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Cumulative causation in a structural economic dynamic approach to economic growth and uneven development☆

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ABSTRACT

A structural economic dynamic approach is distinguishable by its simultaneous considerations of supply and demand and their related effects wielded upon economic growth. However, properly considering cumulative causation requires a special framework for more fully accounting for technological progress, and not leaving it as simply exogenous. With this inquiry dimensions of Verdoorn's Law are selectively embedded in Pasinetti's multi-sector model, thus allowing us to better consider cumulative causation through rendering structural changes endogenous. In this setup, reconciliation between cumulative causation and balance of payments constrained views is shown to hold.

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1. Introduction

> "Where does technical progress come from? What is its source? How are economic systems induced to take advantage of it? And why is it that some countries took advantage of it earlier than others? Why are most countries still so far behind? By which factors have they been blocked? And again, how is it that some countries, after lagging behind, have then caught up so quickly and are now themselves among the leaders? Will it be possible for other countries do to the same? How? These and similar questions are really fascinating. They are precisely the type of questions that have constantly struck and puzzled the imagination of the most perceptive minds among economists." L. Pasinetti (1993, p. 106): *Structural Economic Dynamics: A Theory of the Economic Consequences of Human Learning*.

Although cumulative causation and structural change register as concepts alien to most of mainstream economics, these stand as important terms and also central tenets of Post-Keynesian growth theory, playing crucial roles for explaining contemporaneous processes taking place integral to economic development. See, for example, contributions of Ocampo (2005), Cornwall and Cornwall (2002) and Setterfield (1997). The concept of cumulative causation has been addressed by a number of authors such as Kaldor (1966, 1972),[1] Skott (1988), and McCombie and

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[1] One of Kaldor's Growth Laws is based upon Verdoorn's Law. Accordingly, the faster the rate of growth of manufacturing output, the faster will be the rate of growth of labour productivity in manufacturing. According to Hall and Whybrow (2008, p. 354) the notion of cumulative causation was firstly discussed by Veblen in his inquiry into the dynamic interplay of the material and immaterial in economic and social processes. The roots of this idea may be found in the writings of Adam Smith for whom the

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Thirlwall (1994), to describe one of the logical effects of static and dynamic economies of scale, or what could be thought of as increasing returns considered in its widest sense. According to this view, manufacturing is thought to play special roles in generating dynamics that can run throughout a macro economy. Especially when considering backward and forward linkages and economies of scale, cumulative causation helps us explain why a faster growth of output leads to faster growth rates of productivity: thus rendering economic growth demand induced rather than resource constrained.

Structural change should be seen as intrinsically related to processes of cumulative causation, and was formally studied among others[2] by Pasinetti (1981, 1993) and presented as integral to his structural economic dynamic (SED) approach. According to Pasinetti, structural change refers to variations in the structure of an economy, and should be understood as related to the existence of particular rates of technological progress and also demand levels for final consumption goods. His emphasis upon demand composition offers a significant qualitative improvement vis-a-vis traditional, aggregated models[3] that fail to adequately consider composition of consumption demand. The importance of this issue in the study of economic development has been considered. Authors such as Ocampo (2005, p. 8) and Rodrik (2008, p. 398) consider that success in structural change proves key to understanding processes integral to economic development.

Although the Pasinettian approach offers some clear advantages over the aggregated approach, technological change is treated essentially in the same exogenous manner[4] as in the mainstream view, however, with the advantage that each sector is assigned a particular rate of technological progress. Some attempts of giving a better treatment for technological progress in the Pasinettian framework were provided by a number of authors. Reati (1998), for example, introduced long waves for explaining technological revolutions, while also considering a complex dynamics for prices, output and employment. Araujo and Teixeira (2011) and D'Agata (2010) have also aimed at endogenizing technological progress in this framework, by considering an evolutionary view of dynamic capabilities as fundamental forces driving technological change.

Although these approaches have proven useful we note a failure for dealing with – or even considering – cumulative causation. Such a failure results in a weakness to account for connections between productivity and output growth in the tradition emphasized by Roberts and Setterfield (2007). According to these authors there is indeed a conception of endogenous technological growth associated with Post-Keynesian growth theory – specifically, the Kaldorian tradition – according to which the rate of technological progress remains sensitively related to a growth rate of output. Then, we could move to a relation in which "growth depends on growth." Adding a temporal dimension to the relationship, growth at any point in time depends on its own history in a self-reinforcing schema of cumulative causation.

By ignoring cumulative causation, Pasinetti's SED approach overlooks some crucial dimensions of economic growth, calling his approach into question. In this vein, this inquiry seeks to enhance the Pasinettian multi-sector growth framework by endogenizing technological progress, and in such a way that the latter is made sensitive to developments from the demand-side of the economy[5] – through the operation of Verdoorn's Law. Following this view, a deeper notion of technological progress is considered, thus making Pasinetti's analysis consistent with the deeper conception of endogenous growth identified by Roberts and Setterfield. The result is a multi-sector model of cumulative causation in which the pace of technological progress can indeed be determined.[6]

Worth noting is that some other authors have already sought to establish links between structural change and cumulative causation. Botta (2009), for example, stresses the importance of these linkages in a balance of payment constrained framework. In sum, industrialization and economic growth feedback to each other, giving rise to a cumulative causation process. Although Botta's approach focuses on connections between cumulative causation and structural change, it faces limitations when considering the latter for he relies upon an aggregated model. In addition, Fiorillo (2001) describes and simulates how rate of growth and specialization coevolve in an export-led growth model of Kaldorian-type. He focuses on feedback from growth rates to income elasticity of exports, accounting for the presence of endogenous changes in growth regimes. This means that a country specialization in a sector leads toward its maintaining its specialization unless the system reaches certain critical values.

division of labour is limited by the extent of the market. Young (1928) is also referred to as a pioneer in this tradition, pointing out that important economies of scale result extension of markets and related prospects for differentiation that leads to the emergence of new processes, for example.

[2] Kuznets and Baumol also focus on structural change. See Syrquina (2010) for a comparison between the notions of structural change in Kuznets and Pasinetti, and Silva and Teixeira (2008) for a survey of structural change.

[3] In these models any increase in per capita income is transformed into a higher level of consumption of the same kind. It is implicit a well-known and strict definition of balanced growth: growth of a non-inflationary, full-capacity utilization with all sectors growing at the same rate [see Solow (1956)].

[4] According to Pasinetti (1993, p. 107): "This is also the point where attempts could be inserted to 'endogenize' technical change. The model is left open in this direction, also because these investigations could not rely on the characteristics of specific institutional set-ups." This view is emphasized by Silva and Teixeira (2008, p. 286) where they consider that: "Although Pasinetti relates both factors with the learning principle, learning itself is essentially unexplained and therefore the question of what moves the driving forces of the economy remains unanswered."

[5] Pasinetti (1983, p. 69) himself acknowledges the importance of considering the demand side when questing the origins of technical progress: "[t]his means that any investigation into technical progress, must necessarily imply some hypothesis on the evolution of consumers' preferences as income increases. Not to make such hypothesis and to pretend to discuss technical progress without considering the evolution of demand would make it impossible to evaluate the very relevance of technical progress and would render the investigation itself meaningless."

[6] It is worth to mention that a similar line of research has already been pursued by Kaleckians, who introduced Verdoorn's Law into their framework [see Lavoie (1992)].

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