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Kuznets and Pasinetti on the study of structural transformation: Never the Twain shall meet?

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ABSTRACT

The main characteristics of the economic growth of nations are a sustained increase in the growth of output and factor productivity and a widespread process of structural transformation. In this paper I contrast two of the few important authors that do not ignore structural change: Kuznets and Pasinetti. Over several decades the two approaches have developed in an almost orthogonal manner. I discuss the reasons and evaluate the relevance of the approaches for the study of economic development.

Many of the articles published in this Journal can be seen as elaborating or interpreting the contribution to the theory of structural dynamics of Luigi Pasinetti's in his celebrated book *Structural Change and Economic Growth* (1981) and in related endeavors. These studies share a common methodological outlook and reflect a common discourse community.

All through the period when Pasinetti's structural dynamics approach was being developed and even prior to that, a no less significant and influential program of research on growth and structural change was underway. I refer to Kuznets' study on Modern Economic Growth for which he was awarded the 1971 Nobel Prize in economics. The main elements of Kuznets' approach to structural change are already hinted in his 1930 study on *Secular Movements in Production and Prices* and became his main project from the late 1940s culminating in the publication of the ten long articles in *Economic Development and Cultural Change* (1956–1967) and the monographs on *Modern Economic Growth* (1966) and on the *Economic Growth of Nations* (1971). The two approaches, both sadly now mostly neglected in mainstream economics, would seem to have developed almost orthogonally with very little cross-referencing.

The extent of these nonintersecting developments is nicely illustrated in two key recent publications on structural change, in both of which Pasinetti figures prominently. In the massive three volume Elgar collection on *The Economics of Structural Change* (edited by Hagemann et al., 2003), Kuznets' lone entry appears only in volume 3 on "*Patterns and Empirics*" in the part devoted to "*Decomposing Economic Growth: Historical Perspectives*". The second

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example comes from the recent bibliometric survey on structural change in this Journal (Silva and Teixeira, 2008, p. 276), where Kuznets does not even appear in the table of "most cited authors in the literature of structural change" that refers to "articles gathered from all the issues of *SCED* from vol. 1 (1991) up to vol. 18 (1) (2007)."[1]

Pasinetti refers to Kuznets in his 1993 study but only as one that "has devoted the whole of his life to the praiseworthy job of gathering, ordering and comparing data... without pretending either to use or to develop any theory" (p. 10), a reductionist view for which he was chided by Malinvaud in his 1995 review [see below].

While apparently addressing similar issues and using the same terminology I will argue that Kuznets and Pasinetti represent two very different endeavors, with different almost non-overlapping aims and methods. The discussion below focuses on the implementation of the approaches to the study of economic development and concludes that for *this task* the relevance of the structural dynamics approach of Pasinetti appears to be of less relevance than that of Kuznets, a point not always recognized.

Following a discussion of how Kuznets and Pasinetti conceive of structural change as a key ingredient in the process of economic development I conclude with some observations on the main issues that would have to be considered in a reevaluation of the Kuznets approach today.[2]

1. What is "Structural change"?

There are many uses of the concepts of structure and structural change in economics. Some of them have a clear meaning while others are vague or worse.[3] The most common use refers to long-term persistent changes in the composition of an aggregate. In development and in economic history structural change usually refers to the relative importance of sectors in the economy, to changes in the location of economic activity (urbanization), and to other concomitant aspects of industrialization jointly referred to as the *structural transformation*.

A broader measure also considers changes in institutions as concomitants or necessary conditions for structural change to proceed. Kuznets includes changes in the "structures of society and its ideology" among the six characteristics he selects to describe the process of Modern Economic Growth (1973, p. 249). For Nelson institutional change is necessary for the successful exploitation of new technologies which are the main drive of growth and structural change. The range of institutions considered include universities, public laboratories, and government agencies, in addition to business firms and markets and they all form part of a broad nexus of interrelations between institutions, firms, and technology (Nelson, 2005; Nelson and Winter, 1982).[4]

1.1. A Caveat

As a cursory review of the Elgar collection (Hagemann et al., 2003) makes clear structural change also appears in various other approaches more or less akin to those of Kuznets and Pasinetti whose contrast is the focus of this paper. One major approach not explicitly considered in this paper, can best be described by what it is not rather than what it is. The common elements of most studies in this approach are the rejection of equilibrium and of systematic maximization by agents, and the common label identifying them as Schumpeterian and/or evolutionary. These studies would often, but not always, refer to structural change as a byproduct of the evolution of the system but mostly present a concept of structure which while more encompassing is less adapted to the economy-wide balance which figures so prominently in Kuznets and Pasinetti. Some of the studies in the Schumpeterian/evolutionary perspective claim a close kinship to Pasinetti's framework and his insights but largely, this kinship reflects the common rejection of the orthodox approach rather than a shared methodology or purpose [see below].

The survey article of Silva and Teixeira (2008) has a very useful mapping of research on structural change based on the number of citations and the links among (clusters of) researchers. It clearly shows the existence within the current literature of a "Neo-Schumpeterian and Evolutionary" cluster[5] but it also reveals the neither Kuznets nor Pasinetti are claimed as significant precursors by the authors within this cluster. Pasinetti, while at the center of the diagram with the largest number of citations and key links to his predecessors, shows almost no forward links to the subsequent "Neo-Schumpeterian and Evolutionary" cluster. Kuznets comes in only as a minor player in the "New School and Development" cluster.

The output of the "Neo-Schumpeterian and Evolutionary" cluster is a vast and expanding one which no general work on structural change can afford to neglect. The focus of this paper is more restricted; it deals with the (lack of) contact between two programmes of research which could benefit from exchange given their specialization.

1.2. Two brief digressions

1.2.1. Sectors

In much of the literature on history and development structural change refers to sectors of economic activity. One of the early skirmishes in the field focused precisely on

[1] Some signs of change are beginning to emerge; references to Kuznets can now be found in various growth related studies such as in Metcalfe (2003) who sees Kuznets as pioneering precursor of the evolutionary approach and Acemoglu (2008), who acknowledges an inability to offer "...a framework that can do justice to Kuznets's vision...largely because the current growth literature is far from a satisfactory framework that can achieve this objective."

[2] In this paper I draw from various of my publications, with Hollis Chenery or alone, including Chenery et al. (1986), Syrquin (1988, 1993, 2006, 2008), Syrquin and Chenery (1989), and Deutsch and Syrquin (1989).

[3] Machlup (1963) is still the best source for the various ways in which the terms have been used and abused in economics.

[4] North (1981) interprets structural change in economic history as institutional change, but almost completely omits shifts in the structure of production and factor use. The centrality of institutions is also emphasized in Morris and Adelman (1988), and in Acemoglu et al. (2002).

[5] Important representative authors from this cluster include, according to Silva and Teixeira (p. 277) Giovanni Dosi, Robert Nelson, Sidney Winter, Cristopher Freeman, Luc Soete, and Luigi Orsenigo.

the issue of our ability (or lack of it) to clearly differentiate among the various occupations in terms of sectors of economic activity (Bauer and Yamey, 1951). Sectors can simply represent lines of activity with no clear identity other than the ordinal indicator (x_1, x_2, x_3, ...) but otherwise undifferentiated for practical or theoretical purposes. This is the case with much of the theoretical literature on growth (a prototype would be the von Neumann model). At the other end of the spectrum in some of the development literature we have models, mostly not well formalized, where identity (of sectors) is destiny. A generic example is the staples approach where the characteristics of the dominant staple determine the fortunes of the economy.[6] In between we find most of the applied literature on growth and development in which structural change does not always figure prominently but sectors do.

1.2.2. Terminology

Structural change has been the common term used to denote the changing composition in economic activity in the development literature and in economic history. While the term also appears in the title of Pasinetti's (1981) book, there has been a subtle differentiation in terminology since then. In the works of Pasinetti and kindred scholars we do find the term "structural change" but embedded now as part of the "structural dynamics" of an economic system, this being taken to be more theory based. "Structural dynamics" studies can be found in the *Cambridge Journal of Economics*, in the *Economic Journal*, and primarily this journal specially created in 1990 to provide a receptive place for this approach. A Google search of "structural dynamics" shows that most of the entries continue to refer to engineering applications. In this paper except for direct references to Pasinetti I will continue using "structural change".

2. Why care?

Both Kuznets and Pasinetti (and the traditions that relate to them, which, while not homogeneous I continue to treat as such) stress the inevitability of structural change and remark or bemoan the lack of attention to it in the major theoretical works in the field.

But even if structural change is everywhere and always a concomitant of growth there may still be a question[7] of whether it has to be modelled. Models are abstractions which by definition imply selectivity; it is not immediately obvious that any conceivable change must be modelled. The argument for considering it must be that otherwise we would miss something essential. As we shall see while their analyzes of the proximate sources of structural change are not too different their rationale for its study, other than because it is there, are.

For Kuznets, and more generally in economic history and development, growth and structural change are strongly interrelated. Once we abandon the fictional world of homothetic preferences, neutral productivity growth with no systematic sectoral effects, perfect mobility, and markets that adjust instantaneously, structural change emerges as a central feature of the process of development and an essential element in accounting for the rate and pattern of growth. It can retard growth if its pace is too slow or its direction inefficient, but it can contribute to growth if it improves the allocation of resources by, for example, reducing the disparity in factor returns across sectors or facilitating the exploitation of economies of scale.

An important motivation for Kuznets' studies was the fact that structural change is a conflictive process that requires individual and societal adaptations and, especially in the early stages of development, a large reallocation of population from rural traditional places to modern urban ones. These changes require mechanisms for conflict resolution. Kuznets regarded the State as having often been the arbiter among group interests and a mitigator of the adverse effects of economic change.

In Pasinetti's synthesis of the classical and Keynesian approaches, structural change poses a continuous challenge to the stability of the system. There is an ever-present tendency towards unemployment owing to the structural dynamics of the economy. Fear of technological unemployment appears to be an important consideration.

For Pasinetti structural dynamic analysis requires new tools and, accordingly, he carries out the discussion in terms of vertically integrated sectors whereby all value can be traced back to labor. The normative component is an essential part of the analysis of the "natural economy" at the pre-institutional stage. This is one of the most puzzling elements of the approach further discussed below.

3. Structural change in models of growth and development

Kuznets was among the few that did not adopt the distinction between growth and development. He documented and analyzed the processes of structural change over time in the advanced countries and showed it to be an integral part of the overall process of Modern Economic Growth and provided at each stage of his presentation ample appreciative theorizing[8] to describe and account for the patterns observed. If development is growth with structural change then of course there is no other type recorded or, as Pasinetti strongly argues, possible. In most of the literature, however, the two are treated as almost separate disciplines.

While formal theories of growth did ignore structural change this was not the case with most of the vast empirical and theoretical literature on economic development. Here, the process of development is usually portrayed as going beyond just growth, incorporating at a minimum structural changes and at times considering also social, political, and institutional transformations.

[6] See Hirschman (1977) for a very broad ranging view of staples and Findlay and Lundahl (1994) for a more recent and more formal presentation.

[7] A question posed by Sen and others at the Varenna conference. See Pasinetti and Solow (1994).

[8] In Nelson and Winter's terminology.

3.1. Models of growth

The original growth models were one sector dynamic extensions of the Keynesian model and an outgrow of its concerns. By definition they ignored structural change even in the multisectoral versions which continued to focus on balanced growth solutions.

In the last decade some formal models have attempt to replicate the basic patterns of structural change by modifying some of the usual assumptions in standard growth models.[9]

The main departures from the standard presentations that may lead to unbalanced growth have been, on the *demand side,* the introduction of non-homothetic preferences by positing Stone-Geary preferences (Echevarria, 1997; Kongsamut et al., 2001), or by assuming a "hierarchies of needs" in consumption (Stokey, 1988). On the *supply side* the main innovation has been allowing for differential productivity growth. This was the core of Baumol's 1967 contribution to the "Macroeconomics of Unbalanced Growth" where he assumed the rates of productivity growth to be exogenous. Modern versions of Baumol's hypothesis include Ngai and Pissarides (2006) and Acemoglu's presentation in his book where it is shown that Baumol's results can arise endogenously from the combination of different capital intensities and capital deepening in the aggregate.

These are most welcome developments, especially when accompanied by empirical implementation. However, their intended domain of application is still limited to only the early stages of development. Acemoglu's frank assessment is telling. I quote extensively from his excellent presentation (2008, p. 697):

> Behavior along or near the balanced growth path of a neoclassical or endogenous growth economy provides a good approximation to the behavior of relatively developed societies. But many salient features of economic growth at lower incomes or at earlier stages of development are not easy to map to this "orderly" behavior of balanced growth. . .
> [W]e have not offered a framework that can do justice to Kuznets's vision . . .largely because the current growth literature is far from a satisfactory framework that can achieve this objective. In this light, the distinction between economic growth and economic development can be justified by arguing that, in the absence of a unified framework or perhaps precisely before we can develop a unified framework, we need to study the two aspects of the long-run growth process separately. Economic growth, according to this division of labor, focuses on balanced growth,. . . approximating the behavior of relatively developed economies. Economic development, on the other hand, becomes the study of structural transformations, and the efficiency implications of these transformations, at the early stages of development.

But even if structural change was not incorporated in the key theoretical models of growth it would be very inaccurate to claim that structural change has been absent from the economic literature of developed and, especially, of developing countries. This applies to both, empirical and theoretical studies, as long as we refrain from adopting a very narrow conception of what "theory" is. We turn now to a sample of those studies.

3.2. Some early studies relevant for development

Arguably the most important contribution to the early development literature was Lewis' (1954) model of dualistic development (and its neoclassical variant in Jorgenson, 1961). Development was seen as a gradual replacement of traditional by modern sectors and techniques – structural change fuelled by capital accumulation in the expanding modern sector. Other approaches going back to Marx stressed the composition of capital or of demand (consumption and investment) as crucial.

Fisher and Clark (see Syrquin, 1988 for references) focused on sectors of economic activity, the former to draw attention to 'growing points' in the economy and the latter to point out the association of level of development with structure. Kuznets embedded this in a more comprehensive approach. He regarded structural shifts as a requirement for the high rates of growth and in turn saw the changes in economic structure as requiring:

> "shifts in population structure, in legal and political institutions, and in social ideology. [Not] all the . . . shifts in economic and social structure and ideology are *requirements*, [but] . . . *some* structural changes, not only in economic but also in social institutions and beliefs, are required without which modern economic growth would be impossible" (1971, p. 348).

An additional group of studies, that includes some very congenial to Pasinetti's concerns and to his approach, are the computable general equilibrium models, neoclassical or not. Multisectoral economy-wide models of the 1950s and 1960s vintage were primarily consistency models built around input–output relations or optimization exercises of the linear and nonlinear programming type. Those models were particularly well suited to put forward a structuralist message not too dissimilar to Pasinetti's, of low or no substitution in consumption and production, rigidities, and often an implied corollary of the necessity of planning. In the mid-1970s, input–output and programming models began a transformation into price endogenous models that could mimic the working of the price system in a market economy. These models owed a great deal to two major, not quite neoclassical, precursors: Johansen's (1960) multisectoral growth model and Stone's Cambridge Growth Project whose first publication dates from the same period (Stone and Brown, 1962). Computable general equilibrium (CGE) models reintroduced substitutability, endogenized prices, and provided a more thorough specification of income

[9] The following is based (lifted really) from the recently published book by Acemoglu, certainly to become the standard reference for models of growth and development. I mention only some of the newer studies beginning with the earlier ones. For further references see Acemoglu (2008).

flows, taking as a point of departure a more or less disaggregated social account matrix (SAM).

Applied CGE models in development start from a Walrasian framework, neoclassical in spirit, but invariably abandon some of the strong assumptions of the neoclassical model and introduce a variety of structural features that lead to less flexibility, lower speeds of adjustment, and to sector or agent-specific characteristics that highlight the importance of disaggregation and the prevalence of gaps in returns across the system. At the extreme of the structuralist end of the spectrum we find a group of models close in spirit to the models of the 1950s, though dressed up in CGE garb this time, that see themselves hailing not from Walras but from KKK (Keynes, Kalecki, and Kaldor).[10]

Of the early studies of unbalance growth only Baumol's 1967 paper on differential productivity growth is cited by Pasinetti as a relevant model of growth. Differential productivity growth has long been an important factor in studies of transformation in the economic history literature. Williamson, among others, has featured it as a prime determinant of structural change in advanced and in less developed countries. One important example would be his joint study on third world city growth (Kelley and Williamson, 1984).

The contributions of Kuznets are presented in the next section.

4. Kuznets and Pasinetti

Following a brief illustration of the work of Kuznets on growth and the structural transformation I present a more extensive interpretation of the applicability of Pasinetti's structural dynamics approach to the study of economic development.

4.1. Kuznets and the study of modern economic growth

During the 1930s there were two interesting and totally independent developments which presaged the break between growth and development.[11] One was the Von-Neumann model of growth and the second was the publication of Kuznets' *Secular Movements in Production and Prices*. Von Neumann's was an elegant parsimonious representation of equilibrium in a multi-sector expanding economy. It took more than a decade for it to be translated and interpreted in the economic literature and another decade to be appreciated as a complete exposition of duality, minimax, etc. It became the canonical multisectoral balanced growth model.

Kuznets started his comprehensive project on the economic growth of nations not much before 1950; however, already in his earlier studies in the late 1920s he showed interest in growth and structural shifts. His 1930 book on secular trends looks at long-term movements in production and prices in many products in six countries. He first notes that the global "modern economic system is characterized by ceaseless change... a process of uninterrupted and seemingly unslackened growth" (p. 1, 3); yet at the sectoral or national level the picture is less uniform: leadership among nations shifts over time and, within a nation, leading sectors are continuously replaced as retardation inevitably reaches former leaders. Kuznets contrasts the secular retardation at the sectoral level "with our belief in the fairly continuous march of economic progress" (p. 5) and asks why not balanced growth? The answer combines demand effects and technological change: progress of technique makes new goods available (tea cotton, radios...) but eventually demand reaches saturation, the pace of technical change slackens, new goods emerge, and possibly also competition from younger nations. With this general retardation come shifts in the relation between capital and labor, in the distributive process, in the character of the market, in the type of business organization, and in the roles of industry and agriculture. Here, in a nutshell, are the sources of structural transformation which were to reappear several decades later with technical change and sectoral shifts as key elements of the process. Kuznets seminal analysis of structural change and retardation was rediscovered 70 years later by Metcalfe (2003) who considers it a pioneering precursor of the evolutionary approach.

4.2. Pasinetti on growth and change

For more than 40 years Luigi Pasinetti with great perseverance has argued for a view of growth as a process of continuous change, not steady balanced growth and not a traverse between such states, but a never ceasing transformational process. His earlier work was done at a time when growth theory was synonymous with *balanced growth* [the Acemoglu quote above in a Lampedusan moment illustrates how much things have changed but still remain the same] and capital accumulation reigned supreme. Pasinetti's work is part of a Keynesian-Cambridge tradition but no less so it can be seen as a revival of a classical (Smithian) tradition:

> "Pasinetti derives what are arguably the most characteristic concepts of his growth theory explicitly from Smith: the central role of technical innovation occurring unevenly in different sectors, and the method of analysis in terms of vertically integrated sectors, found in an embryonic form in the *Wealth of Nations*." (Walsh, 2003, p. 372)

The structural dynamics approach to growth attempts to pick up where the classics, including Marx, left off. It does not see itself as *an* approach along with others and in that it resembles some of the neoclassical extremes it often targets. The approach, especially in its rich original Italian variant, can be read as part of the concerted attempt to demolish the edifice of neoclassical economics and establish a revitalized classical/Sraffian alternative in its stead. Spaventa (2004), in a revealing account of the objectives and the fervor in pursuing them of the then young integrants of a research group sponsored by

[10] See Taylor (1990) for a collection of such models.

[11] At the time Schumpeter was not much present in growth or in development. Kuznets wrote a very harsh review of *Business Cycles* even while praising it as a "monumental treatise." The Kuznets–Schumpeter chapter remains to be written. An insightful preview of this epic interaction appears in Perlman (2001).

the National Research Council (CNR), recounts among the aims:

> "...the implacable pursuit of the *pars destruens*, in order to demonstrate the incoherence of the "traditional" theory in its entirety... a return to the history of analysis, in order to specify and recover the premises and the research method of the classical economists, specially of Ricardo; the attempt to heal in Sraffian terms the incoherences of the Marxian theory of value." (p. 560, my translation)

This continuing preoccupation to distinguish and distance the approach from neoclassical economics has, I believe, reduced the attention to influences outside the tradition and limited its reach beyond it.[12]

4.2.1. The natural economy: normative analysis without institutions

Structural dynamics, while portrayed as a general theory of growth in capitalist societies, was not designed as a tool to understand or reconstruct the process of Modern Economic Growth, nor is it a theory with verifiable empirical implications for advanced (capitalist) or for less developed countries. This of course does not imply that there are no predictions or implications that can be derived from the theory but only that for these one has to go beyond or outside the core 'natural system'. Instead it is a framework for normative analysis.

To avoid misrepresenting these most puzzling aspects of the Passinetian approach I quote extensively from the summary presentation of Scazzieri (2006), one of Pasinetti's closest collaborators:

> Pasinetti's theory of the natural economic system is an attempt to turn the classical theories of Smith and Ricardo into a fully-fledged pure (and *general*) theory of a production economy.
> ...[it] is perhaps the first explicit attempt in economics to build a purely structural theory of a production economy (that is, a theory that does not presuppose any specific, and thus more contingent, set of institutional and behavioural assumptions). ...the natural system presupposes a process of *analytical simplification* ...the corpus of classical theory is, so to speak, 'stripped down' to its essentials, or to its minimal core.... In particular, Pasinetti moves away from the institutional assumption of a decentralized, private ownership economy, and still finds a meaningful core of structural properties.... The natural system is s set of propositions that makes normativity possible precisely because such a system is a *prototype structural system* stripped of behavioural and institutional properties. *The natural economic system is not a descriptive tool, nor is it a tool aimed at explaining in a direct way the actual workings of the real economic system. Structural economic theory... becomes a normative theory precisely because it may be a benchmark against which the actual workings of economic systems may be assessed.*
> ...The normative properties of the natural economic system derive from the 'deep structure' of the real economic system, and suggest manifold ways in which the real economy could take advantage of the possibilities of improvement inherent in its own constitution, provided economists and policy makers are bold enough to envisage a *variety* of institutional arrangements and behavioural patterns (italics added).

If one does not subscribe to the obviousness of the normative vision, or to the methodological starting point of searching for such a system as the desideratum for theoretical inquiry, then the relevance of the scheme is severely diminished without in any way detracting from its value as a contribution to classical economics or even moral philosophy.

It is ironic that one of the strong criticisms leveled against mainstream economics by radical economists in the 1960s was precisely that it ignored institutions. As it is often the case, mainstream economics has slowly begun to address some of those issues. The most recent example being the Nobel Prize to Leonid Hurwicz for his work on mechanism design and institutions. In this light the call to study a 'natural economy' at a pre-institutional level seems anachronistic as does the emphasis on a type of 'pure theory' at a time when the tide seems to have turned towards theory strongly linked with empirical and simulation-like analysis.[13]

4.2.2. Structural dynamics: too little substitutability and missing agents

In this section I switch from the broad overview to the nuts and bolts of the approach to examine whether it can be considered an operationally useful approach for the tool kit of the economist interested in growth and development as an empirical phenomenon. After what was said above this analysis could be likened to setting up a straw woman. Pasinetti could, rightly so, claim that most of the argument is not relevant for the avowed purpose of his approach. Still, it may be relevant for anyone interested in applying it to the study of development. I limit myself to a very sparing presentation of issues essential for the study of development most of which appear in Kuznets, or are mentioned as deserving treatment by him.

Pasinetti sees his theory as hailing from and building on Adam Smith. But one will not find in his work a treatment of economies of scale or of the division of labor.

The key elements in the model are Engel coefficients and fixed rates of technical change. Both of these are given exogenously without motivation or justification. Both are said to depend on 'learning', the prime mover of capitalist growth, portrayed as perhaps the most innovative concept. Learning and knowledge were indeed neglected categories

[12] A similar lament appears as the coda in Baumol's positive review of Nelson and Winter: "Indeed, productive approaches being so scarce and valuable a commodity, my main complaint about the book is the amount of space wasted in denouncing neoclassical approaches, as though it were essential to prove the bankruptcy of alternative methods in order to establish the value of one's own." (Baumol, 1983, p. 581).

[13] See Colander (2000) and Deaton (2007).

in the early theories of growth but they were always at center stage in the Kuznets study of Modern Economic Growth. After all, Modern Economic Growth was *defined* by Kuznets as the epoch characterized by the pervasive application of science based technology to development. Moreover, when learning is invoked in structural dynamics it is left unexplained, without any hint as to its determinants.

In structural dynamics we find techniques of production, processes, exogenously given fixed coefficients or rates, but no agents with volition (households or firms) and therefore no price-responsiveness and no incentives. It is therefore difficult to see how the Structural Dynamics approach can be invoked as a precursor of evolutionary economics and its related evolutionary game-theoretic approach (as in Saviotti, 2001, for example, an otherwise pioneering effort to deal with the implications of variety for demand).[14]

The absence of incentives and decision makers leads to excessive reliance on theoretical constructs with no life of their own. A prime example is the coefficients of the 'vertically integrated sectors' or VIS. This is a key innovative tool introduced by Pasinetti for the analysis of structural dynamics. Its coefficients are simply the Leontief total (direct and indirect) coefficients ("logically identical" as per Pasinetti) and yet they are claimed to "have a deeper economic meaning and possess,. . ., much more favourable characteristics for dynamic analysis." (Pasinetti, 1981, p. 114). Even if one were to grant this curious claim it is still the case that only the direct coefficients would be of any relevance to economic actors, the VIS coefficients being ex-post constructs relevant only to the analyst. Steedman (2004), certainly a kindred spirit, asks if vertically integrated sectors are useful in simplifying the analysis of a changing economy. Chagrined as he appears to be to do so he still gives a negative answer:

> "Such sectors are hypothetical constructions,. . ., whilst actual investment decisions relate to investment in actual, individual industries and even in specific production processes. . .. Similarly, technical change actually occurs at the level of quite particular production activities and, while the theorist can calculate the consequent changes at the vertically integrated level, the result is just that – a calculated accounting magnitude."

The supply of labor is assumed to grow at a fixed rate exogenously determined outside the model, in common with most of the growth models of the time. For Kuznets however, the relationship between growth, demography, and distribution were of such importance that he devoted to them more than a decade of intensive work after receiving the Nobel award. His last and posthumous collection of studies was on *Economic Development, the Family, and Income Distribution* (Kuznets, 1989).

4.2.3. On theory, endogenizing, and convergence

Kuznets regarded a general theory of growth a the worthwhile goal to pursue, for the present, a very remote and unattainable goal (Kuznets, 1955, see also Fogel, 1989). For him a central problem was how to endogenize what economics mostly tended to regard as givens: technology, population, tastes, and institutions. The grand theory would have to await a firmer foundation to be achieved by the accumulation of empirical evidence and abductive theorizing, not unlike "appreciative theorizing" in Nelson and Winter.

In a thorough review of Pasinetti's work on structural dynamics, Malinvaud (1995) stresses Pasinetti's significant contribution but takes issue with his reductionist view of theory which would exclude Kuznets and Leontief among others. He also analyzes some of its limitations and suggests some additions. For Malinvaud the exogeneity of the consumption coefficients is untenable:

> "In order to explain the actual structural dynamics of final demand one must refer not only to new products and to income effects, but also to price effects,. . . So amended,. . . the physical quantity system is no longer clearly separated from the price system and determined only by structural evolution of consumption demand" (p. 62)

In discussing the "natural economy" and Pasinetti's quest for "fundamental relevance", Malinvaud suggests three additions, all quite subversive to the structural dynamics program but highly relevant to the study of economic development:

> "substitutability between goods for the satisfaction of real human needs, scarcity of resources, particularly of non-renewable ones, economies of scale in production." (p. 65)

Learning (technical change) in its various manifestations is the engine of growth for both Kuznets and Pasinetti. As Malinvaud points out (1995, p. 64), its diffusion is "the best solution to the dilemma of development." Both stress that this may not be easy or automatic. For Kuznets: "Advancing technology is the permissive source of economic growth, but it is only a potential, a necessary condition, in itself not sufficient." (1973, p. 247).[15]

Its realization, as well as its transfer across nations, requires institutional and ideological adjustments. Kuznets illustrates this with some examples from modern economic growth: the modern large-scale plants needed to exploit inanimate power are not compatible with illiteracy or slavery, or with the rural mode of life or the veneration of undisturbed nature.

Pasinetti does not address the issue of realization of the potential for technical change nor its sources. He does dwell, however, on the lack of diffusion and possible

[14] As pointed out by a referee, evolutionary scholars have been attempting to endogenize preferences, technology, and institutions in an evolutionary framework with heterogeneous agents to account for the dynamics of the economic structure and its impact on aggregate growth. But, as the referee recognizes, not much has been done in the context of development. Prominent outlets for the output of these studies include the *Journal of Evolutionary Economics* and this journal.

[15] Abramovitz (1989) was to take up and substantially develop this theme. This is acknowledged in much of the technology trajectories/paradigms literature but the links to Kuznets are not. In the bibliometric article of Silva and Teixeira (2008), as mentioned above, Kuznets has a very meager presence.

downside of what he takes to be the pattern of productivity growth across countries:

> "the benefits deriving from productivity increases remain in the countries that have obtained them, and are not leaked by international trade to the remaining countries of the world. At the same time the poorest countries are compelled, by the very structural characteristics of their internal demand, to concentrate their production in sectors with very low, or even zero, rates of growth of productivity. The very same principles also help to explain phenomena to which development economists have paid so much attention, such as the declining trend in the terms of trade between the countries producing primary products and the countries producing manufactured commodities (see Prebisch, 1959)." (Pasinetti and Scazzieri, 1987, p. 528)

The experience of globalizing developing countries in the two decades since the above was published has not resembled the dire predictions there, nor have the facts confirmed the Prebisch thesis of a secular deterioration in the terms of trade of primary producing countries.

There is a great affinity between the structural dynamics approach and the structuralist approach to development of the 1950.[16] Both share a view of lack of substitutability in production and demand, of low mobility of factors, and more generally of lack of flexibility. The resemblance extends to a general distrust of the market and advocacy of inward-oriented strategies and planning.

To conclude this section I want to present a different, more optimistic, assessment of the possibility of bridging the gap between the approaches of Kuznets and Pasinetti. In a very thorough introduction to a volume of works by Kuznets translated into Italian, the late Onorato Castellino (1990) regards the 1981 study by Pasinetti (in its 1984 Italian translation) as an attempt:

> "to move from the abstractness of the models of development to the concreteness of the Kuznetsian visions" [and, after describing the work and its influences, adds that even though Kuznets does not figure among the authors cited by Pasinetti] "one begins to discern between the two an ideal thread, a certain potentiality of a dialogue: the two halves of the world will be able perhaps, someday, to communicate and interact". (pp. 37–38, my translations)

5. Where to now?

So far I have contrasted two main approaches to the study of growth and structural change and found one less relevant for the historical and current studies of the process of Modern Economic Growth. I argued for the relevance of the Kuznets approach even while aware that it is not much present in the current literatures of growth and development.

Some 20 years ago various studies expanded the Kuznets approach to cover the developing countries over the first decades of the post-war period (see, for example, Syrquin, 1988; Syrquin and Chenery, 1989). There has not been much systematic comparative work since then except for growth regressions which have ignored structure and are of limited relevance for country experience over time.

Structural change is ever so hesitantly making an appearance in studies of growth of less *and* more developed countries. Even references to Kuznets, other than in its "Kuznets-curve" guise, are no longer black-swan events. It seems therefore a good point to ask what would be some of the issues to consider in a reevaluation of the Kuznets approach today. The following is a brief list of such issues further discussed in Syrquin (2008) which also contains the references to the studies and approaches mentioned:

1. How robust have been the main trends analyzed and described by Kuznets and others to the momentous changes in the international economy since he wrote? Has the economic epoch characterized as Modern Economic Growth run its course and is it being superseded by a new one where ideas become more important than inanimate power and the nation state looses its distinctive character as the main unit of analysis?
2. Resource shifts are mostly ignored in old and new growth theories. Most empirical studies find the contribution of resource reallocation to productivity and growth to be lower than expected. The principal reasons are: insufficient disaggregation and ignoring quality changes, in particular, new goods and varieties. The growing availability of large micro data sets on firms and employment and the greatly enhanced computational capacity have now stimulated research on the dynamics of firms and the process of creative destruction. Studies for both developing and more advanced countries show that:
   - Gross flows are large, namely, focusing on net changes in employment and unemployment ignores what is a most active process of job creation and job destruction and underestimates the costs associated with gross flows.
   - Reallocation *within* sectors may be more important than reallocation *between* sectors.
   - Reallocation from existing firms to more productive new entrants accounts for a significant share of total productivity growth.

   As for new goods and varieties, well over 50% of the commodities we consume today did not appear at all in the typical consumption basket in 1900. What exactly is the meaning of models of unchanged sectors when the type or identity of the output is changing so drastically? This is one area where the evolutionary approach is making important progress (for example, Saviotti and Pyka, 2004).
3. The last two decades have witnessed important advances in theoretical and empirical studies of growth, trade, and economic geography. In growth theory structure continues to be almost absent with only a few exceptions briefly mentioned above and at great length in Acemoglu (2008). More relevant have been the devel-

[16] See Arndt (1985). Other prominent authors that contributed to this view include, besides Prebisch, Lewis, Myrdal, Nurkse, Rosenstein-Rodan, and Singer.

opments of "new" trade theory and "new" economic geography. Trade in differentiated products, transport costs, density and specialization, are among the topics in these literatures with important bearings on economic structure. The fall in transport costs could lead to a reversal of the process of urbanization, a central element of structural change, as the advantages of agglomeration in cities declines.

4. What are we trying to measure?

   Sectors: The division into components must have an analytical basis; "sectors" must differ significantly from each other. With new technologies much of what used to be "services" is becoming part of what used to be "manufacturing", and much of employment growth in services reflects contracting out (outsourcing) of work previously done by manufacturing. Determining the national location of sectors is also becoming more difficult if not impossible; whole industries no longer migrate, manufacturing is becoming a genuinely international affair.

   The denominator – GDP?: There is a need to reevaluate the Kuznetsian themes of delimiting what enters into the economic calculation and where to draw the dividing line between final and intermediate outputs. Structure is still an essential ingredient in studying development. But "structure of what"?[17]

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[17] While revising what should and should not go into aggregate output we would still want to retain a concept of production for the total. Moving in the direction advocated by the Stiglitz Commission (see Stiglitz et al., 2009) created at the initiative of President Sarkozy – may improve the measurement of welfare but will lose all touch with structure.

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