Sir W. Arthur Lewis

Berhanu Abegaz
The College of William and Mary

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Raised by school-teacher parents in the Caribbean island of St. Lucia and educated in St. Mary's College there—a school that also produced poet Derek Walcott, the other Nobel Laureate of St. Lucia—Lewis began his studies and career at the London School of Economics (LSE). He subsequently held distinguished professorships at the universities of Manchester and Princeton. He also served as a senior economic advisor in West Africa in addition to administrative stints as Vice Chancellor of the University of the West Indies and as founding president of the Caribbean Development Bank. Knighted by Queen Elizabeth in 1963, Arthur Lewis retired in 1983 and died in 1991 at the age of 76 in his summer home in Grenada.

It was in Manchester that he did some of his most significant works in development economics, especially the seminal article `Economic Development with Unlimited Supplies of Labor' (1954) and the treatise, *The Theory of Economic Growth* (1955). Lewis is also known for his work, while at Princeton, on the history of the second industrial revolution and the new international economic order. While *The Theory of Economic Growth* (1955) and *Growth and Fluctuations 1870–1913* (1978) are both regarded as classics, it is the 1954 article that constitutes his most influential single contribution having spawned a large literature on development as structural transformation. Lewis's foundational and pioneering research arguably launched the field of modern development economics. This and a deep knowledge of economic history earned him the ultimate recognition as a Nobel Laureate in Economics in 1979. A gifted scholar and a perceptive public intellectual with the sensibilities of a British Fabian socialist (a view he shared with the likes of Gandhi), he was blessed with the good luck of appearing in an era on the cusp of major world events, including decolonization, the global civil rights movement, centrally planned economies, and the urgency for accelerating economic development felt in the newly independent countries of Africa, Asia, Latin America and the Caribbean.

Lewis is also remembered as an independent-minded trailblazer: the first black man to serve on the faculties of LSE, Manchester, and Princeton; to head the University of the West Indies; and to be awarded the Nobel Prize in a field other than peace and literature. Given his origins in a poor outpost of the British Empire and the blatant institutional racism he had to confront at the intellectual centers of the metropole, his life's journey provides a great inspiration to all who cherish the life of the mind, responsible citizenship, and dream of living in a world free of racial injustice and abject poverty.

Berhanu Abegaz
Department of Economics
College of William and Mary
Williamsburg, VA 23187-8795
bxabeg@wm.edu

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Sir W. Arthur Lewis

A Cosmopolitan Academic and a Public Intellectual

Born and Raised:	January 23, 1915 (in St. Lucia, The Caribbean)
University of London (LSE):	1933-1940: • B.A., Commerce (1937) • Ph.D., Economics (1940) 1939-1947: • Assistant Lecturer (1939) • Reader in Colonial Economics (1946)
University of Manchester:	1948-1958 (Stanley Jevons Professor of Political Economy)
Princeton University:	1963-1983 (Professor of Political Economy)
Public Service:	1957-1958 (U.N. Economic Advisor to Nkrumah's Ghana) 1959-1963 (Vice-Chancellor, University of the West Indies) 1970-1974 (President, The Caribbean Development Bank)
Major Awards:	Knighted by Queen Elizabeth (1963) Nobel Prize in Economics (1979) • Development Economics • Economic History
Retirement:	1983-1991
President:	1983 (American Economic Association)
Family:	Dame Gladys Lewis; two daughters
Died:	June 15, 1991 (buried in St. Lucia)

In this essay, I shall sketch out a portrait of Sir W. Arthur Lewis in three parts. Under "The Man," a brief account of his upbringing, education, and career and community involvement will be provided. This is followed by "The Work," which summarizes his lasting contributions to economics, especially in the studies of economic growth, structural change, and patterns of international trade for tropical economies. The third section, "A Public Intellectual," looks at his involvement in public affairs both as an activist and as a policy advisor to governments and international organizations.

Much of the ground covered here is covered in the sizeable literature on the subject. The biographical sketch and personal reflections on the evolution his thinking draws heavily on Tignor (2006) and Lindbeck (1992). The contributions of Lewis to economic growth and development synthesized below are based largely on the many excellent critical accounts, especially Findlay (1980; 2007), Bhagwati (1982), Ranis (2004), and Becker and Craigie (2007). Interested readers must also consult the original writings of Lewis himself and the large secondary literature they spawned in order to appreciate his place in history as a preeminent economist of the twentieth century. The rather modest contribution of this essay lies in the concise and coherent account it provides concerning the place of Lewis's ideas in the context of his upbringing and the intellectual milieu of his day, and the interconnections among the world that made the man, the significance of his academic contributions, and their impact on thinking about development policy.

I. The Man and the Social Context

1.1. Upbringing in St. Lucia

Education was something that was very much emphasized in the Lewis household—both his parents were teachers. The Lewises put persistent effort in making their children understand how education would be the only way for them to climb the social ladder. Additionally, one of the main reasons that his parents moved to St. Lucia from Antigua was to give their five sons a first-rate English education (Tignor, 2006).

Although racial discrimination was prevalent in St. Lucia during his youth, it was not as prominent as it was in England or in the United States. St. Lucia was a small island that had less poverty or inequality, and smaller chances for social upheaval as compared to places like Jamaica or Trinidad and Tobago. In St. Lucia, Lewis was also a part of an emerging black middle stratum, which was educated, urban and similar to Europeans in tastes, aspirations and opinions.

After the death of his father, Lewis and his siblings were raised by their mother. All his biographical accounts describe the significant role played by his mother in his upbringing. In that regard, Ida Lewis, a deeply religious woman, is credited with encouraging her children to dream big by telling them from early childhood that they were as capable as the privileged white elite of St. Lucia. She inculcated in her sons the values of discipline, responsibility, and respect for other human beings. In the face of a well-entrenched color bar, all her children managed to become very successful in life—one became a psychiatrist, another became a lawyer and later a Supreme Court justice for the Caribbean Islands, and another became an important and a well known bureaucrat.

Given this upbringing, Lewis had a highly developed sense of self-worth. Thus, he was very motivated to succeed academically and intellectually in the larger British world by progressively overcoming the consciousness of racial inferiority that bedeviled young non-Europeans throughout the British Empire. Despite being confronted with racial prejudice throughout his career, an intellectually maturing Lewis believed that rationality, not emotions, was the most effective way to deal with life’s momentous challenges. As a greatly driven and determined individual, he also had a pleasant sense of humor which is evident in his personal letters, photographs, and the accounts of friends and colleagues (Lindbeck, 1992; Tignor, 2006). His students saw him as rather shy, unassuming and generous with a penchant for delivering brilliant lectures that emphasized intuitive understanding of fundamental economic ideas.

1.2. Education

Moving from a small island of St. Lucia to a big metropolis like London was a big transition for Lewis. He started his Bachelors of Commerce coursework at the London School of Economics (LSE) in 1932 as Great Britain was going through the Great Depression. Having been raised in an island with an almost all black population, he understandably felt quite self-conscious about his skin color during his initial years in London. His impressions of deep-seated British racism and imperial arrogance became more vivid following his visits to the less race obsessed France and Denmark (Tignor, 2006).

LSE was a vibrant place for intellectual growth where the young scholar got an opportunity to study and work under several prominent economists—mostly advocates of liberal capitalism. They included such luminaries (many of whom later earned knighthood) as L. Robbins, F. Hayek, A. Plant, P. Rosenstein-Rodan, N. Kaldor and J. Hicks. Being a hard-headed but soft-hearted social democrat, this exposure allowed Lewis to appreciate the role of incentives in shaping economic behavior, the working of prices, and the functioning of free markets. Despite obtaining his first degree with first-class honors in 1937, he was nonetheless barred from employment with the Colonial Office in London as well as *The Economist* magazine on account of none other than his skin color.

1.3. Teacher, Scholar, and Public Servant

Lamenting his deficiencies in mathematics, he nonetheless heeded the good advice of mentors to enroll in the post-graduate program in Economics at LSE on a scholarship. He says that he had no idea in 1933 what economics was, but managed to earn a Ph.D. in Industrial Economics in 1940 (Lindbeck, 1992).

It is interesting to note here that Lewis was allowed initially to teach, but not to advise, students out of concern by the LSE administration as well as the Appointments Committee that he may not be accepted by the university community on account of his race. However, because of his wide-ranging grasp of economics and his unmatched pedagogical skills, he became popular among faculty and students alike. He taught courses in the principles of economics, economic history, industrial economics (the subject of his dissertation), and colonial economics—the last being the predecessor of modern development economics of which he is rightly celebrated as one of the founders. He offered his first course in economics in 1943, and was given the title of Reader in Colonial Economics in 1946.

Lewis himself has the following to say (Lindbeck, 1992: 395) about developments early in his career:

> In 1938, I was given a one-year teaching appointment which was sensational for British universities. This was converted into the usual four-year contract for an Assistant Lecturer in 1939. My foot was now on the ladder, and the rest was up to me. My luck held, and I rose rapidly. In 1948, at 33, I was made a full professor at the University of Manchester.

It is after he went to Manchester that his teaching and research interests moved away from industrial economics to the history of the world economy since 1870 and, eventually, to modern development economics. Here is how Lewis describes the evolution of his intellectual interests (Lindbeck, 1992: 396):

> I got into the history of the world economy because Frederick Hayek, then Acting Chairman of the LSE Department of Economics, suggested that I teach a course on "what happened between the wars" to give concreteness to the massive doses of trade cycle theory which then dominated the curriculum. I replied to Hayek that I did not know what happened between the wars; to which he replied that the best way of learning a subject was to teach it ... Now for development economics. From the middle of the 1930s, I had spent time in the Colonial Office Library reading reports from the colonial territories on agricultural problems, mining, currency questions and the like, and by comparing different territories, had learnt something about the efficacy of different policies. I did some lecturing on this to colonial students at LSE in the 40s, but it was the throng of Asian and African students at Manchester that set me lecturing systematically on development economics from about 1950, following Hayek's rule that the way to learn is to teach.

Lewis was able to focus his scholarship largely on problems of economic growth and development policy in Africa, Asia, and the Caribbean. The political context of decolonization added to his inquisitiveness as well as his classes on colonial and postcolonial economies, his work for the British Colonial Office, and his own personal interest. His enduring perspective, informed by his advisory work and deep knowledge of western economic history, emphasized the need to strengthen weak or failing markets with sensible government planning.

Outside of academia and policy circles, Lewis was well acquainted with the West-Indian immigrant community in London. In the community, he formed friendships with intellectual activists like Eric Williams (scholar and a governor of Trinidad), George Padmore (pan-African activist), and CLR James (West Indian nationalist and Marxist scholar). Despite his friendship with them and his shared belief in the idea of a pan-African movement, he was not attracted to radical politics. He preferred to stress the importance of intellectual discipline, meritocracy, and the humanism and inherent goodness of all human beings. Thus his closest associates were from the League of Coloured Peoples, an organization which provided a social outlet for West Indian communities throughout Britain. He was also the editor of *The Keys*—a journal published by the League.

Robert L. Tignor (2006), a very valuable account of the life and inspiring achievements of Sir W. Arthur Lewis, draws attention to the stoic courage and steely resolution with which he confronted and overcame the racial prejudice which was so virulent even in Western academic circles during his early career. Tignor observes that the effect of these experiences may have made him appear to many as reserved, aloof and prickly. To all who knew him well, he was always kind, courteous and considerate, and with a puckish sense of humor.

II. The Work and the Wider Intellectual Context

It will be useful to remember the particular moment in history during which many of the ideas that animated Lewis emerged. As Findlay and O'Rourke (2008) note, the Great Depression had eroded the faith of the economics profession (as well as governments) in the ability of unfettered markets to maintain stability and to sustain full-employment growth. Keynesianism and development planning resonated quite strongly with the postwar intellectual predisposition in favor of selective state intervention to correct market failures. A successfully industrializing and increasingly self-confident Soviet Union, with an expanded sphere of influence, lent additional support for policy activism in late-industrializing countries. Much to the surprise of the skeptics, post–war recovery was swift for the statist countries which recorded economic gains as significant as those of the high-achieving among the mature capitalist economies.

The retreat from economic globalization entered a new postwar phase the newly independent colonies embraced overly inward-looking strategies. This finally gave way to aggressive liberalization as the global golden age of growth ended with the two oil shocks of the 1970s. The intellectual formation and contributions of Lewis, therefore, reflected the period between the end of the first era of modern globalization in 1914 and the beginning of what is sometimes called the Great Moderation circa 1980.

The early postwar decades were remarkably productive for development as a new sub-field of economics. A number of contemporaries of Lewis produced big ideas that attempted to tether insights from economic anthropology, classical economics, neoclassical economics, and Keynesian economics.

This synthesis produced what came to be known as the (old) structuralist approach to development which highlighted the need for taking full account of underdeveloped markets and dynamic comparative advantage. Rosenstein-Rodan (1943) and Gerschenkron (1962), for example, argued for a big push of coordinated investments to extricate low-income economies from a vicious circle, to realize scale economies and increasing returns, and to generate the requisite demand. Leibenstein (1957) put forward the notion of a "critical minimum effort" as an escape from Nelson's (1956) "low-level equilibrium trap." Nurkse (1953) called for balanced growth of coordinated and mutually supporting activities. Hirschman (1958) countered with a plea for unbalanced growth, maintaining that spreading extremely scarce resources too thinly is neither feasible nor desirable. Well-chosen leading sectors, he argued, should be allowed to emerge to propel the rest of the economy with the help of profitable forward and backward linkages. All parties underscored the need for economic diversification, mainly via robust industrialization, to escape secularly declining terms of trade against primary exports though not as pessimistic as Singer (1950) and Prebisch (1962).

It is fair to say that recent research in development economics has done more to formalize and tame the excesses of these canonical ideas than to add to them. Lewisian structuralism, which sequentially links the idea of qualitative differences between the developing and the developed with the centrality of incentives in both, has for example been re-baptized by a World Bank's Chief Economist as 'new structural economics' which seeks to identify the conditions under which conforming with existing comparative advantage is better than defying it (Lin, 2012).

2.1. Bridging Classical Economics and Neoclassical Economics

Lewis's early work focused on the application of price theory to problems of industrial organization and public utilities, all of which were compiled in the volume, *Overhead Costs* (1949). Another significant book, *Economic Survey 1919-1939 (1949),* was a history of the world economy in the interwar period where Lewis managed to creatively link together the experiences of the `core' industrial countries with those of the primary exporting `periphery.' Findlay (2008: ??) notes that the "pessimism about the possibility of international trade to serve as a sustained `engine of growth' for the developing countries, that has marked his subsequent writings on development economics down to his Nobel Prize Lecture … can perhaps be traced to his study of the inter-war period."

Lewis's most influential contribution to economics, as intimated above, revolves around his 1954 seminal paper on development with unlimited supplies of labor. The central idea of this paper provided one way for deepening the insights generated by the one-sector growth models (such as Harrod-Domar and then Solow) popular at that time. In these models, the central preoccupation is finding full-capacity utilization at the steady state for a mature market economy.

Lewis instead provided a nifty way of introducing the disequilibriating nature of capacity-stretching structural change that is triggered by a simple intersectoral reallocation of underutilized resources such as labor. This way, he incorporated the most salient features of semi-industrial economies, including the fact that they contain several distinct economic systems—capitalist as well as pre-capitalist or non-capitalist. In the more recent economics literature, the importance of interlinkages in production and consumption has been incorporated into multisectoral general equilibrium models and empirical analyses of structural convergence in production, trade, and consumption between leaders and followers.

The idea of surplus labor has its genesis, according to Lewis, in two questions that could not be satisfactorily answered using neoclassical models of production and trade: the determination of the relative prices of commodities such as steel and coffee, and the constancy of real wages during the early phases of industrialization. As Lewis recollects the moment of revelation (Lindbeck, 1992: 397):

> One day in August, 1952, walking down the road in Bangkok, it came to me suddenly that both problems have the same solution. Throw away the neoclassical assumption that the quantity of labor is fixed. An "unlimited supply of labor" will keep wages down, producing cheap coffee in the first case and high profits in the second case. The result is a dual (national or world) economy, where one part is a reservoir of cheap labour for the other. The unlimited supply of labour derives ultimately from population pressure, so it is a phase in the demographic cycle ... The publication of my article on this subject in 1954 was greeted equally with applause and with cries of outrage.

I will now sketch out the main features of the Lewis model and its extensions. This will give the reader a flavor for the great insights generated by a simple economic model which honors the dictum of Occam's Razor. Let us begin by pointing out that the notion of dualism simplifies a more complex landscape of economic segmentation that characterizes marketizing economies. Forms of dualism where non-clearing markets are ubiquitous might include: product market dualism signaled by excessive price differentials across regions; labor market dualism signaled by large wage differentials across comparable skills or demographic groups; and capital market dualism indicated by unjustifiable (in terms of risk premia or transaction costs) interest-rate differentials among borrowers or lenders; and even public sector dualism which shows up as unduly large differences in service provision across localities.

The root of persistent dualism has long been a subject of much debate among the various schools of thought in economics. For example, neoclassical theorists (such as Harris-Todaro) invoke downwardly rigid urban wages to explain the process of excessive urban-bound internal migration. Classical economists invoke the immobility of land or capital to explain the existence of dualism and how unfettered intersectoral labor mobility will eventually end dualism (as we will see in the Lewis-Ranis-Fei models). Keynesians invoke non-clearing factor markets and product markets to explain persistently high unemployment. North-South models of unequal trading relationships, labor is assumed to be immobile while capital is mobile. Neo-Marxist theorists conceptualize the dynamics of capitalist penetration of a colonial economy as involving three sequential phases—pure trading relationships, trading relationships with some capitalist production relations (in modern mining, plantation, and export processing zones), and eventual economy-wide capitalist penetration in the production and commercial spheres thus bringing dualism to an end.

Economic inefficiency that emanates from excessive segmentation may also assume various forms, including unproductive activities, idle resources, and misallocation of resources across sectors or firms. In the development economics of the prescient decades of the 1950s and the 1960s, two big ideas ruled regarding how to boost allocative and technical efficiency: (1) judicious government intervention to discover new markets and to correct market failures where they exist, and (2) temporary and conditional state support for promising infant industries to give them a chance to develop the capability to compete globally.

The specific question Lewis liked to ponder was rather simple, at least in hindsight: how could a capital-poor country with an underutilized labor force kick-start a growth process that would eventually lead to a structural transformation, i.e., a robust industrialization drive? Given the large reservoir of unemployed and underemployed labor, the answer is seductively simple and direct--by mobilizing and reallocating surplus labor toward the more productive and primarily urban-based activities. The challenge, of course, is to explain the process by which such factor reallocation-driven growth takes place in an 'infant' market economy.

2.1.1. The Basic Lewis Model of Development with "Unlimited Supplies of Labor"

Lewis shared the dominant view of his day that the accumulation of physical capital is the primary constraint on productivity-driven growth. A key feature of the Lewis model is the presence of some barriers that prevent, or slow down, the allocation of low-productivity workers away from the subsistence or traditional service sectors to the more dynamic commercial or industrial sectors. In other words, in the absence of a Rostovian leading sector to propel the rest as an engine, the Malthusian trap cannot be easily escaped.

I will outline briefly the assumptions, dynamics and conclusions of this partial equilibrium model. Though rendered variously in the literature, the following key presumptions about the relationship between developed and developing economies underlie the thinking of Lewis. The first is that underdeveloped countries can draw on an ever-increasing stock of standardized technologies (aka of-the-shelf blueprints) to facilitate catching up with leaders (positive externalities as *advantages of backwardness).* The second is that the marginal productivity of capital is higher in underdeveloped countries because of its scarcity relative to labor *(diminishing* *marginal returns*)—a fact that should generate net inflows of capital to developing economies (but usually does not, hence the Lucas Paradox). The third assumption is that gross underemployment provides an opportunity to bring low-wage labor and new capital together to produce more profitable, labor-intensive tradables *(comparative advantage).*

In the basic version of the Lewis model of intersectoral economic relations within a sub-class of pre-industrial economies, there are two stylized sectors: a small Modern (M) sector (say, urban-based manufacturing but may include modern plantations and mining) and a large Traditional (T) sector (say, subsistence agriculture, proto-industrial, and urban self-employment activities) all of which contain surplus labor. Capital (K) is inter-sectorally immobile between the M and T sectors, but unskilled labor (N), manufactures, and food/fiber are mobile. *Surplus labor*, broadly construed, comprises redundant labor with zero marginal product and disguised unemployment. Note here that surplus labor is a technological concept—there is simply too much labor to be absorbed relative to land and other inputs of production in the T-sector.

The M-sector and the T-sector are interlinked not only by labor flows (and the implied saving flows) but also by flows of food/fiber from the latter and flows of industrial goods from the former. Post-migration, total production of food remains adequate and constant as does the barter terms of trade between food and manufactures. This is because those who remain in the traditional sector are expected to adjust their hours upwards, in the face of a progressively declining rural labor force, in order to maintain the pre-migration level of food production. That is, surplus laborers (not surplus labor per se) move out of the traditional sector metaphorically carrying their subsistence food packets on their backs (Lewis, 1954; 1979; Ray, 1998). The M-sector real wage rate in terms of food can, therefore, remain stable as the excess labor is mopped out of the T-sector although employers may pay a premium to compensate migrants for perceived risk or for efficiency-wage reasons.

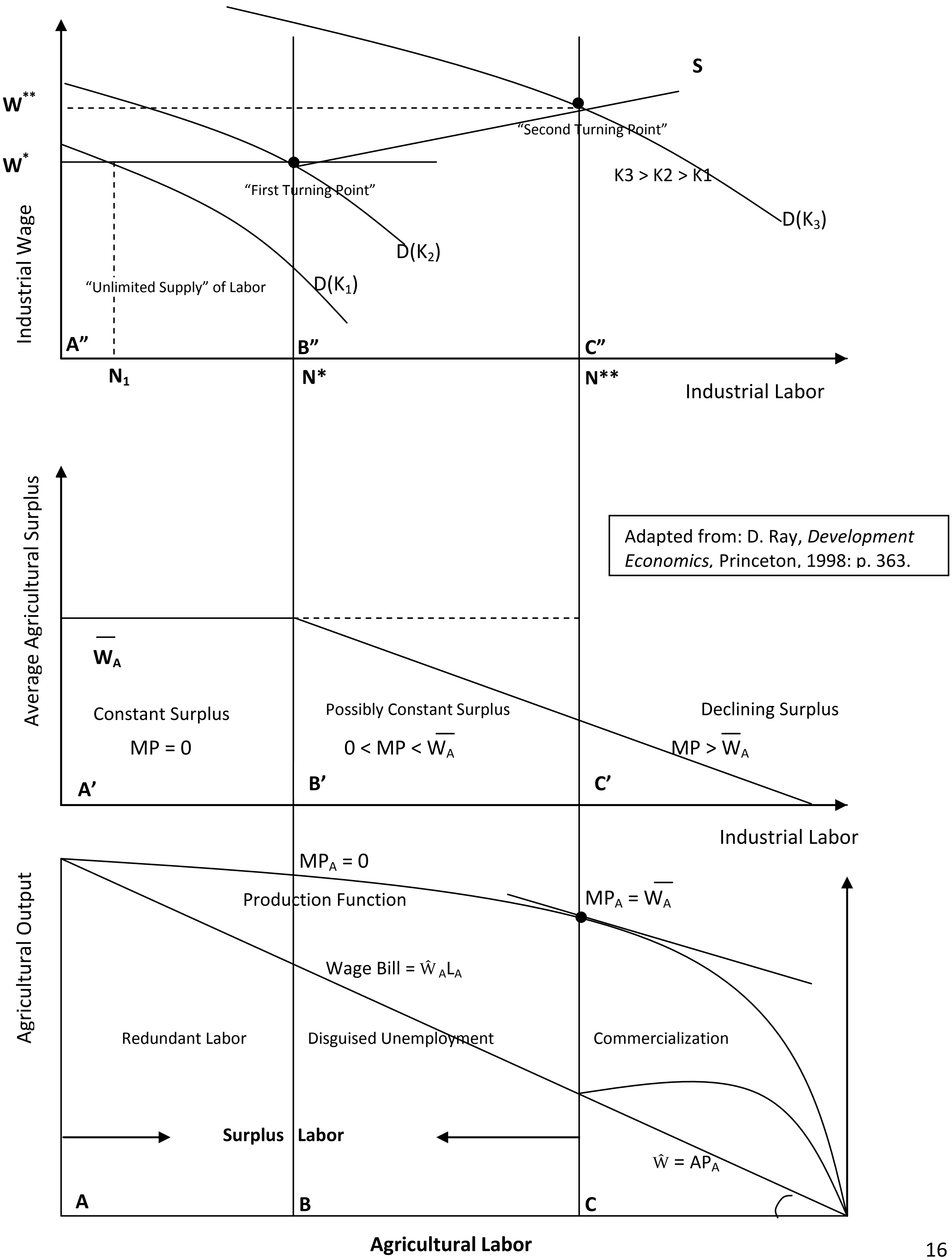
In other words, the opportunity cost of drawing away rural labor is very low. In China today, for example, the urban efficiency wage is currently about twice the rural one (thereby triggering an internal migration stream of 150-200 million people) while it is as high as five in India. Urban productivity in developing countries also exceeds rural productivity by a factor of three to six.

Lewis made additional assumptions to avoid unnecessary complexity such as the existence of adequate demand for M-goods, automatic equality of savings and desired investment, ever-clearing money market, and an institutional environment (such as access to housing and basic public services to all) that would enable inter-regional migrants to survive as they navigate the strange world of modern markets.

The behavior of the wage rate in the modern sector can be thought of as having two labor-market segments: pre-integration and post-integration. The first (Classical) level (A-B region in Figure 1) is determined by a perfectly elastic segment of the labor supply curve (S) reflecting the existence of surplus labor in "redundant" form. That is, the size of the actual migrant pool is less than the potential migrant pool which, when narrowly construed, is the fraction of total rural labor force with a zero marginal product. The second (Neoclassical) segment is the positively sloped segment of the labor supply curve (S) which means that the real wage rate rises with urban employment reflecting the exhaustion of redundant labor and an impending intersectoral equalization of wages for similar skills (B-C region in Figure 1).

Lewis, in other words, adopts a strictly classical viewpoint on the two crucial features of his model of surplus labor. First, the real wage rate for unskilled labor in the modern sector is institutionally (exogenously) given at W*, with employment and profits being determined solely by the demand for labor that corresponds to the fixed stock of capital that underpins it. The second classical feature is that the accumulation of capital, which drives labor demand (D), is determined by savings out of profits which are endogenous to vertical (inter-class) inequality. That is, Lewis accepts the classical assumption that workers save nothing, so that the only source of saving is the capitalists in the modern sector. The process of economic development

Figure 1: The Lewis-Ranis-Fei Model



Adapted from: D. Ray, *Development Economics*, Princeton, 1998: p. 363.

is then little more than the expansion of the more productive modern sector relative to the traditional sector until such time as the `surplus labor' pool in the traditional sector is absorbed. The Lewisian process gives way to an integrated labor market whereby the free interplay of demand and supply determines the equilibrium real wage, saving rate, and investment rate.

The canonical Lewis model, conditional on the validity of its strong assumptions, leads to a number of conclusions. First, redundant labor can be transferred to the modern sector without any noticeable reduction in total food output—the product terms of trade and real manufacturing wage remain unaffected by internal migration. Second, economic development proceeds by transferring laborers from traditional to modern activities which is necessarily accompanied by the *simultaneous transfer* of surplus food to sustain the industrial labor force. Third, industrial investment, whose rate is determined by rising inequality in favor of modern-sector employers (profits and taxes), drives economic growth. Fourth, economic growth is in effect a "free lunch" in the sense that the labor-surplus economy (think of China, Egypt, Indonesia, Ethiopia, India, Bangladesh or Nigeria) can exploit the potential opportunity presented by the presence of a grossly underutilized resource (labor) to kick start a self-sustaining process of industrialization.
All said, the key insight of the basic Lewis model is that wages for unskilled labor must remain low in the early stages of industrialization for reasons unrelated to the types of products produced. It is, of course, the dismally low productivity of labor in the traditional sector, whatever its underlying causes, that keeps the opportunity cost of labor (and hence wages) low (see also Lewis, 1978b). Today, the issue has been recast in terms of unit labor cost in order to explain, say, why foreign direct investment in manufacturing is flowing to a high-wage, high productivity country (Indonesia or China) rather than to a low-wage, low productivity country (Nigeria or Ethiopia).

2.1.2. The Lewis-Ranis-Fei Model

Gustav Ranis and John Fei extend the reach of the model by dispensing with two key assumptions of the basic Lewis model (Ranis and Fei, 1961; Lewis, 1979). They discard the notion that food and fiber production in the traditional sector can continue to catch up as laborers are moved out of the traditional sector to the modern sector. The idea here is that the real wage may not remain fixed at the initial average product level for too long so long as outmigration becomes non-negligible. After all, non-migrants are progressively enjoying higher income from rising food and fiber sales since more land per head is available and they are working longer hours to compensate for the loss of family hands. The principle of income-sharing ensures that consumption levels (and hence the reservation wages of successive cohorts of migrants) will rise along with the demand for agricultural goods.

Furthermore, a shrinking rural labor force may not be able to maintain the pre-migration level of output of food in the absence of farm modernization. This raises the possibility that neglect of agriculture-related investment may choke off the labor transfer prematurely as food prices rise fast and eat into the profitability of M-sector activity. Productivity gains in subsistence agriculture may ironically harm industrial deepening by raising the wage for low-skilled labor unless it is counteracted by a corresponding increase in migrant labor productivity.

What we dub the Lewis-Ranis-Fei (LRF) Model then pays attention to the changing conditions which unfold in the process of agricultural development, including commercialization, institutional wage rates, turning points, take-off, and self-sufficiency. In order to free up labor when the marginal product is positive and to meet the rising needs of the modern sector for food and fiber, agricultural productivity will have to be boosted.

To see how this plays out, modify the assumptions used in constructing the labor supply curve so that, not just redundant labor but, disguised labor can also be reallocated to the more efficient modern sector as long as the M-sector wage is higher than the T-sector's positive marginal product of labor. That is, labor's positive rural marginal product (not the average product) is the opportunity cost of the urban wage for potential migrants. Unlike in the phase of redundancy, disguised labor can no longer be mobilized *without a drop in the production of food.*

This second phase (the B-C region and beyond in Figure 1)) ushers in (a) rising food prices relative to those of manufactures, (b) urban nominal wage hikes to at least ensure the continued affordability of the subsistence food parcels (and inevitably other components of basic needs), and (c) real wage hikes due to rising rural income and increases in the capital intensity of production beyond the second turning point. The extent of urban wage hikes may actually depend on the scope for altering the consumption mix (food vs. manufactures), the elasticity of supply of agricultural output, and the pace of expansion of the urban demand for labor.

If T-sector output does fall when disguised labor (with positive marginal product) is removed, then no amount of nominal pay raise in the modern sector will solve the problem in a closed-economy context since there simply is not enough food to go around. However, if the additional effort (and investment in agriculture) raises the productivity of food production, then the process of laborer transfer continues even in the face of rising wages.

As we have seen in the basic Lewis model, the first turning point is reached when the redundant labor phase ends and T-sector real wage begins to rise. The second turning point is reached in the LRF extension of the basic model when members of the T-sector households all earn their marginal product. Beyond this point, the urban wage-bill increases at even a faster rate, food output per head falls rapidly, and full commercialization of agriculture picks up speed in order to keep both sectors moving in lockstep. Dualism ends for good at this point with the equalization of marginal products and real wages across sectors as in the case of a full-fledged capitalist economy.

The key implication of the Lewis-Ranis-Fei model, therefore, is that capital accumulation in the industrial sector is the engine of growth. However, the pace of capital accumulation is limited by the ability of the economy to produce surplus food and fiber, and to meet the rising demand from the traditional sector for manufactures as well as from exports in the open-economy version. Furthermore, factors left out of the model such as agricultural taxation and pricing, immigration, the pace of the demographic transition, and foreign trade and investment matter, too. As the economy enters the neoclassical world of a fully monetized economy, not just labor but capital also becomes mobile across sectors to ensure a sustained and inter-sectorally congruent growth drive.

The Lewisian process is best seen as a part of a set of interlinked and staged processes of development whereby successful latecomers switch from factor accumulation-driven (labor- and capital-intensive) growth to productivity-driven (skill- and technology-intensive) growth. Both socialist and capitalist developers, we can now confidently say from the vantage of the East Asian and post-socialist transitions, switched from a classical world of growth via reallocation resources (state led or market led) to a neoclassical world of growth through continual gains in technical efficiency and, hence, sustained increases in total factor productivity.

As we take stock of the criticisms leveled against dual economy models, it will also be helpful to remember that we judge models on the relevance of their assumptions and the novelty of as well as empirical support for their explanations. The concept of a ˋdual economyˊ has generated some controversy, to which references can be found in Findlay (1980), together with an appraisal, extensions and critique of the model itself. The most sophisticated and thorough theoretical defense of the dual economy and the associated notion of ˋsurplus laborˊ remains that provided by Sen (1966). The *Manchester School* in 2004 marked the 50th anniversary of the most celebrated article it ever published, and the special issue of the journal contains a valuable survey of subsequent developments by Kirkpatrick and Barrientos (2004).

On the positive side of the ledger, the labor-surplus model melds the insights of the Classical, Keynesian, and Neoclassical models of growth by partitioning the developing economy into two distinct economic systems. It especially alerts us to the possibility of kick-starting modern economic growth via surplus labor mobilization, and to the importance of recognizing the interdependencies among the various sectors of the economy.

Though some, notably T.W. Schultz and Rosenzweig, have questioned the empirical evidence for surplus labor, the weight of the evidence from the rapidly industrializing and thickly populated economies favors the prescient insights of Lewis.

The East Asian countries experienced rapid increases in wages for unskilled and semi-skilled labor as they completed the primary stage of industrialization. This is captured by the so-called "flying-geese" pattern of regional industrial investment whereby rising labor cost in the emerging economies induces FDI outflows toward labor-abundant neighbors as high labor-cost leaders relocate their most labor-intensive assembly operations—Japan to much of East Asia, Taiwan and S. Korea to Thailand and China, and China to Indo-China. Furthermore, in the more populous countries such as China, inter-regional labor movements are no longer sufficient to prevent rising wages in the booming coastal economic zones as the pool of low-income labor is exhausted in the hinterlands, efficiency wage considerations become important, and young people inevitably prolong their schooling years (Yusuf, 2008).

It must also be noted that development economics has recently moved its focus away from the macro level to the micro level, using more or less the same analytical techniques employed in the study of the developed economies. The new economics of growth has emphasized elements such as technological innovation and diffusion which Lewis rightly assumed was less pressing in the early stages of development where extensive growth based on factor accumulation was a necessary prelude to productivity-driven intensive growth which predominates in the neoclassical phase.

Institutional economics has also drawn attention to the role of institutions in shaping incentives for rent seeking as opposed to profit seeking. Although Lewis has studied pre-colonial and colonial institutions in great detail, he nonetheless stubbornly clung in his policy advice based on a Eurocentric predisposition which saw indigenous institutions as obstacles to be circumvented. As Bruton (2006: 1034) argues a bit too harshly, "Perhaps the most telling lacuna in his vision was the awareness that so little of the technology, institutions, learning of the advanced countries could be easily transferred to the developing world. Development must be an indigenous process of learning, of finding one's own way. My reading suggests that Lewis did not fully understand this fundamental notion."

2.2. Industrialization: From Economic History to Development Economics

Another notable, but much less appreciated, contribution of his seminal (Lewis, 1954) paper is a theory of the terms of trade between manufactures and primary products that is developed further, with empirical applications, in his Wicksell Lecture (Lewis, 1969) and Janeway Lecture (Lewis, 1978b). The Hecksher-Ohlin assumption of a shared production function was, after all, patently inapt in explaining, say, international trade between tropical producers of coffee and temperate producers of steel. Lewis thought that a different theoretical framework was needed.

The central thesis is that the world price of manufactures, relative to the prices of tropical products such as coffee, tea, sugar, rubber and jute, is determined by the relative opportunity costs of labor in food production. Thus the Pittsburgh steel worker's wage is governed by the Kansas farmer's productivity, while the Brazilian coffee plantation wage is determined by the much lower productivity of peasant subsistence agriculture, which explains why a unit of steel in the world market commands so many more units of coffee. Since the transformation curves between steel and food, and coffee and food are assumed to be linear, demand only determines quantities produced, consumed and traded, not relative prices, exactly as in the approach of the classical economists.

Parenthetically, Lewis delighted in telling students that their post-graduation compensation levels depend crucially on the productivity of their compatriots thereby rendering the accident of birth as a form of lottery. A telling support for this reasoning is the evidence that global income inequality among individuals is driven more by inter-country inequality than by intra-country inequality (Milanovic, 2010; Picketty, 2014).

Lewis applied this economic principle in a very imaginative way to illuminate several key aspects of the first global century in his last major work, *Growth and Fluctuations 1870-1913* (Lewis, 1978a). This volume extended his examination of the world economy in the inter-war period, *Economic Survey 1919-1939* (Lewis, 1949b).

What Lewis dubbed an "engine of growth" in recognition of the 1% annual growth rate of real GDP per head in the periphery was induced by the second industrial revolution in Europe. The growth-enhancing effects must, however, be tempered by the effects, at least in some parts of the periphery, of Europe-led globalization which included deindustrialization, Dutch Disease, commodity price volatility, and rising inequality (Williamson, 2011).

To be fair, Lewis did draw attention to the possibility of immiseration when poor countries engaged in trade with more diversified rich countries because the disproportionate share of the gains from trade is likely to go to the consumers in the latter as high price elasticity on the supply side meets low price elasticity on the demand side. Take his example where the richer countries produce steel (shorthand for manufactured goods) and food, and the poorer countries produce coffee and food (shorthand for exports of poor countries). Assume that before exports are increased, ten pounds of coffee trade for one ton of steel. Now, because producers in low-income countries have a low opportunity cost of increasing the export of coffee (because the food that they could have exported is globally uncompetitive), they are compelled to increase coffee exports. But doing so will drive down the price of coffee to, say, twenty pounds of coffee per ton of steel. Most of the gains from increases in the productivity of tropical beverages will then be dissipated through declines in their world prices. This is certainly a good deal for coffee buyers, but not so for tropical producers (Findlay, 2008).

In essence, Lewis was arguing that poorer countries had a latent monopoly power in their exports that they were failing to exploit. These countries would do better, he argued, to enhance the productivity of food production and diversify away from low-demand elasticity exports. Despite recent improvements in the world price of tropical beverages and minerals, the historical evidence bears him out, as Williamson (2011: 173) notes: "[W]hat is true of today was also true of the half century before World War I: external price volatility was a special attribute of the poor commodity exporters."

III. A Public Intellectual

3.1. Colonialism and Race Relations

Lewis was a public intellectual with a passion for freedom from both racial tyranny and abject poverty. And yet, his intellectual activism did not translate into political activism. In his public speeches and editorial writings, he waded into controversies seeking to dispel many widely held misconceptions about institutional racism and the appropriate strategy for rectifying its pernicious consequences in the areas of education, business, and the public service (Tignor, 2006).

Lewis was of the opinion that European racism was a result of an immoral pursuit of economic gains, and the entire Victorian self-justificatory discourse about 'civilizing backward people' was an attempt to mislead the European population at home and to legitimize the greed of the colonizers and the profiteers. He also thought that British heroism in fighting the Nazi ideology of racial supremacy, on the one hand, and discriminating against colored people in Britain itself, on the other, was clearly hypocritical.

Even though he had such strong opinions against colonial rule and practices, Lewis did have close relations with the Colonial Office. In fact, he worked on several projects—for instance, the Moyne Commission and the Colonial Economic Advisory Committee—during his time at LSE. This fact, however, was consistent with his non-confrontational approach and his belief that that reforms can come through working with the system rather than employing radical politics. The series of projects he was involved in for the Colonial Office also provided him with privileged access to information about colonial economies, and allowed him to review several development programs that the colonial governments had produced.

Lewis devoted a good part of his academic career and public life to promoting a vision of a decolonized, color-blind, and prosperous Africa and the Caribbean. Being a social democrat in temperament, he sought out Fabian socialists to enlist in the anti-colonial struggle. Despite rejection for employment because of the color bar and numerous disagreements about imperial policy with the British Colonial Office, he nonetheless joined with its officials in combating Nazism and fascism.

His hard-headed approach to economic analysis and soft-hearted policy advice to eradicate institutionalized discrimination is self-evident from his reflections on racial and ethnic conflict. In his W.E. Du Bois Lecture (Lewis, 1985b), Lewis clarifies several misconceptions by noting that: (a) racial conflict (much like class or ethnic conflict) is rooted in ideology; (b) the component of racial discrimination within the market is what remains after controlling for such factors as age, gender, education, occupation, assets, or region of residence—some of which, of course, reflect pre-market discrimination; and (c) income inequality affects the economic welfare of racial minorities in myriad ways. Inequality, as corroborated by accumulating empirical research, discourages class-based solidarity across the races, leads to underinvestment in public good that would benefit the subordinate group, adds envy to inter-racial differences in well-being, and leads to the self-confirming conclusion that the economic status of the subordinate group is rooted in congenital inferiority rather than in institutionalized discrimination.

He further argues (Lewis, 1985b: 67) that "Economic equality is a necessary but not sufficient condition for racial peace. The psychological roots of racism have also to be destroyed directly, as well as by indirect economic and political action." Regarding the latter, he notes that racial conflict, which is more murderous than class conflict, cannot be fully addressed by the free market since markets tend to reinforce pre-market inequality. It also turns out regulatory capture in the developed countries more common and quite damaging than is often assumed (Stiglitz, 2012). A fast growing economy will certainly help but so do well-designed and temporary affirmative action. The ultimate goal must also be clear: economic equality between the races can only mean that racial groups are found all the way along the income/wealth scale, but not necessarily equal representation in each industry or income class.

3.2. Development Policy and Administrative Service

As decolonization commenced, Lewis turned his attention to the nationalist movements in Africa and the Caribbean. He left the comfort of his prestigious academic position as a chaired professor of political economy at the University of Manchester to become Ghana's chief economic adviser in 1957-58. Ghana appeared to provide a promising laboratory for what we now call a developmental state with a market-friendly stance. The small West African country had ample natural resources, decent human and physical overhead, and an admirably Pan-Africanist Kwame Nkrumah. The World Bank at that time thought likewise judging the country more promising than South Korea. Ghana subsequently proved disappointing since Nkrumah chose to ignore much of the economic advice provided by Lewis.

In 1959, Lewis turned his attention to the West Indies, soon assuming the position of Principal of the University College of the West Indies and then Vice-Chancellor of the University of the West Indies. The British West Indies were striving to form an independent political federation, a goal that Lewis had championed. Building up the high-level manpower and laying down a sound development strategy were preconditions for success on which Lewis was uniquely qualified to provide leadership (Lindbeck, 1992: 397):

> Since 1957, I have spent nearly as many years in administration as in academic scholarship. First, a group of six years, 1957-1963, in which I was in turn UN Economic Adviser to the Prime Minister of Ghana, Deputy Managing Director of the UN Special Fund, and Vice-Chancellor (= President) of the University of the West Indies. Then, from 1970 to 1974, I set up the Caribbean Development Bank. These experiences broadened my understanding of development problems, without doing much to deepen it in the scholarly sense.

Again, his idealism and efforts frustrated, he retreated to the safe harbor of the ivory tower. He accepted the offer of a professorship at the Woodrow Wilson School at Princeton University in 1963. For two decades, he thrived at Princeton, teaching courses in economic history and development economics, publishing scholarly and policy works, and advising a large number of government and international organizations. Despite his inability to prevail over West African and Caribbean policymakers on the need to reconcile collective interests with elite interests, he never gave up on his faith in the power of reason and persuasion in policy debates.

4. In Summary

W. Arthur Lewis was an extraordinary man in his own right. His contributions to economic thought, built around the central idea that economic development is best understood as the expansion of the modern capitalist sector at the expense of the traditional sector, were significant and pioneering. They made him one of the founding fathers of a wholly new branch of economics (see Lewis, 1988). His 1954 article on economic development using unlimited supplies of labor was arguably the single most influential essay in this field. It is certainly one of the most frequently cited articles in the economics literature. His deep economic intuition and methodical approach to economic statistics more than made up for his admitted inadequacies in mathematical modeling.

As scholar and teacher, few remain unimpressed by the rigor of his ideas and the elegance and uncommon clarity with which he expressed them. These qualities led to many path-breaking 'firsts' (Tignor, 2006: 2):

> Although the LSE had never had a faculty member who was of African descent, Lewis's performance in class and on his thesis persuaded them that he was just the person to break the color barrier at their institution. Such was to be the pattern throughout his life. The first person of African descent to hold a named chair at a British university (Manchester), he went on to become the chief economic adviser to Ghana, tropical Africa's first country to gain its independence from European rulers after World War II. He followed this stint in Ghana by becoming the first black principal of the University College of the West Indies, the first vice-chancellor of the University of the West Indies, and in 1963 the first black professor at Princeton University. Not surprisingly, he was also the first economist of African descent to win the Nobel Prize in economics, an award presented to him in 1979.

His activities with the British Colonial Office, the United Nations, the World Bank, the government of Ghana, and the University of the West Indies gave him a public presence attained by few scholars. It is this combination of a small but path-breaking corpus of scholarly work and the larger body of analytical writings on issues of development policy and inter-group (horizontal) inequality, which make him a fascinating case study. His is a gripping life story of how one black economist from a poor outpost of the British Empire managed through sheer will power and superior intellect, to penetrate the pinnacles of intellectual life and policy circles in the imperial center.

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