis (1988, p. 30) asserted that, differently from 18<sup>th</sup> century economists, we "20th century development economists are not caught in such a trap because we do not answer questions involving all-or-nothing. We operate at the margin". The relevant question was by how much to increase agriculture *and* manufacturing, depending on elasticities and other variables. Historically, the notion of agricultural surplus preceded the full development of the concept of economic surplus as a foundation of models of income distribution and growth by Ricardo and Marx (Meek 1951; Brewer 2011), on which Lewis (1954) would build his own model.

### **3 Economic surplus, productive labor and accumulation**

#### **Capital and productivity**

Lewis (1954, pp. 145, 153) treated capital accumulation, technical progress and the growth of the supply of skilled workers as a "single phenomenon", in the sense that both the application of new technical knowledge and the education of qualified workers were essentially determined by the availability of capital. Like Adam Smith, Lewis never took the position that only capital mattered, but, since the other factors that affected productivity growth were linked to capital accumulation, capital provided the connecting factor around which the explanation of economic growth could be elaborated. Smith's introduction into economics of the notion of capital accumulation as the core of economic growth displaced the previous emphasis on knowledge displayed by 17<sup>th</sup> and mid 18<sup>th</sup> century authors, and influenced strongly classical economics in general (see Prendergast 2010). Ricardo clearly distinguished between the effects of technical progress and capital accumulation on growth, and focused on the latter. J. S. Mill adopted Smith's ([1776] 1976, II.iii.32, p. 343) view that capital accumulation is a pre-requisite for the implementation of division of labor and technical change. However, the relation between division of labor and capital is

not straightforward in the *Wealth of Nations*. In some passages, Smith ([1776] 1976, I.i.8, pp. 19-20) stressed how the division of labor led to the invention of machinery.

As put by Lewis,

Smith attached so much importance to the division of labor that he made it seem even to be the cause of the growth of technology and the application of capital. Later writers challenged this causation, and some even argued the other way – that specialization is not the cause but the result. On our day we are content to say that specialization, knowledge and capital grow together. (Lewis 1955, p. 70)

That was behind Lewis's (1954) strategy to treat the last mentioned factors as a "single phenomenon" and to remove increasing returns to the background. Moreover, the presence of increasing returns would make difficult for Lewis to model the capitalist sector as perfectly competitive, with a labor demand curve determined by marginal productivity. If anything, increasing returns would add to the general results of his model. As Lewis (1954, p. 177) claimed while discussing his open model, "the result is the same whether one assumes increasing or diminishing returns to labor", since, when "wages are constant at subsistence level ... all the benefit of increasing returns goes into the capitalist surplus". In the same vein, Kaldor-Verdoorn's law – that the rate of growth of productivity per head is a positive function of the rate of growth of industrial output and employment – added significance to Lewis's (1972, p. 77; 1976b, p. 35) results, although it was not necessary in order to derive them. Among the "later writers" he alluded to above figured prominently Allyn Young's (1928) influential critical discussion of the relation between capital, increasing returns and growth in Smith.<sup>12</sup>

From Lewis's perspective (shared with others; see e.g. Hicks 1965, p. 36), the center-piece of the *Wealth of Nations* was chapter III of book II, titled "Of the accumulation of capital, or of productive and unproductive labor". Lewis's (1954, p. 146) definition of the capitalist sector – as that part of the economy which "uses

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<sup>12</sup> As pointed out by Swan (1956, p. 338), a positive permanent effect of a higher saving rate on economic growth may be explained not just by the assumption of perfectly elastic labor supply à la Lewis, but, alternatively, by the notion that accumulation gives rise to external economies (and technical progress), so that the social yield of capital exceeds its private return. Swan suggested that "this point would have appealed to Adam Smith", but did not pursue it.

reproducible capital, and pays capitalists for the use thereof” – was meant to coincide with Smith’s definition of productive workers as those who work with capital and whose product can be sold at a price above their wages (the economic surplus). The subsistence sector is that part of the economy that does not use capital and has therefore a lower productivity, which, again, was Smith’s sense of “unproductive”. Echoing Myint’s (1948, chapter 5) criticism of Robbins and Cannan, Lewis (1954, p. 147) argued that the classical distinction between productive and unproductive “had nothing to do with whether the work yielded utility, as some neo-classists have scornfully but erroneously asserted”. Smith’s distinction was made and used only for the purpose of discussing capital accumulation, in a cumulative growth process in which the increase in the surplus, resulting from the transfer of labor from unproductive to productive employment, would bring about more saving and expansion, in a “continuous chain” (Lewis 1958, p. 4). The ratio between productive and unproductive employment (or between productive and unproductive use of the surplus) decided the rate of growth in Smith’s scheme.

This is what made Lewis return to what probably was “the most maligned concept in the history of economic doctrines” (Blaug 1997, p. 53), handled by Smith in a “clumsy and inconsistent” way (Schumpeter 1954, p. 192, n. 22). Lewis (1958, p. 8; 1988, pp. 30-31) was aware of Smith’s attempt to tie the productive/unproductive distinction to the distinction between (tangible) wage goods and services, which he disapproved. Instead, Lewis (1958, p. 8) agreed with Malthus (1820, chapter I, section II) that the terms “productive” and “unproductive” implied a difference of degree (more or less productive), not an absolute one. The relevant distinction was between labor that produces an investible surplus over wages and labor that does not, irrespective of whether it produces a commodity or service. This was consistent with Marx’s definition of productive labor as labor that produces surplus-value for the capitalist (Dobb 1973, pp. 60-61; Schumpeter 1954, p. 630; Jones 1994). Hence, argued Lewis (1958, p. 8), labor employed for wages with no intention of resale (e.g. domestic servants), as well as labor that is not employed for wages (even if it works with physical capital in the form of means of production), belong in the non-capitalist sector.

### Lewis vs. classical economics

Lewis's building of his notion of economic duality on the concepts of productive and unproductive labor, and his declared filiation with the classical framework as a whole, attracted the attention of some historians of thought – most notably William Barber (1967, 1994) and Vincent Bladen (1961, 1974) – and also development economists Gustav Ranis and John Fei (1966, 1982), and Richard Grabowski and Michael Shields (1989). One key issue was the apparent absence of economic dualism in classical economists, who generally assumed capitalist profit maximization throughout the economy, including agriculture, as pointed out by Ranis and Fei (1982). Lewis (1988) noticed as much. In the pure classical model the economy consisted of landlords, capitalists and wage earners, corresponding to the English agriculture pattern. But in other countries the labor force was formed by small farmers and peasants, whose “ways of living were not represented” in classical theory (Lewis 1988, p. 34).<sup>13</sup>

Barber (1967, pp. 107-15, “postscript to classical economics”) – who had started his career in the 1950s as a development economist, under Lewis's influence – presented Lewis's model as one of the “more interesting statements of updated classicism”, together with Sraffa's well-known 1960 *Production of commodities*. Despite sharing a surplus approach to distribution, Lewis and Sraffa differed insofar Lewis restricted the relevance of classical economics to underdeveloped labor surplus economies (see Findlay 1982, p. 3), and showed no interest on its potential implications for the theory of relative prices, regarded a “minor by-product” (Lewis 1954, p. 139) of the classical system of growth and distribution. This may explain why neo-Ricardian (and Marxian) economists have generally not referred to Lewis's model in their exposition of the surplus approach to distribution (see e.g. Dobb 1973).

Lewis's reformulation of the classical model substituted sectoral distinctions for the class divisions and the population principle, but kept the proposition that capitalist profits are the source of accumulation and growth (Barber 1967, p. 108). Barber (1994) investigated whether signs of Lewis's dualism could be detected in discussions by classical economists of underdeveloped regions such as India. He

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<sup>13</sup> That was also the assessment of Georgescu-Roegen (1960), who argued that non-capitalist agricultural economies presented no analytical interest for classical economists and Marx. Mill's ([1848] 1909, book II, chapters 6 and 7) discussion of peasant agriculture in Ireland was a partial exception to that.

found some elements in Richard Jones's (1831) heretic criticism of the application of Ricardian rent theory to Indian traditional agriculture, largely ignored at the time. Barber (1994, p. 66) drew from that episode the ironic conclusion that, although Lewis's model was faithful to the mainstream version of the original master (Ricardian) model, "in his treatment of the structural discontinuities imbedded in dualistic economies, the mainstream classists of the early nineteenth century would have consigned him to the camp of the heterodox".

From a distinct standpoint, Ranis and Fei (1966, 1982), who had put forward a first influential formalization of Lewis's model (Ranis and Fei 1961), also argued that, despite Lewis's successful use of the classical system as a source of inspiration, there was a historical break between his and the original classical model – in the sense that the latter dealt with an essentially agrarian economy converging to the stationary state, based on circulating (the "wage fund") instead of fixed capital and a small or no role for technical progress – which prevented its application to current conditions. Unlike Lewis, Ranis and Fei (1966, p. 3) warned about the "limited usefulness" of classical theories (or any past theories, for that matter) for examining 20<sup>th</sup> century underdevelopment issues, since those theories reflected their own historical conditions and were hardly transferable to modern times.

Most development economists followed Ranis and Fei and did not join Lewis in his quest for the classical roots of development economics. A few others, like Grabowski and Shields (1989), on the other hand, maintained that Lewis's model and the classical (Ricardian) formulation – as portrayed by Kaldor (1955-56), whose diagram and interpretation they reproduced, without referring to that article – produced substantially the same results. The only significant difference, in their view, was Lewis's assumption of non-maximizing behavior in agriculture. If one prefers Ricardo's rationality assumption, his model should be chosen over Lewis's, as they proposed. Grabowski and Shields interpreted the adverse (to industry) terms of trade in Lewis's model as caused by diminishing returns to land, with ensuing convergence to a Ricardian stationary state featuring no capital accumulation and population growth. However, as discussed above, the evolution of domestic terms of trade in that model is determined by unbalanced growth between industry and agriculture, regardless of Ricardian diminishing returns to land. Moreover, Lewis pointed to a tendency to steady-state growth (determined by technical progress), called "second

stage of development” (Lewis 1958, p. 26), instead of a stationary state with constant income per capita.<sup>14</sup>

Bladen (1960; 1974, part I, chapter 8) also assimilated Lewis to aspects of classical analysis, more particularly Smith’s unproductive/productive labor distinction. However, he used Lewis (1954) to shed light on Smith’s concepts and to bring out their relevance. Bladen (1960, pp. 629-30) found significant similarities between the notion of “disguised unemployment” current in 1950s development economics and Smith’s “unproductive labor”, as suggested in Smith’s ([1776] 1976, II.ii.12, p. 335) assertion that “the proportion between those different funds [to maintain productive or unproductive labor] necessarily determines in every country the general character of the inhabitants as to industry or idleness”. We are “more industrious than our forefathers” because the funds destined for the maintenance of industry are greater in proportion than those employed in the “maintenance of idleness”, continued Smith. On the basis of those passages, Bladen argued that Smith’s reference to the “idleness” of those employed unproductively (as menial servants etc.) meant that they were employed at points of low (but positive) marginal productivity. He went on to propose that Smith’s approach to growth should be interpreted in terms of a two-sector model à la Lewis, with labor transfer to the advanced (more productive) sector constrained by capital shortage. Bladen did not claim that Smith actually assumed a dual economy, but that his description of economic growth in chapter II of book II of the *Wealth of Nations* made better sense in that setting.

### **Growth stages and the reserve army**

Bladen (1960, p. 630; 1974, p. 67) extended his interpretation of Smith’s unproductive workers to Marx’s “industrial reserve army” of unemployed, which should also be understood as an army of under-employed unproductive workers employed at low productivity in the primitive sectors of the economy. Lewis (1958, p. 24) shared with Marx the rejection of the Malthusian long-run population mechanism

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<sup>14</sup> Lewis (1954, p. 172) did consider the possibility that real wages (in terms of industrial goods) may rise so high as to reduce profits to the level at which they are all consumed “and there is no net investment”, but did not pursue it, probably because it did not fit the (stylized) facts of capitalist growth mentioned above.

as an explanation of subsistence wages and perfectly elastic labor supply. Indeed, several commentators have suggested that Lewis's subsistence sector, and its role in the determination of the wage rate, was formally analogous to Marx's reserve army (Noyola 1956, p. 280; Jorgenson 1967, p. 289; Marglin 1984, pp. 64, 108, 534; Kindleberger 1988, p. 16; Taylor and Arida 1988, pp. 174-75). Lewis (1954, 1955, 1958) referred often to Marx's approach to unemployment, which he saw as a generalization of Ricardo's discussion of the machinery question. Beyond those workers displaced by machinery, Marx's ([1867] 1992, chapter 15.8 and 25.3) reserve army contained also unemployment caused by the capitalist assault on pre-capitalist enterprises (handicraft unities).

Lewis (1955, p. 298) endorsed, for the early stage of capitalist development discussed in his 1954 model, Marx's view that real wages remain constant despite the growth of productivity, which is captured by capitalists. In particular, Marx "was right" in arguing that "for a while" the capitalist sector creates surplus labor by putting the handicraft workers out of business and reducing labor requirements in agriculture organized on capitalist basis (Lewis 1958, p. 25). An important "corollary of this is that, from the point of view of capitalist expansion, *even a pre-capitalist economy with abundant land is capable of developing a labor surplus*" (ibid, italics added). This applied to African and Latin American countries, which had been excluded from Lewis's (1954, p. 140) model for featuring abundant land and scarce labor. Even in those regions, a labor surplus could be created by the expansion of capitalist production at the expense of pre-capitalist forms of handwork.<sup>15</sup> "In other words, Adam Smith and Karl Marx throw more light on how those economies will develop than does Walras or Pigou" (Lewis 1958, p. 26, n. 1).

The reserve army will be eventually exhausted as capital accumulation catches up with population growth and the economy enters its second stage of development with growing real wages (Lewis 1954, p. 175; 1955, p. 298; 1958, p. 175; cf. Marglin 1984, p. 64). This "turning point" was a key aspect of Lewis's model, unlike Marx's formulation. Marx argued that the increase in real wages and fall in profits caused by the (temporary) exhaustion of the reserve army bring about a crisis and a higher "organic composition of capital", until capital accumulation and the demand for labor

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<sup>15</sup> Moreover, as Latin American economists pointed out at the time, what mattered was not the per capita endowment of land (quite high in Latin America), but its distribution, which was often very unequal in the region (see also Ray 1998, p. 356).

are reduced sufficiently to restore the labor reserve. Lewis (1958, p. 25), like Kaldor (1960, section 4), objected that, instead of a crisis, the situation would result in balanced-growth equilibrium with a rate of capital accumulation equal to the rate of increase of labor supply, which would also fit the alleged facts of capitalism history. Like Marx (but for different reasons), Ricardo and Malthus did not recognize that capital accumulation would eventually create a shortage of labor and raise wages permanently above subsistence, as they over-estimated the rate of population growth. Of the classical economists, argued Lewis, only Smith ([1776] 1976, I.viii, sections 16-23 on increasing wages and economic growth) saw that there are two different stages of economic development, with two distinct sets of results, but he did not offer an explanation of income distribution and saving ratios in that second stage (Lewis 1954, pp. 175-76; 1958, pp. 24-26).

Despite Lewis's positive references to Smith, his treatment of the economic surplus and capital accumulation was closer to Marx's than to any other "classical economist". Lewis (1958, p. 4, n. 3) found it difficult to follow the Smith-Ricardo-Mill analysis of capital formation, which assumed that production takes place in one year and disregarded the lengthening of the production period, as if the wage-fund could be identified with the whole capital even though it was invested for only one year. Hence, whereas "the classics wrote in terms of consumer goods being produced by capitalistic processes, we now most often distinguish a sector producing consumer goods and a sector producing capital goods" (ibid). As Lewis mentioned, this criticism of classical economists' wage-fund approach, together with the distinction between two "departments" of consumer and fixed capital goods, originated with Marx, particularly in his elaboration of the reproduction schemes.

Lewis's (1954, 1958) approach to economic surplus and capital accumulation combined elements from Smith, Ricardo, Marx and Marshall.<sup>16</sup> The economic surplus, as depicted in figure 1, was interpreted as Marshallian quasi-rent, in the sense of payment of fixed capital in the short-run. Boulding (1945) had discussed the role of the economic surplus concept in current economics, with a few references to Ricardo and Marx. The "surplus" was defined as the excess of the receipts of an agent over its supply price. For the economy as a whole there are no alternative opportunities in the

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<sup>16</sup> On some of the problems involved in Lewis's restatement of Marxian surplus analysis with the instrumental of the marginal product of labor and linear homogenous production function see James 1994.



short-run, but, in the long-run, the supply price of capital is zero only if saving and investment are not functions of the interest or profit rate (for a given income distribution). Marx (see Blaug 1997, pp. 234-35) and Lewis assumed as much when they argued that all saving is performed by capitalists for reinvestment and that capitalists automatically reinvest their profits regardless of expected returns. This is Marx's notion that capitalists have a "passion for accumulating capital", which was part of Lewis's (1954, p. 153) model. The corollary that there are no realization problems was relevant for Lewis's assessment of the Malthus-Ricardo debate on effective demand and growth.

### **The Malthus-Ricardo debate**

Lewis (1954, pp. 152-54) observed that a proper understanding of the dynamics of his economic development model depended on the clarification of two controversial issues. The first (tackled at the beginning of this section) was the relation between capital and knowledge accumulation. The other concerned the profitability of accumulating an ever-growing surplus accompanied by increasing income concentration, which could restrict the working of the model from the aggregate demand side. Juan Noyola (1956, pp. 280-82) and other Latin American structuralists close to the underconsumptionist tradition would criticize Lewis's model precisely on those grounds (Boianovsky 2010, pp. 254-55). Lewis (1954, pp. 153-54; 1958, p. 18) found the answer by delving deeper into classical economics and re-constructing the debate between Malthus and Ricardo in the form of a dialogue between the two men. Lewis's (1954) account was probably based on J. Bonar's 1887 edition of Ricardo's letters to Malthus, cited by Lewis (1958, p. 12, n. 2). As one might perhaps expect, he sided with Ricardo. As recounted by Lewis, Ricardo's reply to Malthus's charge – that a growing economic surplus would cause an embarrassing excess of commodities – was that there would be no glut, since capitalists' saving would be used for investment in fixed capital, which would increase employment in the capitalist sector.<sup>17</sup>

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<sup>17</sup> As Lewis (1954, p. 153) acknowledged, this was a "free interpretation", as classical economists associated the expansion of employment with an increase of circulating instead of fixed capital.

This led, according to Lewis's (1954, p. 153) narrative, to Malthus's second round retort: "Why should the capitalists produce more capital to produce a larger surplus which could only be used for producing still more capital and so *ad infinitum*?" Ricardo's answer, which Lewis endorsed, was that capitalists might decide to consume instead of saving. As long as there is no hoarding (excess demand for money), it is irrelevant to the current short-run level of employment – although not for its long-run future level – whether capitalist consume or save.<sup>18</sup> Malthus, Lewis continued, questioned whether such continuous process of saving and investment, by taking the economy to a path on which capital is growing faster than consumption, must not reduce the rate of profit and therefore affect the capitalists' investment decision. Indeed, Patnaik (2006, p. 339) would level the same criticism against Lewis's own model, which he charged for sharing Tugan-Baranowsky's controversial concept of an equilibrium in which the production of ever more machines is used to produce ever more machines, with no apparent role for consumption.

The answer to that, assuming a given capital-output ratio, was provided by Domar's concept of an equilibrium growth rate that keeps the expansion of capacity and demand in balance, advanced in the context of the secular stagnation debate led by Alvin Hansen (Boianovsky 2017). Lewis (1955, pp. 215, 287, 297, 303) rejected Hansen's secular stagnation thesis that an increase in saving may discourage investment. He sided with Frank Knight and others in assuming contra Hansen (and Domar) that the ratio of capital to consumption was not fixed, but dependent on the rate of interest. As far as the Malthus-Ricardo debate was concerned, capital deepening was not the issue, though. Ricardo's reaction to Malthus's contention in the last round was especially relevant to Lewis's model. As reported by Lewis (1954, p. 154), Ricardo replied that, since the supply of labor is unlimited, it is always possible to find employment for any amount of capital – that is, indefinite capital widening at a constant capital/labor ratio – which Lewis (*ibid*) found "absolutely correct for [Ricardo's] model" as well as for his own. The only operative cause of a fall in the rate of profit in Ricardo's system is the rising cost of production of wage goods (and rising rents) due to diminishing returns from land. "We are not so certain of this as he

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<sup>18</sup> On hoarding see Lewis (1955, pp. 214-15; 1988, p. 31). Most of Lewis's model assumed away money and credit, which he took into account when discussing inflation as a way to increase the saving ratio and economic growth (see Lewis 1954, section 6, pp. 160-66).

was ... If we assume technical progress in agriculture, no hoarding, and unlimited labor at constant wage, the rate of profit on capital cannot fall”, Lewis (ibid) concluded.

Aspects of the Malthus-Ricardo controversy may be also found in their respective accounts of underdevelopment and poverty in regions such as Latin America and Ireland, especially in view of A. von Humboldt’s extended reports on New Spain (see Boianovsky 2013a, section 4). Lewis (1955, p. 19) pointed out that, “to Malthus, one of the major obstacles in underdeveloped countries was lack of demand, which we would translate in these days as a ‘low valuation of income in relation to leisure’, and this point of view has many adherents today”. Although Lewis (1955, p. 280) mentioned occasionally the relation between lack of demand and “preference for leisure”, this did not fit easily into his model. Malthus (1836) argued that the indolence, low population and poverty in countries with abundance of fertile land, like New Spain (Mexico), was caused by the high productivity of land (with its perverse effect on effort) together with deficient effective demand. Ricardo ([1821] 1951, pp. 99-100), on the other hand, explained underdevelopment in countries with large supplies of natural resources by the reduced pace of capital accumulation. In contrast with long-settled nations like England, poverty in such countries was not caused by the pressure of population on land as capital accumulated, but by the effects of “bad government, insecurity of property and want of education” on investment. Lewis (1955, p. 234, on the “political security of capital investment” as a pre-requisite for growth) would probably agree.

## **4 The open economy and comparative advantages**

### **The limits of Ricardian trade theory**

Lewis did not carry to his treatment of the open economy the excitement he showed about classical economics elsewhere. He admired the fine logic of Ricardo’s comparative advantages theory, but at the same time regarded it as an analytical straightjacket. In a paper contributed to the International Economic Association 1962 conference on development, Lewis (1966, p. 485) stated that classical economists

were concerned with dynamic matters (e.g. international investment) in open economies, “but when they invented the Law of Comparative Costs, and bequeathed its simple arithmetic to become the foundation of the neoclassical theory of international trade, statics supplanted dynamics”. By “neoclassical” trade theory, he meant the Heckscher-Ohlin model, which assumed that countries had the same production functions and differed only in relative factor endowments. Lewis (1965, p. 13) preferred instead the Ricardian version of comparative costs, with its emphasis on relative differences in productive efficiency, since many tropical goods (e.g. coffee) cannot be grown in industrialized countries. Nevertheless, both versions were unsuited for the analysis of growth issues.

The theory of international trade, as the classical economists developed it, did not provide for the transmission of sustained growth (or its opposite) from one country to another, since it simply did not deal with growth: technologies are given, and neither labor nor capital migrates. (Lewis 1978a, p. 16)

Above and beyond its allocative role, trade had been an “engine of growth” (as D.H. Robertson called it), particularly for tropical countries between the 1870s and the First World War, and then again between the 1950s and early 1970s. Thomas (1954, chapter I) called attention to the classical dualism between the static Ricardian theory of international trade (applied to trade between Britain and other countries) on one side, and the dynamic theory of colonization and emigration (applied to the British community of countries as a whole) on the other, based on the law of diminishing returns and the tendency of profits to fall. The classical approach to colonization was developed by E.G. Wakefield in the 1830s, largely in opposition to Ricardo’s views on stagnation (cf. Lewis 1955, p. 363; 1949b, p. 127). Moreover, as it is well-known, Ricardo’s comparative advantage model showed how nations may gain by trade but not how the gain from trade is divided among trading countries. Terms of trade are indeterminate, since Ricardo assumed away profit equalization between countries (because of capital immobility) and, therefore, could not apply the labor theory of value to international trade. J.S. Mill’s reformulation in terms of reciprocal supply and demand curves – further developed by Marshall, Edgeworth, Viner and Haberler – provided the missing element to determine the terms of trade.

Lewis probably learned all about the Mill-Viner-Haberler trade model at the LSE. That model did not provide the explanation Lewis was seeking for the persistent

differences in real wages and welfare across countries. He found it in a new trade model (Lewis 1954, part II; 1969, part I) with two regions and three goods, with each region producing two goods, one of which (“food”) is common to both. The three goods are produced with a Ricardian technology using only labor with constant returns.

Why does a man growing cocoa earn one tenth of the wage of a man making steel ingots? I was taught that the answer depended on the relative marginal utilities of cocoa and steel, but this has never made any sense to me. My alternative answer can be put in a nutshell. Each of these men has the alternative of growing food. Their relative incomes are therefore determined by their relative productivities in growing food; and the relative prices of steel and cocoa are determined by these relative incomes and by the productivities in steel and cocoa. Demand is important in the short-run, but the long-run determinants are the conditions of supply. (Lewis 1969, p. 17)

The productivity conditions in steel and cocoa are irrelevant to account for the wage gap, claimed Lewis – only relative productivities in the production of food matter. That was not directly based on classical trade theory, but Lewis (1976a, p. 142) suggested that “Adam Smith would have understood this arithmetic”. The assumption that both countries produce food ties the terms of trade strictly, unlike Ricardo’s model (see also Findlay 1982, pp. 9-10; Ros 2001, chapter 7.4). This is behind Lewis’s (1954, p. 183) explanation of “why tropical produces are so cheap” and his policy recommendation to improve food productivity in tropical countries with unlimited supply of labor and land. The peasants constitute a reservoir of cheap labor available for work in export industries. An increase in the productivity of cocoa benefits only foreign consumers, not the tropical country, since the supply is infinitely elastic. Rates of profit are equalized through international mobility of capital; likewise, emigration (and sometimes slavery), particularly from China and India, contributed significantly to the elastic labor supply.<sup>19</sup>

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<sup>19</sup> This implies that wages cannot go up in any poor (tropical) country until excess labor supply is eliminated throughout the entire world economy (see Perrotta, 2016, p. 58).

### **Terms of trade, the tropics and protectionism**

Despite its results, Lewis did not construct his open economy model as a frontal challenge to Ricardo's law of comparative costs. He claimed that Ricardo's law "remained valid if written in real marginal terms" in labor surplus economies, where money costs (average productivity in the subsistence sector) do not reflect the nearly zero real (opportunity) costs of surplus labor, given by its marginal productivity in that sector (Lewis 1954, p. 185) – as Lewis (1984a, p. 125) later became aware, the argument had been advanced by the Rumanian economist M. Manoilescu back in 1931 (see Love 1996, p. 83, n. 91). This "modified" (like Lewis's closed model) open classical model supported protection of domestic industry against imports, in marked contrast with the traditional classical free trade argument. In fact, as Lewis (1988, p. 36) remarked in his essay about the classical roots of development theory, "we look for a theory of shadow prices, but this was still a century ahead" (!).

The low level of the double factorial terms of trade (domestic's labor compensation versus that of its foreign counterpart) affected negatively the ability of tropical countries to consume industrial goods or accumulate capital. Moreover, data indicated that – due to the fact that productivity in steel grows more slowly than in food in industrial countries, while productivity in cocoa grows faster than in food in the tropics – the terms of trade tended to move against the tropics (Lewis 1976a, pp. 144-153-54; 1969, pp. 22-27). Lewis's (1949c, pp. 192-96) first attempt to calculate the evolution of terms of trade between primary and manufactured commodities was based on the terms of trade between British imports and exports from 1811 to 1939, the same data used by Hans Singer in his better-known estimates around the same time. Like Singer, Lewis's data showed a relative fall of industrial prices against agricultural prices in the first three quarters of the 19<sup>th</sup> century, followed by a sustained increase after that. As Lewis (1949c, p. 192) observed, "Malthusian fears" were born in the early 1800s, and the "the Law of Diminishing Returns considered to be the most important of all economic principles". After the 1870s, however, the opening up of new countries as the result of migration, investments and lower transport costs (sometimes called "globalization") led to continuous increase of the production of primary commodities, with a rising trend in the relative prices of industrial goods. Lewis (p. 197) concluded from the data that "history has shown Malthus to be wrong in thinking that population must grow faster than food supply".

Lewis's (1949c) explanation of the course of the commodity terms of trade was based on supply-demand factors, before the elaboration of his hypothesis about the factoral terms of trade in 1954 and 1969.

When Lewis (1969, p. 8) came to measure the annual growth rate of tropical trade (3.6%) in the period 1883-1913, he was surprised to find a figure so close to the rate of growth of the world trade (4.0%), and that the “engine of growth” was beating “so powerfully in the tropics” before WWI. He explained the reason for his surprise.

Growing up in the academic world of the 1930s, I absorbed the conventional view that while economic growth was relatively easy to achieve in the temperate world it was rather difficult in the tropical world because the tropical peoples had the wrong kinds of social institutions; or were not sufficient materialistic; or disliked hard work; or simply because the tropics were just too hot. This remained the conventional view right up to the end of the 1950s; but in the 1960s this position was clearly no longer tenable. (Lewis 1969, p. 8)

Classical economists like D. Hume and J.S. Mill had discussed the apparent historical correlation between tropical climate and reduced economic growth.<sup>20</sup> F. List ([1841] 1885), an opponent of classical economics, divided the international economy into “tropical” and “temperate” areas in order to argue that the tropics were unfit for industrialization, for the reasons listed by Lewis above (Boianovsky 2013a, b). Accordingly, List did not apply to tropical nations his influential argument about “infant industry” tariffs (which differs from Lewis's 1954 case for protection) – a fact that went largely unnoticed by Lewis and other readers of the German economist. Lewis (1955, p. 21) regarded List a “lesser, unorthodox writer” but important because of his influence on German and American thought in the 19<sup>th</sup> century, when his book “became the bible of all industrializing countries ... except Great Britain” (Lewis 1978a, p. 221-22). Lewis (*ibid*; see also Lewis 1978b, pp. 23-24) agreed with List's thesis that market forces in an agricultural economy work to keep it agricultural and over-specialized in primary exports, unless economic policy manages to halt their momentum and modify their direction.

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<sup>20</sup> Lewis (1955, p. 53) did not dispute the association between growth and temperate climates, but regarded it a recent phenomenon in human history.

### Vent for surplus and convergence

Despite the relatively high rates of growth in many tropical countries in the period 1883-1913, industrialization was long delayed, which puzzled Lewis (see Williamson 2011, who critically examines Lewis's 1978a historical-statistical investigation). Lewis (1969, p. 28) referred to the "popular answer" that first-comers have an advantage over latecomers, with increasing divergence in technology, productivity and income levels. D. Hume, J. Tucker and J. Oswald had debated the matter in the Scottish Enlightenment, in what would become known as the "rich-country-poor-country" debate, probably the first major controversy in the history of the theories of economic development (see Elmslie 1995). Lewis learned of that debate from a pioneering contribution by J.M. Low (1952), his Manchester colleague and a reader of the first draft of Lewis's *Theory* (Lewis 1955, p. 6).

The "popular answer", originated with Oswald and Tucker, was based on the effects of technological innovation on reducing export prices, and on cumulative productivity differentials due to increasing returns (Lewis 1955, p. 347). Lewis (1979, pp. 215-16) was skeptical about what he called "polarization growth theory". He sided with Hume's argument about the effects of unbalanced trade on relative prices of goods and labor across countries. Costs rise relatively to the costs of less developed areas, which attracts capital flows to those areas (Lewis 1955, p. 345; 1969, p. 28; 1988, pp. 29-30). Moreover, there is the "alleged disadvantage of the early start" (1955, p. 345), borrowed from Gerschenkron, as well as diseconomies of congestion, ossification of institutions and technologies, etc. (Lewis 1969, p. 28; 1979, p. 216). The successive change of leadership between developed industrial countries provided evidence of a convergence club. On the other hand, the failure of less developed countries, except for Japan, to "force their way into the charmed circle" gave support to the alternative divergence position and to protectionist policies (Lewis 1955, pp. 347-51).

Adam Smith did not join the convergence debate. As Myint (1958) pointed out, there are two distinct links between international trade and growth in the *Wealth of Nations*. The first, better-known, one, discussed by Young (1928) and others, is the effect of trade on the size of the market and, by that, on increasing returns, the division of labor and productivity. From the perspective of the 19<sup>th</sup> century expansion of trade to underdeveloped countries, however, the transfer of labor from the



subsistence economy to mines and plantations, together with an increase in working time, provided a better explanation of the positive effects of trade on income per capita. This is what Myint (*op. cit.*) described as Smith's "vent for surplus" theory, which, instead of the allocative function of Ricardian comparative advantage, stressed the effects of trade on the new demand for the output of surplus resources (land and labor) that would otherwise remain unemployed. Myint's new approach to the significance of classical trade theory for underdeveloped economies was clearly put forward as an alternative to Lewis's (1954) model. Having before (see Myint 1948) discussed in detail Smith's "unproductive labor", Myint now argued that it should not be confused with the modern concept of "disguised unemployment" associated to land shortage in overpopulated countries. Unproductive labor, in Smith's sense, existed as surplus labor not because of shortage of other factors (land and capital), but because isolated subsistence economies could not find market demand to sell its potential surplus output. That was, Myint (1958, p. 328) claimed, the "archetypal form of Smith's 'unproductive labor' locked up in a semi-idle state in the underdeveloped economy isolated from outside economic contacts". Such surplus labor was mobilized not by transfer to the "capitalist" sector (as in Lewis), but by the absorption of peasant units into production for the foreign market.

The opening of trade changes the pre-trade equilibrium and the work-leisure choice. A new equilibrium is established in which peasants work harder and produce a higher output, argued Myint. Lewis's surplus labor concept also implied a larger work effort, but without an increase in the marginal utility of the goods purchased in exchange for compensation for the rising marginal disutility of labor (see Little 1982, pp. 393-92, n. 17). Lewis (1970a, 1978a, 1978b) reacted to Myint's (implicit) criticism by investigating further the dynamics of open tropical economies in a series of books. He acknowledged Myint's "excellent discussion" that the gain from trade in Smith derives from using surplus labor and natural resources, not from switching as classical economists later argued. Nevertheless, from Lewis's viewpoint, the problem remained that the expansion of tropical production did not lead to sustained increase in welfare and real wages. The explanation, Lewis's (1976a, p. 156) claimed, was the low and declining factoral terms of trade due to reduced productivity in food production.

## 5 Classical themes in development economics

### External economies and balanced growth

Lewis's model of development of a dual economy, together with its classical pedigree, continues to draw development economists' attention (see e.g. Gollin 2014). Nevertheless, development economics has since the 1990s become increasingly attracted to models featuring low-level equilibrium traps associated to increasing returns, complementarities and external economies. That argument – built on Rosenstein-Rodan (1943), Nurkse (1953), Scitovski (1954) and others – owes little to Lewis. Indeed, Debraj Ray's (2008) entry on development economics, organized around the notion of coordination failures, does not even refer to Lewis.<sup>21</sup> In a similar vein, Paul Krugman (1992) excluded Lewis from what he labeled the “high development theory” of the 1940s and 1950s, which also comprised, beyond the authors mentioned above, Hirschman (1958). Krugman (1993, pp. 22-23) acknowledged that Lewis (1954) was the “most famous paper in the literature of development economics”, but found it hard to see exactly why. Krugman's suggested explanation was that, by leaving external economies and multiple equilibria out of the picture, Lewis, unlike Rosenstein-Rodan and others, was able to put forward a *model* of economic development, which led to further modeling, mostly along neoclassical lines distinct from Lewis's original formulation (on the debates provoked by Lewis's model and attempts to formalize it see Vines & Zeitlin 2008 and Sunna 2016, as well as Lewis's [1972] critical reaction).

Lewis's modeling style, as Bhagwati (1982, p. 22) pointed out, was more in the nature of a flexible “grand design” than a modern theoretical piece (see also Little 1982, pp. 90-91). Agarwala and Singh (1958, p. 4), who reprinted Lewis (1954) together with Singer (1952) and two other papers by Chenery and Bronfenbrenner in section 6 (titled “models of development”) of their collection, remarked “we hope we are correct in calling Lewis's paper a model”, which “deserves special attention because it is written in the classical tradition” dear to economic thought in India. Lewis's (1954) closed and open growth models elaborated and modified classical

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<sup>21</sup> Neither did Ray (1998) refer to Lewis in his core chapter 5 about development theory. But he did discuss Lewis's dual model in some detail in chapter 10 on “rural and urban”.

theory in order to explain the long-run behavior of savings and the international terms of trade. Rosenstein-Rodan (1943) and Nurkse (1953) built on Young's (1928) criticism that Smith's famous thesis – that “the division of labor is limited by the extent of the market” – omitted the reciprocal influence of the size of the market on the division of labor (i.e., on the use of capital). In Nurkse's (1953, p. 18, n. 1) words, Smith “shunned the circular relation and presented a straightforward linear sequence of causation”. Classical economics did not play a role in Rosenstein-Rodan's and Nurkse's interpretation of underdevelopment as caused by market failures associated to externalities and indivisibilities. Moreover, Nurkse (*ibid*) criticized Smith for discussing the “size of the market” mainly in terms of its geographical area and transport facilities, instead of income per capita – a criticism Nurkse (p. 19) extended to a quotation of Smith's phrase by the United Nations 1951 report prepared by a team led by Lewis and T. Schultz (United Nations 1951, p. 23).

The balanced vs. unbalanced growth controversy attracted much attention from early development economists (see Alacevich 2011). Lewis did not actively participate in the debate, although he did put forward an argument for proportional growth of different sectors (e.g. agriculture and industry in a closed economy; see Lewis 1955, pp. 277-80), called “balance in supply” by Hirschman (1958, pp. 51 and 62) in contrast with “balance in demand” argued by Rosenstein-Rodan and Nurkse. According to Hirschman (p. 63), classical economists did not worry about sectoral disequilibria, since they relied on prices signals to correct them. Lewis's case for balanced growth, suggested Hirschman, was based on the view that market forces are not efficient enough to restore equilibrium. Indeed, Lewis (and Latin American structuralists) argued as much in his discussion of low supply elasticity and market failure in agriculture (Lewis 1949b, pp. 123-24). Reacting to Hirschman's criticism, Lewis (1966b, p. 488) maintained that the choice between the anti-balanced growth view – which argued that the opportunity for response to challenges is the heart of the growth process – and the balanced growth position – with its emphasis that challenges without response lead to failure – depended on specific circumstances. To argue about which one was more correct seemed “rather childish” in his view (*ibid*).<sup>22</sup>

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<sup>22</sup> The broad disagreements between Lewis and Hirschman on development theory and policy reflected on their uneasy personal relationship, especially when they found themselves together in Princeton in the 1970s and 1980s (Adelman 2013, p. 543). The fact that Lewis was awarded the Nobel Prize for his contributions to development

Krugman (1993, p. 22) has suggested that Lewis was “fairly innocent of the whole idea of external economies”, which supposedly explained why he remained out of the so-called “high development economics” circle. Lewis (1949a, 1949b), however, mentioned external economies and increasing returns often from the beginning. True enough, he remained skeptical of the central role they played in the theory and policy of economic development. As stated in his Richard T. Ely Lecture,

Development theory makes a great deal out of external economies, whether in explaining the low level of investment, or assessing the advantages of geographical concentration, or tracing the history of growth through linkages, or making the case for the government as a promoter of interdependent investments. The analysis has been influential, though factual evidence remains scarce. (Lewis 1965, p. 5)

### **Lewis vs. Nurkse on the classical heritage**

Whereas Lewis’s classical approach to growth focused on the saving constraint and the generation of an economic surplus, Rosenstein-Rodan and Nurkse stressed instead the determinants of the demand for investment (see Nurkse 1953, chapter 1 on the “inducement to invest”).<sup>23</sup> There was a fundamental symmetry, as Nurkse ([1957] 2009) made clear. His argument for balanced growth was primarily relevant to the problem of the demand for capital, taking for granted that the increased supply of capital was forthcoming. Accordingly, Nurkse (*ibid*, p. 336) described balanced growth as an “exercise in economic development with unlimited supplies of capital, analogous to Professor Lewis’s celebrated exercise in development with unlimited supplies of labor”. From Lewis’s perspective, Rosenstein-Rodan and Nurkse’s

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economics (together with T. Schultz) did not help, as it closed the door to Hirschman’s chances at the prize (*ibid*). The same was true of Raul Prebisch’s reaction to Lewis’s Nobel award (Dosman 2008, p. 486). Prebisch had been frustrated before by the publication of Lewis (1954) model of the terms of trade, which gave Lewis priority in modeling a central aspect of what Prebisch called the dual “center-periphery” system (Dosman, p. 322). See also Furtado’s feelings of excitement and frustration on the publication of Lewis (1954), conveyed in his 1955 letter to Noyola reproduced in Boianovsky (2010, p. 252). Lewis (1978a, p. 16) would refer positively to Prebisch’s division of the international economy into the industrial “center” and the largely agricultural “periphery”.

<sup>23</sup> Hirschman (1958, pp. 38-39) as well, for different reasons, emphasized the investment demand side (called “ability to invest”), instead of saving supply.

balanced growth doctrine was closer to Keynesian than to classical economics. Lewis (1966a, p. 30) saw Rosenstein-Rodan's (1943) argument for the balanced planning of industrial growth, illustrated by his famous example of the shoe factory, as an aspect of the "general proposition that if labor and capital are unemployed, an increase in the monetary circulation will increase real output". Lewis shared with Rosenstein-Rodan and Nurkse the assumption of unemployed labor, but not abundant supply of capital.

Nurkse (1953, chapter 2) did take into account capital supply and saving, outside his balanced growth scheme. Again, his views of the saving process differed from Lewis's. According to Nurkse (1953, pp. 37-38), disguised rural unemployment contained a "hidden source of saving", so that, against classical economics, capital accumulation could proceed without requiring a reduction in consumption. "Unproductive surplus laborers" (with zero marginal productivity) in peasant agriculture are sustained by those with a positive productivity, who produce more than they consume. If those rural redundant laborers moved to work on capital projects, Nurkse argued, and continued to be fed by productive workers, the latter's virtual (and abortive) saving would become effective saving – "unproductive consumption" of surplus rural workers would turn into "productive consumption" (see also Little 1982, p. 88). Nurkse (1953) is a slightly revised version of his lectures delivered in Rio a couple of years before. In the lectures, Nurkse (1951, p. 89, n. 1) referred critically to a passage about surplus labor and capital accumulation in the United Nations' (1951, p. 43) report drafted by Lewis and Schultz, which, in his view, overlooked the existence of "hidden saving" as a source of capital formation.

Lewis (1958, pp. 5-6; 1984a, pp. 134-35; 1988, p. 32) rejected Nurkse's concept of "concealed rural saving" in labor surplus economies. From Lewis's (1958, pp. 4-5) perspective, this ignored the classical analysis of accumulation via the consumption of wage goods. Even in the presence of surplus labor, employing more workers on investment projects implies reducing consumption somewhere, if the output of wage goods is given. The employer must find a fund of "saving" to pay wages and finance the increased capital formation.

Surplus labor can be converted to saving when the labor is willing to work without pay; but if it is not, then extra food and other consumer goods must be mobilized for the villagers along with extra pay. So the program absorbs savings instead of generating savings. One can state this in terms of Smith's formula: unproductive workers are being converted into productive ones, but

nothing is gained by doing this, beyond recognizing that the need for savings is a further constraint upon growth even when using surplus labor. (Lewis 1988, p. 32)

Of course, that was one of the central points of Lewis's 1954 classical model.

### **Finis: Marx, imperialism and distribution**

Lewis's criticism of "hidden saving" was also relevant for his assessment of the 1950s debates among development planners in the USSR, India and other countries about whether one should focus on producing capital goods first and consumer goods second, or the reverse, in order to accelerate the growth rate. From the point of view of Lewis's model, the production of capital goods can only increase if consumption is reduced or the output of wage goods (particularly food) increases. "It is not odd", asked Lewis (1958, pp. 7-8), "that it is the Marxist policy makers, presumably bred in the classical tradition, who have most often neglected this proposition?" Lewis probably had in mind the period of growth acceleration in the USSR between 1929 and 1939, when the rate of investment increased from 5 to 20% under the first 5 Year Plan. Soviet planning was partly based on growth models designed in the late 1920s by A.G. Fel'dman, who built on Marx's reproduction schemes. Like Lewis, Fel'dman had assumed perfectly elastic labor supply. However, unlike Lewis's (or von Neumann's), Fel'dman's was an "open model", in the sense that the role of consumption goods is only as final demand, not as an input in the form of wage goods that affect labor supply and production as in "closed models" (see Findlay 1966, pp. 70-71).

Lewis had a deep interest on the Soviet industrial revolution of the 1930s, which partly overlapped with his period as a student at the LSE. His model was supposed to illuminate as well that historical episode (including issues such as forced collectivization of agriculture and inflation), with the government acting as a "state-capitalist" (Lewis 1954, pp. 160, 162-63; 1955, p. 231). The Russian 5 Year Plan and its surrounding debates represented, in Lewis's (1971, p. 3) view, the first ever systematic discussion of sustained growth as a goal of economic policy. Although the idea of unlimited economic progress emerged in the 18<sup>th</sup> century philosophy, classical

economists were mostly interested in how the economy developed up to a limit. J.S. Mill's pleasant stationary state and Marx's "socialist utopia" were not far apart (ibid).

Lewis's model of an expanding capitalist (or "modern") sector is sometimes regarded as part of the same "modernization" paradigm elaborated in the context of the cold war by W.W. Rostow's (1960) influential *Non-communist manifesto* (see Hunt 1989, chapter 4).<sup>24</sup> Although they shared some common elements, Lewis attempted to integrate Marx as part of his own research program, instead of presenting it as an alternative. A native from a small Caribbean island that belonged to the British Empire, the key feature of the international political system for Lewis was imperialism, not the cold war. "My interest in [development economics] was an off-shot of my anti-imperialism", wrote Lewis (1986, p. 12; see also Mine 2006). Traces of Lewis's anti-imperialism may be detected in his 1954 article (see e.g. Lewis 1954, pp. 149-50 on plantations, imperialism and Marx's "primitive accumulation").

Imperialism was an important element of Paul Baran's Marxian text on development economics, which, like Lewis (1954), deployed the notion of economic surplus and its allocation as a core idea (Baran 1957, chapter 2; 1953). However, Baran's (1957, chapter 6) analytical interpretation of growth and underdevelopment owed more to classical economics than to Marx.<sup>25</sup> Moreover – as economic duality persisted in underdeveloped countries despite their positive rates of growth, against the implications of the Lewis model – Marx's thesis that capitalism created its own labor force (through labor-saving innovations and destruction of pre-capitalists production forms) seemed increasingly persuasive to Lewis (1965, p. 14; 1972, pp. 84-85; 1976b, p. 28; 1979, p. 221).

In 1983 Lewis delivered the Presidential Address to the American Economic Association, on the "state of development theory" (Lewis 1984b). Classical economics were not as prominent this time as they were in Lewis's call for a new approach to development three decades before. Moreover, the output of development economists was smaller if compared to the period of intense "theoretical innovations and controversies" of the 1950s and 1960s (Lewis 1984b, p. 1). Models of mature economies tended to display convergence to the stationary state, as in Adam Smith's

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<sup>24</sup> Rostow (1960) referred to Lewis's (1954) model and to Smith ([1776] 1976, II.iii) in support of his view that the "take-off" into sustained growth involved an increase of the saving ratio to around 12% and a shift in income distribution.

<sup>25</sup> Marxian economists (e.g. Jones 1994) have considered Lewis's (1954) concept of economic surplus closer to Marx than Baran's (1953) formulation.

“full complement of riches”, which Lewis found “unfortunate”. The search for “the” engine of growth was elusive, as there was no single growth theory, but a set of complementary ones. As summed up by Lewis (ibid, p. 7), the Physiocrats found the driver of growth in agriculture, the mercantilists in trade surplus, classical economists in free market, Marxists in capital, neoclassical economists in entrepreneurship, the Chicago School in education, etc. Writing long before neo-institutional economics à la Douglass North became influential in development economics, Lewis (1955, p. 19) had stated that Smith led a long line of liberal economist who argued that economic growth depended primarily on the “right institutional framework” – in the sense that technical progress, capital accumulation etc. are all “instinctive human reactions, inhibited only by faulty institutions”. Lewis did not deny the relevance of institutions, but from his perspective, if there was a core to development economics, it was the “theory of distribution, since this is going to provide incentives and saving” (Lewis 1984b, p. 8). That was exactly what drew his attention to classical economics from the very beginning.

## References

- Adelman, J. 2013. *Worldly philosopher – the odyssey of Albert O. Hirschman*. Princeton: Princeton University Press.
- Agarwala, A. and S. Singh (eds.). 1958. *The Economics of Underdevelopment*. London: Oxford University Press.
- Alacevich, M. 2011. Early development economic debates revisited. *Journal of the History of Economic Thought*. 33: 145-71.
- Avila, M. 1976. Smith and underdeveloped nations. *Review of Social Economy*. 34: 345-58.
- Baran, P. 1953. Economic progress and economic surplus. *Science and Society*. 17: 289-317.
- Baran, P. 1957. *The political economy of growth*. New York: Monthly Review.
- Barber, W.J. 1967. *A history of economic thought*. Harmondsworth: Penguin.
- Barber, W.J. 1994. British classical economists and underdevelopment in India. In *From classical economics to development economics*, ed. by G. Meier, pp. 51-67. London: St. Martin.



Bauer, P. 1956. Lewis' *Theory of economic growth*. *American Economic Review*. 46: 632-41.

Baumol, W. 1951. *Economic dynamics – an introduction*. New York: Macmillan.

Baumol, W. 2000. Review of D. Besomi's *The making of Harrod's dynamics*. *History of Political Economy*. 32: 1037-39.

Bhagwati, J. 1982. W. Arthur Lewis: an appreciation. In M. Gersovitz et al (eds.), pp. 15-28.

Bladen, V.W. 1960. Adam Smith on productive and unproductive labor: a theory of full development. *Canadian Journal of Economic and Political Science*. 26: 625-30.

Bladen, V.W. 1974. *From Adam Smith to Maynard Keynes: the heritage of political economy*. Toronto: University of Toronto Press.

Blaug, M. 1997. *Economic theory in retrospect*, 5<sup>th</sup> ed. Cambridge: Cambridge University Press.

Boianovsky, M. 2010. A view from the tropics: Celso Furtado and the theory of economic development in the 1950s. *History of Political Economy*. 42: 221-66.

Boianovsky, M. 2013a. Humboldt and the economists on natural resources, institutions and underdevelopment (1752 to 1859). *European Journal of the History of Economic Thought*. 20: 58-88.

Boianovsky, M. 2013ab. Friedrich List and the economic fate of tropical countries. *History of Political Economy*. 45: 647-91.

Boianovsky, M. 2015. Beyond capital fundamentalism: Harrod, Domar and the history of development economics. *SSRN Working Paper*.

Boianovsky, M. 2017. Modeling economic growth: Domar on moving equilibrium. *History of Political Economy*. 49 (forthcoming).

Boianovsky, M. and K.D. Hoover. 2014. In the Kingdom of Solovia: the rise of growth economics at MIT, 1956-70. In *MIT and the transformation of American economics*, ed. by E.R. Weintraub. Durham (NC): Duke University Press. Annual supplement to *History of Political Economy*, 46: 198-28.

Boulding, K. 1945. The concept of economic surplus. *American Economic Review*. 35: 851-69.

Brewer, A. 2011. The concept of an agricultural surplus, from Petty to Smith. *Journal of the History of Economic Thought*. 33: 487-505.

Cairncross, A. K. 1956. Review of Lewis (1955). *Economic Journal*. 66: 694-97.

Cannan, E. [1898] 1917. *A history of the theories of production and distribution in English political economy from 1776 to 1848*. London: P.S. King & Son.

Chernery, H. and T. Srinivasan (eds.). 1988. *Handbook of development economics*, vol. I. Amsterdam: Elsevier.

Dasgupta, A.K. 1954. Keynesian economics and underdeveloped countries. *Economic Weekly*. Jan 26: 100-105.

Dobb, M. 1973. *Theories of value and distribution since Adam Smith*. Cambridge: Cambridge University Press.

Dosman, E.J. 2008. *The life and times of Raúl Prebisch 1901-1986*. Montreal: McGill-Queen's University Press.

Dutt, A.K. 1990. Sectoral balance in development: a survey. *World Development*. 18: 915-30.

Domar, E. 1953. Further comment. *Quarterly Journal of Economics*. 67: 559-63.

Elmslie, B. 1995. The convergence debate between David Hume and Josiah Tucker. *Journal of Economic Perspectives*. 9: 2017-16.

Emmanuel, A. [1969] 1972. *Unequal exchange – a study of the imperialism of trade*. Translated by B. Pearce. New York: Monthly Review.

Figueroa, M. 2004. W. Arthur Lewis versus the Lewis model: agricultural or industrial development? *Manchester School*. 72: 736-50.

Findlay, R. 1966. Optimal investment allocation between consumer goods and capital goods. *Economic Journal*. 76: 70-83.

Findlay, R. 1982. On W. Arthur Lewis's contributions to economics. In M. Gersovitz et al (eds.), pp. 1-14.

Furtado, C. 1954. La teoría del desarrollo en la evolución de la ciencia económica. *Trimestre Económico*. 21: 241-64.

Georgescu-Roegen, N. 1960. Economic theory and agrarian economics. *Oxford Economic Papers*. 12: 1-40.

Gersovitz, M., C. Diaz-Alejandro, G. Ranis and M. Rosensweig (eds.). *The theory and experience of economic development – essays in honor of Sir W. Arthur Lewis*. London: Allen & Unwin.

Gollin, D. 2014. The Lewis model – a 60-year retrospective. *Journal of Economic Perspective*. 28: 71-88.

- Goodwin, C. 2008. History of economic thought. In *The New Palgrave Dictionary of Economics*, 2<sup>nd</sup> edition, ed. by S. Durlauf and L. Blume, vol. 4, pp. 48-57. London: Palgrave Macmillan.
- Grabowski, R. and M. Shields. 1989. Lewis and Ricardo: a reinterpretation. *World Development*. 17: 193-97.
- Haavelmo, T. 1954. *A study in the theory of economic evolution*. Amsterdam: North-Holland.
- Harrod, R.F. 1948. *Towards a dynamic economics*. London: Macmillan.
- Hicks, J. 1965. *Capital and growth*. New York: Oxford University Press.
- Hirschman, A.O. 1958. *The strategy of economic development*. New Haven: Yale University Press.
- Hirschman, A.O. 1982. The rise and decline of development economics. In M. Gersovitz et al (eds.), pp. 372-90.
- Howson, S. 2011. *Lionel Robbins*. Cambridge: Cambridge University Press.
- Ingham, B. and P. Mosley. 2013. *Sir Arthur Lewis – a biography*. London: Palgrave Macmillan.
- Jones, R. 1831. *An essay on the distribution of wealth and on the sources of taxation*. London: John Murray.
- Jones, V. 1994. Surplus in Lewis's theory of development. *Review of Radical Political Economics*. 26: 76-98.
- Jorgenson, D.W. 1967. Surplus agricultural labor and the development of a dual economy. *Oxford Economic Papers*. 19: 288-312.
- Kaldor, N. [1954] 1960. Characteristics of economic development. In Kaldor (1960), pp. 233-42.
- Kaldor, N. 1955-56. Alternative theories of distribution. *Review of Economic Studies*. 23: 83-100.
- Kaldor, N. 1960. *Essays on economic stability and growth*. London: Duckworth.
- Kaldor, N. 1961. Capital accumulation and economic growth. In *The Theory of Capital*, ed. by F. Lutz and D. Hague, pp. 177-222. London: Macmillan.
- Kaldor, N. 1967. *Strategic factors in economic development*. Ithaca: New York State School of Industrial and Labor Relations.
- Kindleberger, C.P. 1967. *Europe's postwar growth: the role of labor supply*. Cambridge (Mass.): Harvard University Press.

Kindleberger, C.P. 1988. W. Arthur Lewis Lecture: The Lewis model of “economic growth with unlimited supplies of labor”. *Review of Black Political Economy*. 16: 15-24.

Kriesler, P. 2013. Post-Keynesian perspectives on economic development and growth. In *The Oxford Handbook of Post-Keynesian Economics*, pp. 539-55, ed. by G.C. Harcourt and P. Kriesler. Oxford: Oxford University Press.

Krugman, P. 1993. Toward a counter-revolution in development theory. *Proceedings of the World Bank annual conference on development economics 1992*, pp. 15-38. Supplement to the *World Bank Economic Review*. Washington, DC: World Bank.

Kuznets, S. 1955. Economic growth and income inequality. *American Economic Review*. 45: 1-28.

Leibenstein, H. 1954. *A theory of economic-demographic development*. Princeton: Princeton University Press.

Lewis, W. A. 1949a. *Overhead costs – some essays in economic analysis*. London: Allen & Unwin.

Lewis, W.A. 1949b. *The principles of economic planning*. London: Dennis Dobson and Allen & Unwin.

Lewis, W.A. 1949c. *Economic survey 1919-1939*. London: Allen & Unwin.

Lewis, W. A. 1954. Economic development with unlimited supplies of labor. *Manchester School*. 22: 139-91.

Lewis, W. A. 1955. *The theory of economic growth*. London: Allen & Unwin.

Lewis, W. A. 1958. Unlimited labor: further notes. *Manchester School*. 26: 1-32.

Lewis, W.A. 1965. A review of economic development. *American Economic Review*. 55: 1-16.

Lewis, W.A. 1966a. *Development planning*. New York: Harper & Row.

Lewis, W.A. 1966b. Economic development and world trade. In *Problems in economic development*, ed. by E.A.G. Robinson, pp. 483-96. London: Macmillan.

Lewis, W. A. 1969. *Aspects of tropical trade 1883-1965 – Wicksell Lectures 1969*. Stockholm: Almqvist & Wiksell.

Lewis, W. A. (ed). 1970a. *Tropical development 1880-1913 – studies in economic progress*. London: Allen & Unwin.

Lewis, W.A. 1970b. The export stimulus. In Lewis (1970a) (ed.), pp. 13-45.

- Lewis, W.A. 1971. Socialism and economic growth. Lecture delivered at the LSE.
- Lewis, W. A. 1972. Reflections on unlimited labor. In *International economics and development: essays in honor of Raúl Prebisch*, ed. by L. Di Marco, pp. 75-96. New York: Academic Press.
- Lewis, W. A. 1976a. The diffusion of development. In *The market and the state – essays in honor of Adam Smith*, ed. by T. Wilson and A. Skinner, pp. 135-56. Oxford: Oxford University Press.
- Lewis, W.A. 1976b. Development and distribution. In *Employment, income, distribution and development strategy – essays in honor of H.W. Singer*, ed. by A. Cairncross and M Puri, pp. 26-42. London: Macmillan.
- Lewis, W. A. 1978a. *Growth and fluctuations 1870-1913*. London: Allen & Unwin.
- Lewis, W. A. 1978b. *The evolution of the international economic order*. Princeton: Princeton University Press.
- Lewis, W. A. 1980. Auto-biographical note. *Social and Economic Studies*. 29: 1-4.
- Lewis, W. A. 1984a. Development economics in the 1950s. In *Pioneers in development*, ed. by G. Meier and D. Seers, pp. 121-37. New York: Oxford University Press for the World Bank.
- Lewis, W.A. 1984b. The state of development theory. *American Economic Review*. 74: 1-10.
- Lewis, W. A. 1986. W. Arthur Lewis. In *Lives of the laureates – seven Nobel economists*, ed. by W. Breit and R. Spencer, pp. 1-19.
- Lewis, W. A. 1988. The roots of development theory. in H. Chenery and T. Srinivasan (eds.), pp. 27-37.
- List, F. [1841] 1885. *The national system of political economy*, tr. by S. Lloyd. London: Longmans.
- Little, I. 1982. *Economic development*. New York: Basic Books.
- Love, J.L. 1996. *Crafting the third world – theorizing underdevelopment in Rumania and Brazil*. Stanford: Stanford University Press.
- Low, J.M. 1952. An eighteenth century controversy in the theory of economic progress. *Manchester School*. 20: 311-30.
- Lowe, A. 1954. The classical theory of economic growth. *Social Research*. 21: 111-42.
- Malthus, T.R. 1820. *Principles of political economy*. London: John Murray.

- Marglin, S. 1984. *Growth, distribution, and prices*. Cambridge (Mass.): Harvard University Press.
- Marx, K. [1867] 1992. *Capital*, vol. I. Translated by D. Fernbach. London: Penguin.
- Meek, R. 1951. Physiocracy and classicism in Britain. *Economic Journal*. 61: 26-47.
- Mill, J.S. [1848] 1909. *Principles of political economy*. Ed. by W.J. Ashley. London: Longmans.
- Mine, Y. 2006. The political element in the works of W. Arthur Lewis: the 1954 Lewis model and African development. *Developing Economies*. 44: 329-55.
- Myint, H. 1948. *Theories of welfare economics*. Cambridge (Mass.): Harvard University Press.
- Myint, H. 1958. The ‘classical theory’ of international trade and the underdeveloped countries. *Economic Journal*. 68: 317-37.
- Neumann, J. v. 1945-46. A model of general economic equilibrium. *Review of Economic Studies*. 13: 1-9.
- Noyola, J. 1956. La evolución del pensamiento económico en el ultimo cuarto de siglo y sua influencia en la América Latina. *Trimestre Económico*. 23: 269-83.
- Nurkse, R. 1951. Seis conferências do Professor Ragnar Nurkse [Six lectures by Professor Ragnar Nurkse]. *Revista Brasileira de Economia*. 5: 9-187.
- Nurkse, R. 1953. *Problems of capital formation in underdeveloped countries*. Oxford: Basil Blackwell.
- Nurkse, R. [1957] 2009. Balanced and unbalanced growth. In *Ragnar Nurkse: trade and development*, ed. by R. Kattel, J. Kregel and E. Reinert, pp. 329-57. London: Anthem Press.
- Pasinetti, L. 2000. Critique of the neoclassical theory of growth and distribution. *Banca Nazionale del Lavoro Quarterly Review*. 53: 383-431.
- Patnaik, P. 2006. The Lewis model. In *The Elgar companion to development studies*, ed. by D. Clark, pp. 337-41. Cheltenham: Elgar.
- Perrotta, C. 2016. The brilliant fifties: international trade as a cause of underdevelopment. In Sunna and Gualerzi (eds.), pp. 51-70.
- Pitchford, J. 2002. Trevor Swan’s 1956 economic growth “seminar” and notes on growth. *Economic Record*. 78: 381-87.
- Prendergast, R. 2010. Accumulation of knowledge and accumulation of capital in early “theories” of growth and development. *Cambridge Journal of Economics*. 34: 413-31.

- Ranis, G. and J. Fei. 1961. A theory of economic development. *American Economic Review*. 51: 533-65.
- Ranis, G. and J. Fei. 1966. Agrarianism, dualism and economic development. In *The theory and design of economic development*, ed. by I. Adelman and E. Thorbecke, pp. 3-40. Baltimore: Johns Hopkins Press.
- Ranis, G. and J. Fei. 1982. Lewis and the classicists. In M. Gersovitz et al (eds.), pp. 31-42.
- Ray, D. 1998. *Development economics*. Princeton: Princeton University Press.
- Ray, D. 2008. Development economics. In *The New Palgrave Dictionary of Economics*, 2<sup>nd</sup> edition, ed. by S. Durlauf and L. Blume. London: Palgrave Macmillan. Online.
- Ricardo, D. [1821] 1951. *On the principles of political economy and taxation*, ed. by P. Sraffa. Cambridge: Cambridge University Press.
- Robbins, L. [1932] 1935. *An essay on the nature and significance of economic science*, 2<sup>nd</sup> ed. London: Macmillan.
- Robbins, L. 1952. *The theory of economic policy in English classical political economy*. London: Macmillan.
- Robbins, L. 1968. *The theory of economic development in the history of economic thought*. London: Macmillan.
- Robbins, L. 1998. *A history of economic thought – the LSE lectures*, ed. by S. Medema and W. Samuels. Princeton: Princeton University Press.
- Ros, J. 2001. *Development theory and the economics of growth*. Ann Arbor: University of Michigan Press.
- Rosenstein-Rodan, P. 1943. Problems of industrialization of Eastern and South-Eastern Europe. *Economic Journal*. 53: 202-11.
- Rostow, W.W. 1960. *The stages of economic growth: a non-communist manifesto*. Cambridge: Cambridge University Press.
- Schumpeter, J.A. 1954. *History of economic analysis*. New York: Oxford University Press.
- Scitovsky, T. 1954. Two concepts of external economies. *Journal of Political Economy*. 62: 143-51.
- Scitovsky, T. 1957. Progress in the theory of economic progress. *World Politics*. 9: 254-59.

Singer, H. W. [1952] 1958. The mechanics of economic development: a quantitative model approach. In Agarwala and Singh (eds), pp. 381-99. Originally published in *Indian Economic Review* 2: 1-18.

Smith, A. [1776] 1976. *An inquiry into the nature and causes of the wealth of nations*. Ed. by R.H. Campbell and A.S. Skinner. Oxford: Oxford University Press.

Solow, R.M. 1956. A contribution to the theory of economic growth. *Quarterly Journal of Economics*. 70: 65-94.

Solow, R.M. 1957. Review of D. Hamberg's *Economic growth and instability*. *Econometrica*. 25: 612-13.

Solow, R.M. 2005. Interview. In *Modern macroeconomics*, ed. by B. Snowdon and H. Vane, pp. 660-72. Cheltenham: Elgar.

Spiegel, H.W. 1955. Theories of economic development: history and classification. *Journal of the History of Ideas*. 16: 518-39.

Sunna, C. 2016. Dual development models in historical perspective. In Sunna and Gualerzi (eds.), pp. 71-87.

Sunna, C. and D. Gualerzi (eds.). 2016. *Development economics in the twenty-first century*. London: Routledge.

Swan, T. 1956. Economic growth and capital accumulation. *Economic Record*. 32: 334-61.

Taylor, L. and P. Arida. 1988. Long-run income distribution and growth. In H. Chenery and T. Srinivasan (eds.), pp. 161-94.

Thomas, B. 1954. *Migration and economic growth*. Cambridge: Cambridge University Press.

Tignor, R. L. 2006. *W. Arthur Lewis and the birth of development economics*. Princeton: Princeton University Press.

United Nations. 1951. *Measures for the economic development of under-developed countries*. Sales No. 1951.II.B2. New York: UN Department of Economic Affairs.

Vines, D. and A. Zeitlin. 2008. Dual economies. In *The New Palgrave Dictionary of Economics*, 2<sup>nd</sup> edition, ed. by S. Durlauf and L. Blume. London: Palgrave Macmillan. Online.

Wicksell, K. [1901] 1934. *Lectures on political economy*, vol. I. Translated by E. Classen. London: Routledge & Sons.

Williamson, J.G. 2011. *Trade and poverty – when the Third World fell behind*. Cambridge (Mass.): MIT Press.



Young, A. 1928. Increasing returns and economic progress. *Economic Journal*. 38:527-42.

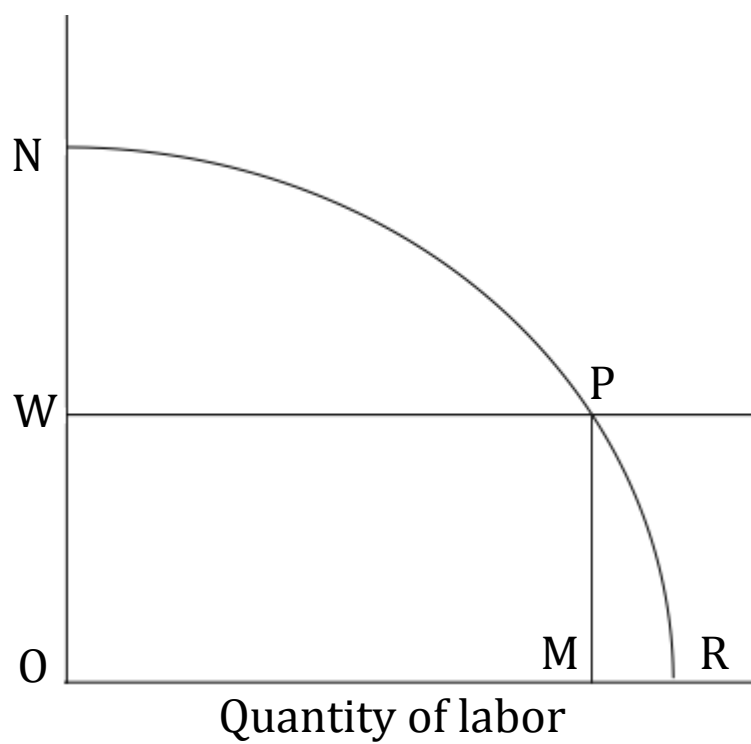


Figure 1: Economic Surplus  
(Source: Lewis 1954, p. 146)

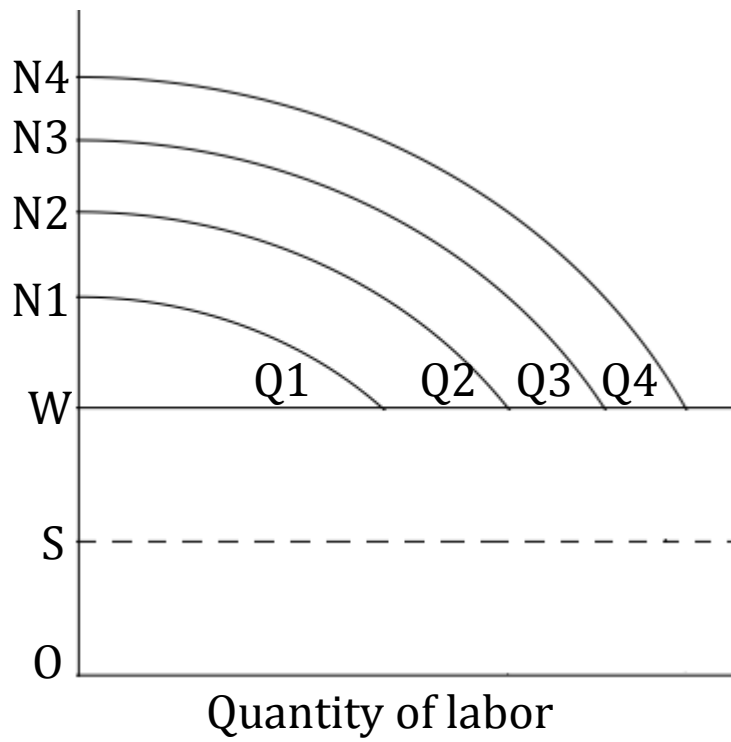


Figure 2: Capital Accumulation  
(Source: Lewis 1954, p. 152)