Competition and Equilibrium in Classical Political Economy and Post Keynesian Economics

A thesis submitted to the University of Hyderabad
in partial fulfillment of the requirement for the award of

Doctor of Philosophy
in
Economics

By

S. LIMAKUMBA WALLING

Registration No: 09SEPH19

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To my parents,

Satem Walling & Bendangla Longkumer

School of Economics
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DECLARATION

I, S Limakumba Walling, hereby declare that the PhD thesis entitled "**Competition and Equilibrium in Classical Political Economy and Post Keynesian Economics"** submitted by me under the guidance and supervision of Prof. G. Omkarnath and Prof. Phanindra Goyari, School of Economics, University of Hyderabad, is a *bonafide* research work, which is also free from plagiarism. Furthermore, I also declare that it has not been submitted previously in part or full to this University or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in Shodganga/INFLIBNET.

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CERTIFICATE

This is to certify that the research work embodied in the present PhD thesis entitled "**Competition and Equilibrium in Classical Political Economy and Post Keynesian Economics**" submitted by Mr. S. Limakumba Walling bearing registration number 09SEPH19 in partial fulfillment of the requirements for award of Doctor of Philosophy in the School of Economics is a *bonafide* work carried out by him under our supervision and guidance. This thesis is free from plagiarism and has not been submitted previously in part or in full to this or any other University for award of any degree or diploma. The candidate has satisfied the UGC Regulations of publications and conference presentations before the submission of this thesis. Details are given below:

A. Publication

1. Walling, S. Limakumba (2018): "Gautam Mathur's Sraffa – Neumann System: A Framework for Development", *Artha Vijnana*, ISSN: 0004-3559, Volume-LX, No. 1, March, pp. 73-89.
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B. Presentations in conferences:

1. Presented a paper: "Competition and the Method of Long Period Analysis", in the First Azim Premji University Workshop on Advanced Macroeconomics", an international workshop hosted by Azim Premji University, Bengaluru, 23-24 August 2018.
2. Presented a paper: "The Sraffa – Neumann System: Strategies for Development with Economic Justice", in the Workshop on "Sraffian Economics", organized by Gokhale Institute of Politics and Economics, Pune, 7-8 March 2017.

Further, the student has passed the following courses towards fulfillment of coursework requirement for Ph.D. degree in Economics.

Course Code	Course Title	Credits	Pass/Fail
EC-801	Advanced Economic Theory	4	Passed
EC-802	Social Accounting and Data Base	4	Passed
EC-803	Research Methodology	4	Passed

PhD Supervisors

Prof. G. Omkarnath **Dean**

Prof. Phanindra Goyari

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S. Limakumba Walling

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Abstract

The thesis mainly explores the tension within the Post Keynesian structure – between the 'Keynesian-Kaleckian' and the 'Classical political economy' (Sraffians) approach to competition, equilibrium and method. The Keynesian-Kaleckian approach favours the short period method, as opposed to the Classical/Sraffians' use of the method of long period. Given the recent Post Keynesian debate about coherence and synthesis between the two approaches, as to what should constitute Post Keynesian economics. The general argument of the thesis is that – First, the "long period method" of the Classical/Sraffian approach has been misunderstood as a Marshallian and neoclassical construct. That with regard to the role of economic theory and the concept of equilibrium, the Keynesian, Kaleckian and the Keynesian-methodologists' positions are similar and compatible with that of the modern revival of classical political economy. However, since the 1970s, misunderstandings have arisen within Post Keynesians, much like the blind men and the elephant story, with each group ascribing different meanings and terms for the theoretical "normal position" or "long period method", brought about by abstracting from the complex social economy the essential features and relations, as "first principles" or the first stage of theorising. Secondly, the present study asserts that a conception of the long period method is essential for a consistent system of theory, legitimised through the process of competition. A general theory of value, distribution and growth based only on the "short period" method is plagued with conceptual inconsistencies. This suggestion for a long period method should not mean a total rejection of the short period theory. In fact, it is claimed that any short period theory must be done with reference to a corresponding long period position in which the process of free competition brings about the uniformity of the general rate of profit across sectors in the economy.

Keywords: History of Economic Thought, Classical and Neoclassical Economics, Sraffian Economics, Post Keynesian Economics, Perfect Competition, Equilibrium.

JEL Classifications: B00, E13, B12, E11, E12, D41

Chapter 1
Introduction

1.1 Competition in Economics

Modern society is a complex web of institutions mediating the basic economic processes of production, exchange, distribution and accumulation. No systematic mechanism of economic and social coordination is immediately perceptible. Economic theory attempts to discover the laws and the mechanism governing such economic processes. This attempt to provide statements of tendency of general applicability must first proceed by abstracting from the actual economy to isolate a set of well-defined phenomena on which economic theory can be built on (Eatwell 1982). Competition provides that coherent basis, the foundation upon which to erect the *method* and *theory* of analysing those economic processes. Competition acts as an organising concept in economics, much like physical sciences study the nature and attributes of 'sound' or 'light' under various mediums like air, water or vacuum. For economics, competition is the medium under which the nature and attributes of production, exchange, distribution and growth are studied. Competition gives a first approximation to understand and bring forth the systemic and permanent forces acting upon economic variables under study. The search for a coherent process that acts upon the "object of analysis" such as output, employment, prices, distribution, etc., culminated in identifying competition as the basis that provides the foundation. One of the methods that lend legitimacy to the persistent and systemic force of free competition in explaining the "object of analysis" is the "long period method" (Milgate 1982, 11). The concept of competition depends on the "method of analysis" and the theory. When either of them changes, the nature of competition also changes. The present chapter is structured as follows, after a brief introduction (section 1.1), the motivation for the present study is discussed in section 1.2, followed by the methodology and scope of the study in section 1.3. Finally, section 1.4 presents the general arguments of the thesis and the broad objectives.

Early political economists before Adam Smith and classical economists realised that to understand the principles and laws governing the workings of an emerging capitalist

economy, one needs to abstract to a free "competitive economy". According to Ronald Meek(1977), the Scottish Historical school (of which Adam Smith was a product) recognised that modern society though complex, has certain regularities and uniformities. Meek quotes Adam Ferguson

> "Society developed blindly, but not arbitrarily. … 'Every step and every movement of the multitude, even in what are termed enlightened ages, are made with equal blindness to the future; and nations stumble upon establishments, which are indeed the result of human action, but not the execution of any human design.' But social changes did occur, and in the process of change certain uniformities and regularities were observable. The great task was to explain these, in terms of the laws which lay behind social development."(ibid., 19)

A capitalist economy is one in which the process of free competition brings forth permanent and systematic forces that induce capitalists to seek the most profitable employment for their capital stock. Thus, it is providing the basis of a general tendency for a uniform general rate of profit. The long period natural position is the "centre of repose and continuance" in which all the prices gravitate to their natural prices. As we shall see later, competition brings about the natural prices in the long period. The long period method is a conceptual framework and not a reference to any historical time; rather, it is a theoretical construct, a position as we shall discuss later in which competition works out fully with uniform prices and a uniform rate of profit. This should not mean that political economists considered only the study of long-period positions brought about by competition. Rather, temporary or accidental disturbances that deviate the systemic forces away from long-period positions were also studied.[1]

Nevertheless, the study of short period deviations was always framed within the corresponding long period position framework.[2] Having specified the "object of analysis" and

[1]The study of deviations of market prices from natural prices is because of temporary or accidental disturbances. Instances of such study are – Ricardo and Malthus' debate about over-production (glut), or Marx's analysis of the possibility of crisis.

[2]The long period position is not static or a motionless position- a stationary state. But a dynamic one, for any change in the factors governing competition (the uniformizing tendency of the rate of profit) such as technology or institutions, etc, will take the economy to a new long period position defined by a new set of natural prices.

the "method of analysis", the next step is to explain the determination, causal relationship and magnitude of these objects. This constituted "the theory", a theory must be held accountable on two related counts. First, a theory's representation of reality through its assumptions and the level of abstraction. Second, the requirement of a theory is to explain the objects of analysis with logical consistency. For a given object of analysis, that of a capitalist economy and the method of analysis, the theory provides an explanation of how the objects get determined and the causal relations among the object of study, using the given method or framework. This implies that there can be multiple explanations or theories for the same object of analysis using the same method of analysis (ibid., 1982, chap. IV)). Classical economists proceeded to theorise the competitive capitalist economy using the method of long-period positions in which free competition is the organising force (Eatwell 1982). As J. S Mill succinctly writes that it is free competition that lends political economy

> any pretension to the character of a science. So far as rents, profits, wages, prices, are determined by competition, laws may be assigned for them. Assume competition to be their exclusive regulator, and principles of broad generality and scientific precision may be laid down, according to which they will be regulated. (Mill [1848] 1909, 16)

Thus, to understand the regular, systematic principles governing production, prices, distribution and accumulation, a conception of competition and its effect on these variables was essential. Therefore, classical economists and Marx conceptualised competition as a dynamic process wherein economic agents and resources have perfect mobility. Under such a conception of competition in the long period, theories on determining value and distribution and economic growth were erected.

In the latter half of the 19^{th,} there was a marked shift in the theory, termed marginalist revolution or neoclassical theory, the structure of the neoclassical theory is completely different from classical political economy (discussed in chapter 2). Its basis was the utility analysis and optimal and efficient use of scarce and given resources, determined through a demand-supply theory. The focus of the theory switched from the production sphere to the market sphere. Furthermore, with the change, in theory, the concept of competition also

underwent a drastic change. Competition was conceptualised in terms of a market structure, as presented in the "perfect competition" model (see section 3.4). Competition no more represented a rivalrous process but rather a state, measured by the number of participants in the market. With this notion of perfect competition, normal prices, quantities supplied/demanded and distribution variables were all determined by the equilibrium of demand and supply functions, concluding that in competitive capitalism, there is always a tendency towards full employment of resources including labour. Over the turn of the 20th century, the theory and analysis were refined, with the result that neoclassical theory displaced the classical theory as the prevailing orthodoxy. With Marshall's *Principles,* this neoclassical theory became synonymous with economic theory.[3] However, it must be remembered that with the advent of this marginal revolution, though there was a shift in the theoretical structure, the objects of analysis and the method of long-period positions remained unaltered. Thus, in the long period, market prices equilibrate to normal prices and hence establish normal profits. Even when Marshall, in his *Principles,* theorised about the short period market conditions, it was always done as a study of deviations of the actual system from the corresponding long period position. As Marshall comments:

> Markets vary with regard to the period of time which is allowed to the forces of demand and supply to bring themselves into equilibrium with one another, ... For the nature of the equilibrium itself, and that of the causes by which it is determined, depend on the length of the period over which the market is taken to extend. (Marshall [1920] 2013, 274).

During the "Great Depression' of the 1920s and 1930s, the neoclassical theory postulating full employment for a competitive capitalist economy came under severe criticism for its failure to explain the large unemployment and measures to correct them. With his *General Theory* ([1936] 2010), Keynes provided a critique of the dominant neoclassical theory and instead put forward the 'principle of effective demand' that determines output and employment without recourse to a demand and supply theory. Keynes asserted that money is not only a medium of exchange but

[3]Marshall in his *Principles* ([1920] 2013) sought to put forward his theory as a continuity of the classical theory, but much improved and refined in analysis. Though as we shall see later that this is not the case, rather there was a marked shift in the structure of the theory.

also a store of value, that investment is volatile and depends on entrepreneurs' expectations about future prospects, and therefore, underemployment equilibrium is the general characteristic of any competitive capitalist economy.[4] However, Keynes's analysis was grounded on a short period method and not on the long period method (see section 2.4). Along with the Keynesian critique, Piero Sraffa, an Italian economist, revived interest in the classical theory and its method of analysis, his book (1960), which also provided a devastating critique of the neoclassical theory. Economists dissatisfied with the theory of perfect competition introduced imperfect competition models inspired by Keynes, Kalecki and Sraffa, wanted to have a more radical departure not only in terms of theory but also in terms of method of analysis. This gave rise to Post Keynesian theory, whose development was touted as a grand alternative theoretical structure to the dominant neoclassical theory.

On the one hand Post Keynesian economics draws its theoretical structure from Keynes and Kalecki, grounded on the short period method and on the other hand from classical political economy, with the method of long-period positions. The present thesis is a study of the Post Keynesian theoretical structure and methods and the tensions within it, i.e., with the modern revival of classical political economy. Post Keynesians need to have a consistent theory and method to present an alternative to the neoclassical narrative of capitalism. One important aspect of which is the conceptualisation of the nature and type of competition within a coherent long period framework, upon which theories of relative prices, distribution and accumulation can be structured.

1.2 Motivation for the Study

The concepts of "competition" and "equilibrium" are, in some sense, generic to all systems of economic theory. The present thesis is an explorative study of the three interrelated concepts of competition, equilibrium and method (short or long period), and how they differ and work across major systems of economic theory. Generally, discussion of theories and their internal and external (from rival schools) critiques seems not only to drown these concepts and methods but is itself quite dense. The motivation of the present study is to appraise these

[4]Michał Kalecki, a polish economist reached the same conclusions as Keynes did, with the short period method but, through a Marxian perspective.

concepts and their implications for the theories rather than an appraisal of the theories themselves.

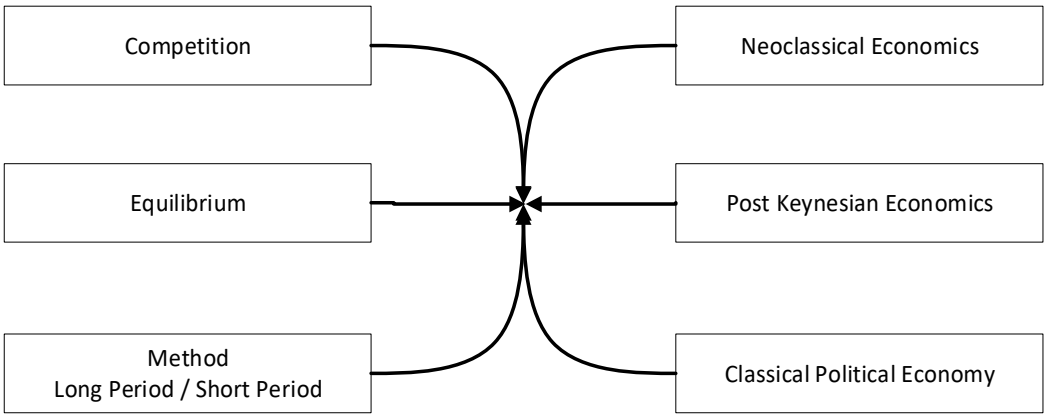

Figure 1.1: Competition, Equilibrium and Method and Systems of Theory

For the present study, we identify three broad systems of economy theory – neoclassical economics, Post Keynesian economics and classical political economy with its modern revival with the work of Piero Sraffa (1960). In this study, we will identify neoclassical economics interchangeably with marginalism or mainstream economics, although most mainstream economics and even some of its critics call for doing away with the term "neoclassical" (see appendix A.2). Post Keynesian economics initially started as a project to offer a grand alternative to neoclassical economics by attempting to synthesise the works of Keynes, Kalecki and Sraffa (see section 2.5). Following Hamouda and Harcourt (1988) and King (2002, chap. 10), one can identify three main strands (or schools) within Post Keynesian economics –the fundamentalist Keynesians, the Kaleckians and the Sraffians (modern classical political economy). All strands of Post Keynesians build around Keynes's principle of effective demand but differ in their points of emphasis and method. The fundamentalist Keynesians build on the Marshallian short period and microfoundations emphasising the role of fundamental uncertainty and money. The Keynes-Kaleckians, on the other hand, have a Kaleckian microfoundations for their macro dynamics, again emphasising on short run, imperfect competition and the role of finance. Classical political economy (Sraffians) through the revival

of the classical theory of value and distribution, emphasizes on free competition and long period and attempts to extend Keynes's effective demand for a theory of accumulation in the long period. Among the three strands, the fundamentalist Keynesians and the Keynes-Kaleckians share much common ground in their emphasis on short period, fundamental uncertainty, and money. However, there have been growing tensions with the classical political economy or the Sraffians. The key differences between the Post Keynesians (Keynesians and Kaleckians) and the Sraffians have to do with regard to the treatment of time, the method of short or long period, uncertainty and money. Most Post Keynesians no longer consider Sraffians as part of Post Keynesian economics as they argue that Sraffian emphasis on long period is much like neoclassical economics (see section 2.6).

The present thesis explores these tensions and differences by focussing on how they conceptualised competition and equilibrium and the method of short or long period and its implication for their theory. For the present, we relegate the study of uncertainty and the role of money as being beyond the scope of the thesis. Sraffa's value and distribution theory based on the long period method and the Post Keynesian mark-up price theory built on the short period method provides an alternative to the neoclassical theory (see section 5.5). Given the different concepts of competition, equilibrium, and method, the thesis explores whether the Post Keynesian theory of prices and distribution provides a robust, logically consistent approach to economics?

The motivation of the present thesis also comes from the fact that there is a failure to recognise that there was a fundamental shift in the conception of competition from a dynamic notion to a static one. The apparent reason is that most modern neoclassical economists view the development of economic thought as a linear cumulative process, that neoclassical theory is an improvement over their classical counterpart. Therefore, there has been no apparent change for the neoclassical economists, rather an improvement in the concept of competition since Adam Smith to the present-day model of perfect competition. The thesis proposes to show that there was indeed a change in the method and theory with the "marginalist revolution", and that the classical economists' conception of competition as a dynamic process is different from that of the neoclassical conception of perfect competition.

1.3 Methodology and Scope of the Study

Competition in economics is an all-pervasive concept. The term "competition" is employed mainly in four ways – legal, strategic, theoretical and as a normative concept. First, competition in the legal sense has to do with competition policy and antitrust laws. It is prescriptive in nature. Second, the term competition is also used while discussing the strategic behaviour of the firms in their quest for larger profits and market share. It is most frequently applied to the study of industrial organisations. Thirdly, competition is used as an abstraction from the complexity of the economy, such that theory can be brought to bear upon the systematic forces at work as a first approximation, and it is possible only with some assumption of competition. Finally, competition is a normative ideal – the "competitive economy" with attributes of full employment, maximum efficiency, productivity, and living standards with the current levels of technological progress and institutional arrangements. It is an ideal state to which all economies should strive toward.

The present thesis focuses only on the third aspect of competition and looks at competition from a conceptual level as a representation of a *method of analysis*. Strategic competition among firms if referenced, is only done within the context of determining relative prices, income determination, and economic growth.

It needs to be clarified that the term *method* or "method of analysis" used in the present study does not imply "methodology" often used to examine what economic theory and research are and how they ought to be. Though we have occasions to refer to Keynesian methodologists (see sections 2.5.3and 5.3), for the most part, in the present study, the term method or "method of analysis" is used in a narrow sense to mean the *frame of reference* for the theory, whether the theory is framed in the short or in the long period. The use of the term "period analysis" is avoided here because of its strong Marshallian connotation (see sections 4.7 and 5.2) of slicing up time into periods. The present thesis endeavours to show that the term long period (though the naming convention is unfortunate), as used by classical political economists (Sraffians), is a method of abstraction (see sections 3.2 and 5.4).

As mentioned in the previous section, the study identifies three theoretical frameworks – Neoclassical theory and the broad rubric of Post Keynesian theory, which encompasses a Keynesian-Kaleckian approach and that of Classical Political Economy. The

discussion is carried forward by juxtaposing the neoclassical theory with that of the Post Keynesian and classical approaches. However, the particular focus of the thesis is on the tensions and the question of coherence between the two approaches within Post Keynesianism with regard to the questions of competition, equilibrium and method and the theory of value and distribution. In identifying the three approaches, it must be recognised that each approach does not contain a set of well-defined, all agreed-upon sets of ideas and theories within themselves. There are variants within each structure. However, we take the dominant themes, method and theory that best identify each approach.

1.4 Objectives of the Study

The thesis mainly explores the tension within the Post Keynesian structure – between the 'Keynesian-Kaleckian' and the 'Classical political economy' (Sraffians) approach to competition. The Keynesian-Kaleckian approach favours the short period method, as opposed to the Classical/Sraffians' use of the method of long period. Given the recent Post Keynesian debate about coherence and synthesis between the two approaches, as to what should constitute Post Keynesian economics. The general argument of the thesis is that – First, the "long period method" of the Classical/Sraffian approach has been misunderstood as a Marshallian and neoclassical construct. That with regard to the role of economic theory and the concept of equilibrium, the Keynesian, Kaleckian and the Keynesian-methodologists' positions are similar and compatible with that of the modern revival of classical political economy. However, since the 1970s (see sections 2.5.3 and 2.6), misunderstandings have arisen within Post Keynesians, much like the blind men and the elephant story, with each group ascribing different meanings and terms for the theoretical "*normal position"* or *"long period method"*, brought about by abstracting from the complex social economy the essential features and relations, as "first principles" or the first stage of theorising. Secondly, the present study asserts that a conception of the long period method is essential for a consistent system of theory, legitimised through the process of competition. A general theory of value, distribution and growth based *only* on the "short period" method is plagued with conceptual inconsistencies. This suggestion for a long period method should not mean a total rejection of the short period theory. In fact, it is claimed that any short period theory must be done with reference to a corresponding long period position

in which the process of free competition brings about the uniformity of the general rate of profit across sectors in the economy.

The following analysis brings the broad objectives of the thesis stated above:

1. To trace the history and the concept of competition in economics. This will help to draw a distinction between competition as a dynamic process and static competition, thus reflecting the theoretical and methodological differences between classical political economy and modern neoclassical economics.
2. To examine the concepts of competition, short period, long period and equilibrium within Post Keynesian, Keynesian methodologists and classical political economy, and how they differ or are similar.
3. To appraise Post Keynesian price theory and the nature of competition. That to have a consistent theory of relative prices and distribution, it must be placed within a method of long-period normal position, as brought about by free competition.

Having stated the problem, objectives and the scope of the study, we proceed to have a more detailed discussion of the structures of – neoclassical theory, classical political economy and Post Keynesian Theory in the next chapter.

Chapter 2
An Outline of Major Systems of Economic Theory

2.1 Introduction

Human civilisation relies on some form of economic organisation, which is appropriate to its degree of development. Any economic organisation comprises institutions, conventions and practices. Many economic ideas about wealth, prices, money, tax, interest, or trade can be traced to ancient and medieval times.[1] However, as economic organisation acquires complexity in the form of modern capitalist economy, thus arise the need for formal economic theory.

> The economic organisation of modern industrial capitalism is not immediately perceptible. As a form of economy in which production and distribution proceed by means of a generalised process of exchange (in particular by the sale and purchase of labour), it possesses no obvious direct mechanisms of economic and social co-ordination. Yet in so far as these operations constituted a system, they must be endowed with some degree of regularity, the causal foundation of which may be revealed by analysis. … Theory proceeds by the extraction from reality of those forces which are believed to be dominant and persistent, and the formation of these elements into a formal system, … capturing the essential character of the phenomena under consideration. (Eatwell 1982, 204, 2011)

Schumpeter ([1954] 1986, 38–39) divides the building of economic theory into three stages. First is the "preanalytic cognitive act" or vision, "to visualise a distinct set of coherent

[1] In classical antiquity traces on economic discussions can be found in the 'Babylonian code of Hammurabi' and Old Testament of the Bible. In Greek, the *Oeconomicon* by Xenophon, from which the term 'economy' is derived, '*oikos*' meaning house, and '*nomos'*, meaning norm or law (see Roncaglia 2005). Other Instances includes "Vatican discourse on interest, Islamic baking, Hindu personal laws… [and] Kautilyas's *Arthasastra* regarded as a manual on economic administration" (Omkarnath 2012, 258).

phenomena as a worth-while object of our analytic efforts". The second stage is "to verbalise the vision or to conceptualise it in such a way that its elements take their places, with names attached to them that facilitate recognition and manipulation, in a more or less orderly schema or picture". This is the stage of abstraction, to isolate those elements of reality that are considered important for the issue under consideration. The final stage is the building of the "scientific model".

Unlike other physical sciences, since economics is a study of human society and its material progress, ethics and ideology are an intrinsic part of the discipline. "The economy is firmly embedded in a social system of morality. ... Trust, cooperation, empathy, and loyalty are an integral part of all economic processes"(Omkarnath 2012, 258). Though a distinction is often made between "normative economics' and "positive economics", it is at best artificial. Economics is vulnerable to ideology, and hence economists should clearly state their value judgment. For instance,

> if we observe two chemists, one with Left political views and one with Right views, we do not really think this information is pertinent to the scientific status of their respective intellectual work as chemists (though it may influence the problems to which each chooses to devote his or her efforts). But if we observe two economists with similarly divergent political views, we are far more likely to think this relevant to the status of their intellectual work, even if that is not inevitably so. (Aspromourgos 2009, 255–56)

The point is that in natural-physical sciences, the social-political beliefs of the scientist do not matter in their work. However, they do, for the economists. This is not because economists consciously invoke ideological purpose (although some do) in their work but rather because there is no strict independence between the theorist's belief and the behaviour of the phenomenon under investigation in economics.

Given that economic theory is a certain vision of the economy, following Roncaglia (2005), we contend a "competitive view" rather than a "cumulative view" of the development of economic analysis. The cumulative view drawing from ideas of "logical positivism" asserts that the development of economic analysis follows a linear trajectory, that there is a progressive

rise to higher levels of understanding of economic realities. It points to the fact that contemporary modern economic theory incorporates all previous contributions and is better and more sophisticated. The idea is incorporated in the use of the term "neoclassical theory" as an improved and refined version of the old "classical theory". Inspired by Thomas Kuhn, Imre Lakatos, and Paul Feyerabend, economists have taken an interest in alternative approaches and the coexistence of different research programmes. The competitive view contends that the progress of economic analysis is not linear or continuous, but rather there has been a discontinuity in the realm of theory though the object and the method might have remained the same. The competitive view recognises that there can be multiple contending visions of the economic system. As Roncaglia stresses that,

> "the competitive view implies neither an equivalence between competing approaches, nor the absence of scientific progress. It simply implies recognition of the existence of different approaches based on different conceptual foundation. … There can be progress both within each approach (where indeed it is the general rule, in terms of both greater internal consistency and higher explanatory power) and along the historical sequence of research paradigms or programmes."(Roncaglia 2005, 10)

Following the competitive view of the development of economic analysis, for the present study, we recognised three competing systems of economic theory. These are Classical economics (Classical political economy), Marginalism/Neoclassical/Mainstream Economics and Post Keynesian economics. Each seeks to explain the workings of a capitalist economy in relation to the questions about growth, prices and distribution. However, each differs in its method and theory, explanatory power and internal logical consistency.

The discussion of the systems of economic theory identified for the present study starts with neoclassical theory in section 2.2.[2] The term neoclassical implies a sort of improved continuity and chronologically after classical economics. However, the following discussion in

[2] As mentioned earlier in section 1.2, some economists do consider neoclassical economics as different from mainstream economics. However, as discussed in Appendix A.2, the core of mainstream remains neoclassical and so in the present study we use the terms interchangeably.

section 2.3 will show that neoclassical economics is theoretically very different from classical political economy. Before discussing Post Keynesian economics, the chapter takes a slight detour to study Keynes's method in section 2.4; this will help better understand Post Keynesian economics in section 2.5. The chapter concludes with a discussion of the differences within the various strands of Post Keynesianism in section 2.6, with section 2.7 offering a summary and concluding remarks.

2.2 Structure of Neoclassical Theory

The term neoclassical economics "was coined by Thorstein Veblen in 1900, and subsequently employed by others, in order to characterise the Marshallian version of marginalism, ... [For Marshall] sought to present his theory as having a substantial continuity with classical economics … only [from] the 1930s and 1940s, that the term was extended to embrace marginalism in general" (Aspromourgos 1986, 266). However, neoclassical economics has its origin in the latter half of the 19th century, as opposition to classical political economy grew particularly to the labour theory of value. The birth of the marginalist revolution is often said to have begun around the 1870s with Stanley Jevons in England, Leon Walras in France and Carl Menger in Austria, who independently put forward an explanation of value and distribution based on utility analysis. However, the 'revolution' was a long-lasting process that gradually formed into an integrated theoretical system called neoclassical economics.

During the middle of the 19th century, the Ricardian labour theory of value found substantial support among the "Utopian socialists", also called "Ricardian socialists", they argued that labour was not given its due share of the social surplus because labour creates the value of commodities. This gave rise to anti-capitalist movements, and faithful Ricardians like Robert Torrens and McCulloch could not modify the theory to take into consideration the changing capital-labour relations and get rid of the anti-capitalist assertions within the theory, and so the Ricardian theory gradually disintegrated. Economists were searching for ways to rationalise profits as a due share of the capitalist. The objective was to re-establish "competitive capitalism" as a free and harmonious just system. The 1870s marked a watershed in economics. In early 1867, Marx published his *Capital*, which presented a richer and systematic theory critiquing capitalist production. Moreover, in the early 1870s, as mentioned earlier, a new

theory of value based on marginal utility was discovered. As Jevons writes, "Repeated reflection and inquiry has led me to the somewhat novel opinion, that value depends entirely upon utility. Prevailing opinions make labour rather than utility the origin of value" (Jevons [1871] 1888, 28)

2.2.1 Marginal utility as the basis for Value

The concept of utility in marginalism is based on the works of Jeremy Bentham, who defined it as the ability to increase pleasure or reduce pain. Utility has come to mean the satisfaction an individual derives from the consumption of a good. Every good gives some utility to its consumer, which can be measured in terms of 'Util' units.[3] As an individual consumes more, their total utility increases; however, after a point, the additional units of goodwill give less satisfaction or pleasure than the previous unit of the good. Marginal utility is the change of utility as a result of consuming an additional unit of a good. The value of any good is determined by the value of marginal utility derived by the individual. Thus, value is determined subjectively. The theory of marginal utility was already there in the works of Cournot, Dupuit and Gossen in the early 19th century. However, the attempt of the marginalist theory was to provide a new vision of the capitalist economy in the following way (Bharadwaj 1978, 28). First, capital and labour were treated on an equal footing, whose services were essential to production. A symmetry was sought between the distributive classes, the distribution shares, factors of production and between production and consumption. There is no antagonistic relation between capital and labour. Second, all individuals in society were conceptualised as rational and self-interested, well aware of their consumption preferences. Social classes are no more the unit of economic analysis, the focus shifts to the individuals (methodological individualism). Third, the analysis shifted from the production sphere to the exchange sphere. Markets came to occupy an important place in the analysis, where 'equivalents' are exchanged under competitive conditions which works through the forces of demand and supply functions. Finally, the idea of scarcity and given endowment which was attributed to land alone by the classical economists, was extended by the marginalist to other

[3] Cardinal utility has been replaced by ordinal utility. Instead of measuring how much utility, the individual rank the goods according to his/her preferences.

factor inputs, especially capital and labour. All factors of production were assumed as scarce and given.

2.2.2 Method of Analysis

With the marginal approach, though the theory shifted to a demand and supply theory, the 'object of analysis' and the "method of analysis" remained unchanged. Just as the classical economics, the marginalist adopted the long-period method – the tendency to a uniform rate of profit and wage rate. However, there was a radical departure from the classical school's theoretical structure. Classical economics viewed the economy as a circular process because of the recognition of production as the primary economic process. Therefore, a "sequential approach" to theorising was adopted, which necessitated a logical separation of the analysis of value and distribution from that of determining the social output. On the other hand, the neoclassical viewed the economy as a linear process, from given endowment of resources to production to consumption of finished goods to maximise utility. Marginalist theory takes as datum (a) the technology, (b) the preference of the individual, and (c) the endowments of the factors of production. Given this datum, whether be it relative prices (value), distribution, or quantities of outputs or inputs, everything is determined 'simultaneously' through the equilibrium of demand functions and supply functions.

Though the method of long-period position was retained, "however, the market price became synonymous with "short period", and the 'natural prices' became the 'long period' prices" (ibid. 41). The analysis can be done in two levels – partial equilibrium and general equilibrium. Alfred Marshall pioneered the short period partial equilibrium analysis. "The study of some group of tendencies is isolated by the assumption other things being equal: the existence of other tendencies is not denied, but their disturbing effect is neglected for a time" (Marshall [1920] 2013, 304). It is a study of an individual, a single market, an industry or a firm in the short period by isolating it from the rest of the economy. Marshall distinguishes four types of equilibrium according to time – the market period or the very short period, the short period, the long period, and secular movements of very long period. Leon Walras pioneered the general equilibrium system, "the whole world may be looked upon as a vast general market made up of diverse special markets where social wealth is bought and sold. Our task then is to discover the laws to which these purchases and sales tend to conform automatically" (Walras [1874] 1954,

84). General equilibrium seeks to determine the prices and quantities simultaneously for the whole economy, consisting of many interacting markets. It recognises the interdependence of markets, in which a change in the preference, technical condition or endowments affects other markets as well (see section 3.4.5).

2.3.3 The Equilibrium Theory

The determination of all economic phenomena shifted to the exchange sphere. i.e., the markets. Demand and supply play an important role. The demand schedule or function of the good is constructed on the basis of utility. As more of a good is consumed, the marginal utility decreases; this is the "diminishing marginal utility" principle. As the marginal utility decreases, the valuation of the good to the consumer decreases with the increase in quantities. Therefore, the demand function or schedule gives a monotonic negative relation between prices and quantity demanded. On the other hand, the supply function or schedule of a good is determined by cost. The cost of production was expressed in terms of disutility. Supply of additional goods can only be increased with increasing marginal cost or marginal disutility, and therefore the supply function has a monotonic positive relation between prices and quantity supplied. The balance of the demand and supply functions, its point of intersection determines the equilibrium of the market, the relative prices of the goods and the quantities. The equilibrium position is determined through a process of substitution, i.e., re-allocation and transformation of the scarce resources. Equilibrium, therefore, denotes efficient allocation of resources and utility maximisation. The goods (resources) are assumed to be divisible so that the principle of substitution is smooth and continuous, showing marginal changes along with the demand or the supply schedule.[4] However, the marginal changes in the magnitude of the goods or prices are only "potential" or "hypothetical changes" along the demand or supply curve and not actual changes in the neighbourhood of the equilibrium (Bharadwaj 1978, 42-43). For neoclassical economics, the economy is "theoretically observable" at the equilibrium position.

The notion of market forces of supply and demand determining equilibrium position is symmetrically extended to the factors of production – the labour markets and capital markets. In neoclassical theory, the market exchanges are depicted in the popular "circular flow of

[4] The demand and supply schedules being continuous functions, with smooth marginal substitution makes it amenable to use calculus for formal modelling.

income" model. In the simplest case, the economy is assumed to consist of two sectors – firms and households. The household sector is endowed with resources and supply savings and labour services. The firms hire the resources, labour services, and investment to produce goods and services sold to the household sector for consumption. The transactions between the household sector and the firms are depicted in Figure 2.1.

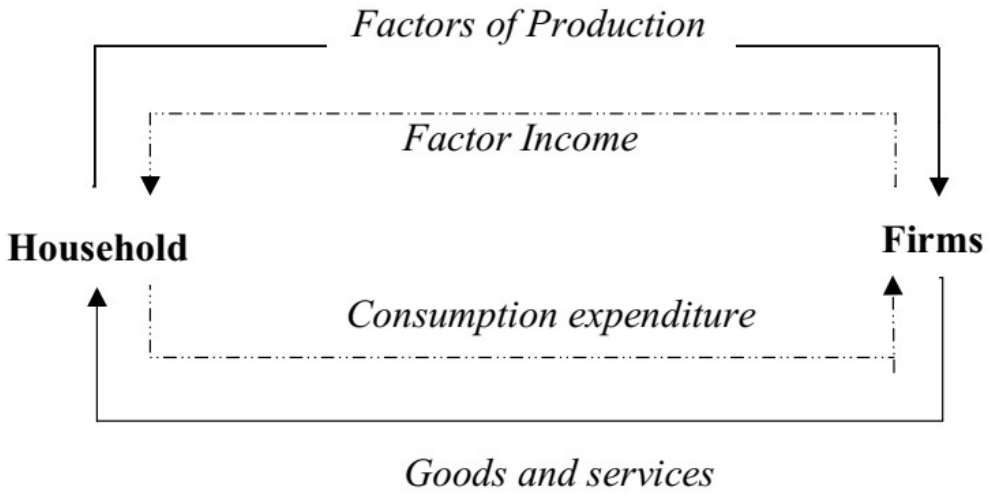

Figure 2.1: The Exchange Model

This simplified model can be extended by including the government, banks and other financial intermediaries. The outer arrows indicate transactions of quantities, and the inner dashed arrows show the corresponding transactions in monetary terms. This circular flow model should not be equated with the classical conception of production as a circular process (see section 2.3.1). Figure 2.1 shows only the transactions or exchanges in the factors market and the goods market. The model does not show how production is organised or the production conditions and relations between the social class. In fact, as discussed earlier, neoclassical theory is a linear approach in which individuals own the resources, and their preferences decide the composition and size of the output. The firm sector is just a 'process box' that transforms factor inputs into output through a production function.

Taking a simple model following Felderer and Homburg (1992), we analyse the behaviour of the firms and the households in various markets. The firm and the household sector behaviour are modelled using Marshall's notion of the "representative firm" (see section 3.4.2)

and the "representative household", and assume a competitive economy. The representative household supplies factors of production such as labour services and savings, and hence earns wage income and interest income, i.e.,$PY = wN^s + iS$, where P is the price level, Y the level of output, N^s Labour supply, w the money wage rate, i the interest rate and S the total savings. The objective of the household is to maximise utility. The representative firm produces commodities using factor inputs Capital (K) and labour (N). The relation between output and inputs is given by the production function $Y = F(N, \text{K})$. The Firms objective is to maximise profit by minimising cost. Therefore, the firm will employ labour till the marginal product of labour is equal to the real wage rate $\frac{\partial Y}{\partial N} = \frac{w}{P}$. Similarly, the stock of capital employed will be till the point $\frac{\partial Y}{\partial K} = i$.[5]

In the labour market, the household sector supplies the labour service to the firm. The supply of labour N^s is a positive function of the real wage rate $N^s = N\left(\frac{W}{P}\right)$. Wage income increases utility, while work is disutility. Therefore, after a certain wage income, the household may prefer leisure to work, thereby diminishing the labour supply. The firm's demand for labour serviceN^d is a negative function of the real wage rate $N^s = N\left(\frac{W}{P}\right)$. This is so because, under competitive conditions, as discussed earlier, firms will employ till the real wage rate is equal to the marginal product of labour. Full employment of labour N^*will be achieved at the equilibrium point

$$N^s\left(\frac{W}{P}\right) = N^* = N^d\left(\frac{W}{P}\right)$$

The price level P is exogeneous to the labour market. If the real wage rate is above the equilibrium rate, there will be an excess labour supply than labour demand and unemployment will prevail. Given the price level P, it follows that the money wage rate w is in excess, and so the unemployed labour will be willing to work at a lower money wage rate. They will underbid the employed. This will bring down the nominal and real wage rates, thus restoring full employment equilibrium. Conversely, when demand exceeds the labour supply resulting in a

[5] In competitive conditions, the rate of profit and the rate of interest are in equilibrium.

lower real wage rate. The high demand for labour will bid up the money wage rate and restore full employment.

In the capital market, households supply their savings as the rate of interest increases. Interest income for the household is the premium for abstaining from present consumption and postponing it to the future. It is a reward for abstinence or waiting and hence, there is a positive functional relation between the supply of savings and the interest rate,$S = S(i)$. The firm demands the savings of the household for investment in capital stock. For the firm, the interest rate represents the cost of borrowing. Hence, investment and interest rate have a negative functional relation $I = I(i)$. The rate of interest will adjust to bring the capital market into equilibrium

$$S(i^*) = I(i^*)$$

the equilibrium interest rate i^*, is called the "natural rate of interest" and is equal to the marginal productivity of capital, $\frac{\partial Y}{\partial K} = i^*$.

The commodity market will be in equilibrium when $Y = C + I$. The Commodity supplied must be equal to the consumption demand and that of investment demand. The fact that the labour and capital markets are in equilibrium will automatically ensure equilibrium in the commodity market. For neoclassical economic theory, "money is a veil", a mere medium of exchange and a measure of value. It has no value of its own and therefore does not affect the "real" sector of the economy. This role of money is expressed through the quantity theory of money. Here, we present the Cambridge version of the theory $M = kPY$. M is the exogenously given quantity of money stock, k is the average duration of cash balance, and is reciprocal to the velocity of circulation of money ($k = 1/v$), which is assumed to be constant. Y is the full-employment output level, P. The price level is the only undetermined variable. Thus, given the money stock M, total output Y, and the velocity of circulation of money v, the price level is determined as $P = \frac{M}{kY}$. If the stock of money is increased by a certain proportion, assuming constant k and Y. Then the price level will also increase by the same proportion. Thus, the quantity of money only increases the price level. This conclusion puts forward the term "classical dichotomy" since money has no consequence on the real sector operating at full-employment equilibrium.

The preceding discussions look at the individual markets of neoclassical theory. Figure 2.2 integrates all the isolated elements and presents a comprehensive impression of the neoclassical doctrine. Quadrant I show the labour market equilibrium. Quadrant II – the capital market, quadrant III – the production function of the representative firm, with labour N as the variable factor, quadrant IV – the quantity theory of money and finally, quadrant V presents a formal identity with the variables *P* and *w/P* determining the money wage rate i.e. $w^* = \left(\frac{w}{P}\right)P$. The simple model simultaneously determines the six equilibrium variables – output (*Y**), labour (*N**), the natural rate of interest (*i**), real wage rate (*w/P*), price level *P* and the nominal wage *w*.

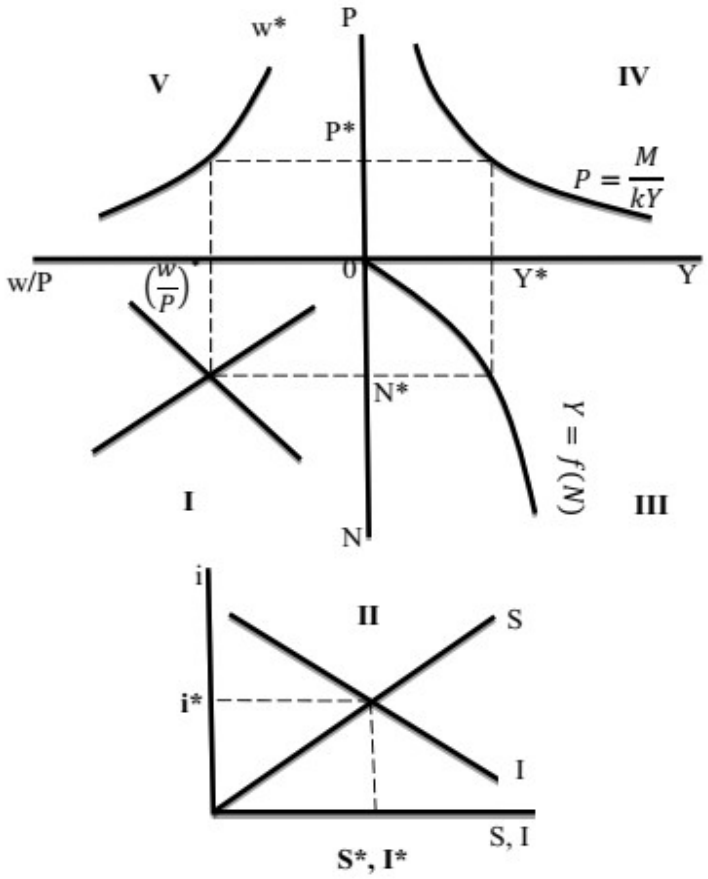

Figure 2.2: The Neoclassical Model of Exchange

Neoclassical economics has mutated into lots of variants over the years and have spread to the social sciences in the hope of enriching the explanatory power of the theory. At the same time, adopting more rigorous and formal methods of analysis has begun to dictate theory rather than being a dutiful servant. However, no matter the amount of makeover, the core utility analysis through demand-supply theory remains the basis of neoclassical economics.

2.3 Structure of Classical Political Economy

Karl Marx coined the term "classical political economy" (or classical economics), who characterised all economists "beginning with Sir William Petty in England and Pierre le Pesant de Boisguilbert in France, and ending with David Ricardo and J.-C.-L. Simonde de Sismondi" (Aspromourgos 1996, 2). According to Marx, the focus of classical political economists was the determination of the social surplus (value) – the difference between the value of total output produced and the value of (direct labour and material inputs) inputs used in production. Productive labour was responsible for the creation of this social surplus. For Marx, David Ricardo represented the last of the great classical political economist while J.S. Mill was the beginning of the disintegration of the Ricardian theory as the validity of the labour theory of value was questioned, instead value and distribution were sought to explain through a demand-supply theory.[6] This alternative approach to theory was called "vulgar" political economy. Keynes also used the term "classical economics" to describe all those economists who accepted Say's Law (that saving determines investment) and full employment equilibrium. Although classical political economists such as Ricardo used Say's law in their analysis, it must be clarified that there was no assumption of full employment of labour or capital stock (see Appendix B.2 for Classical economists' use of Say's law). Keynes's definition includes Alfred Marshall and contemporise like Arthur Pigou. However, as will be seen, Keynes's use of classical economics "actually refers to "neoclassical economics".

Following the competitive approach to economic analysis discussed earlier, the term "classical economics" will not be defined by chronological time but rather by a certain method

[6] For classical economists, "demand and supply can only determine the oscillations of distribution and prices either above or below their 'natural' values"(Pivetti 2018, 1634). On how natural values are determined in classical political economy see section 5.5.2.

and theory characterised as the "surplus approach". The approach has been revived through Piero Sraffa, which had long been "submerged and forgotten", with a radical shift to a marginalist theory and approach during the latter half of the 19th century. Based on the "surplus approach", the definition of classical political economy encompasses the works of William Petty to David Ricardo and even Marx as part of the classical theoretical system.[7] The origin of classical political economy concurred with the emergence of capitalist order out of a feudal and mercantilist system. In the emerging production system, where capital became the prime mover of society, the questions that engaged classical economists were on what factors a nation's general progress and wealth depend on. And the social and production relations among various classes in the society. For classical economists, theories explaining these concerns "were not born out of pure intellectual curiosity but in response to problems that were encountered historically by the community" (Bharadwaj 1978, 12). General or theoretical arguments regarding the problem under consideration were advanced through books, pamphlets and debates. "Even while the particular problem proving the historical problem reseeded historically, the theory lived on, achieving an abstract form as an autonomous construction appearing to attain the status of an objective truth" (ibid. 13).

2.3.1 Framework of Classical Economic Theory

This section discusses the main chrematistics of classical economics that distinguishes it as a separate theoretical system. As mentioned earlier, classical economics was centred around the analysis of the "social surplus". A society's social surplus is the output left over after the necessary input has been deducted from the gross output in value terms.

$$Gross\ Output - Necessary\ Input = Surplus$$

The necessary inputs include the value of material inputs and payment for the labour necessary for production. This must be deducted from the gross output so that production can continue at the same level in the next period. Otherwise, the economic system will not be a viable system. Every society produces a surplus, and it is free to dispose of the surplus as it pleases. Society

[7] Marx shared most of the methods of classical political economy. For Marx, "the fundamental defect of classical political economy … is its failure to recognize that its object and thereby its analytical categories, are historically specific rather than natural"(Aspromourgos 1996, 3). That is, capitalism is but one historically specific temporary epoch of human history.

can either use the surplus for consumption or reinvestment to increase production or to export. The social surplus is analogous to the modern concept of national income. The composition and origin of the social surplus, how is it valued and distributed and what determines its growth over time were the central questions that engaged classical political economists.

The origin of the concept of social surplus can be found in the works of Sir William Petty (1623–87), whom Marx called the "father of political economy". Petty recognised that agriculture produces a surplus, through which he analysed the "social division of labour," i.e. "the division or ratio between necessary employment and total employment" (Aspromourgos 1996, 22).[8] In the same vein, Richard Cantillon (1680-1734) carried forward the idea of social surplus and how they are produced, valued, distrusted and allocated. Building on Cantillon's work, François Quesnay (1694-1774) founded the 'Physiocracy' school and viewed the economy through his *Tableau économique*. The economy was divided into three classes, farmers engaged in agriculture, artisans engaged in manufacturing handicrafts and tools, and the landlord class owned the land. Agriculture is the only sector that produces an annual surplus that the landlords appropriate as rent. The artisans are the sterile sector that does not produce any physical surplus. The *Tableau* presents an analysis of the inter-sectoral interactions among the three classes. Anne Robert Jacques Turgot (1727 -1781), building on his predecessors conceptualised the rate of profit as a return on capital invested and as forming a part of the value of a commodity. With the emergence of commercial and industrial capitalism, Adam Smith recognised that surplus generation was not restricted to agriculture, but rather the manufacturing industry also produced a surplus. Smith gives a rich account of the dynamics of economic growth and the formation of natural prices. David Ricardo (1772 –1823) focus his attention on the distribution of the social surplus. In the hands of Marx, the surplus approach reached its clearest formulation in terms of theoretical concepts and categories.

With this brief run of the history of classical economics and its surplus approach, it is clear that they conceptualised the economy as a circular process. Classical economics recognises production as the primary process in society. The production process is carried out

[8] The concept of social surplus "has a singular origin and that origin is to be found in the person of William Petty. … [He] seems to be the first writer in the history of economic theory to construct and employ notions and models which constitute a theory of surplus."(ibid., 5,123)

with the help of material inputs and labour. Material inputs can be categorised as durable or fixed capital, which outlasts more than one production cycle, and working capital (circulating or raw materials) which is used up in the production process. This circular process relation is shown in Figure 2.3. Whether durable or non-durable, the material inputs are considered as "produced means of production", not as a scarce "factor of production" as is taken by later neoclassical theory. There is complementarity in production as both labour and the *produced means* are required in the process**.**

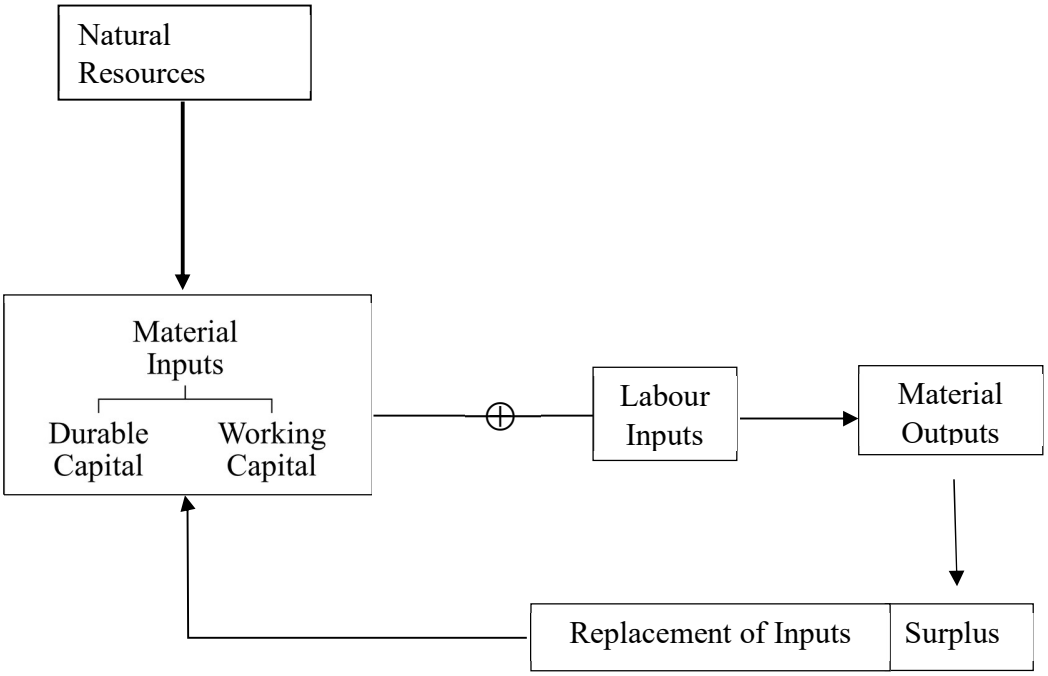

Figure 2.3: Economy as a circular process of production

The total output produced, the material inputs and the surplus all consist of a heterogeneous set of commodities. Before they are exchanged, or the surplus is distributed, they must be valued by a common denominator. Thus, the question of determining value came to the forefront. For classical economics, the 'sacrifice' of labour was identified as the creator of value. The labour expended can be measured by the amount of labour time spent in producing a commodity. Hence, the quantity of labour-time determines the value or the exchange ratio of a commodity.

2.3.2 Production Relations

The classical economists recognised the importance of classifying the society into various social classes in terms of how each class relates to the production process and their share in the distribution of the surplus. The capitalist class was the "production organising class", they borrowed or invested their own capital with the hope of getting a rate of return in proportion to the capital advanced. The working class supply the labour required for production and are hired by the capitalists for a wage. They are the 'productive' class since they create and give value to a commodity. The third social class are the landlord class, they do not participate actively in production, but they own the scarce resource – land, which entitles them to earn rental income for the use of land. The three social class participate in the production process and also gets income (profits, wages and rent) according to the economic function they perform.

2.3.3 Separation of Value Analysis from Output Analysis

Classical political economy has a logical separation of the explanation of value and distribution and that of determining the social output. The capitalist economy is an ever-changing system where every economic variable is changing through time. Economic theory cannot provide a simultaneous explanation of all the variables under study. Therefore, classical economics adopted a "sequential" approach to theory. Distribution of the surplus among the social classes can happen when the surplus, which has heterogeneous commodities, is expressed as a value sum. However, in order to value the surplus, we need prices. The price of each commodity must be such that it covers the cost of material input and labour cost (wage rate) and a normal rate of profit in proportion to the material cost, which the capitalist must earn.[9] From this, it is clear that to determine relative prices, we need to know the functional distribution variables (such as the wage rate and rate of profit), and to determine distributional shares, we need prices to value the surplus. It is evident that prices and distribution are interdependent and, therefore, must be determined simultaneously. In his *Principles* ([1817] 2005), Ricardo using the labour theory of value, provides a formulation of the theory of value and distribution. The theory takes as datum (a) the size and composition of the social output (b) technology, and (c) the wage rate. Following Sraffa (1960), the classical theory of value and distribution can be

[9] Free Competition in the long period will ensure that every capitalist will earn a uniform rate of profits for his investment.

illustrated as follows. Assuming that there are n commodities in the economy, and each commodity is produced by a single sector with circulating capital, we have:

$$\boldsymbol{pA}(1+r)+w\boldsymbol{L}=\boldsymbol{p}$$

A represents the matrix of means of production of order *n x n*, **p** is the price row vector of order *1 x n*, **L** is the direct labour row vector of order *1 x n, r* and *w*are the rate of profit and the wage rate respectively. The price system has a solution given the wage rate *w* and the surplus output. For classical economists the real wage one of the distributive variables, is a given magnitude along with the given surplus which is determined outside of the core (see section 5.5.2). According to Garegnani, the structure of

> the surplus theories have, so to speak, a *core* which is isolated from the rest of the analysis because the wage, the social product and the technical conditions of production appear there as already determined. It is in this "core" that we find the determination of the shares other than wages as a residual: a determination which … will also entail the determination of the relative prices of commodities. (Garegnani 1984, 296)

The core determines the relative prices and the rate of profit (and profits) as a residual, and there is an inverse relationship between profits and wages. If wages rise, then the residual will be smaller, and hence the profits will be lower. This analysis is carried out with the assumption that the proportion of capital to that of labour in each commodity production was equal.[10]

Classical economists assumed that the real wage would be at the subsistence level. Subsistence does not mean the bare biological minimum. It includes “not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without” (Smith [1776]1904, 2:293). The real wage is determined by the rate of accumulation and productivity of labour. Smith recognised that wages can be influenced by the bargaining strength of the

[10] If the assumption is of uniform K/L is relaxed, then the movement of relative prices as the wage rate changes obscure the inverse relation between wages and profits. Hence, Ricardo was in search of a commodity whose value remains invariant with changes to distribution and technology. Sraffa (1960) provides a solution through the standard system (see section 5.5.2).

workers and the capitalist class. For instance, scarcity of labour (or employment) may move the wage rate above (or below) the normal wage rate. However, it is impossible to reduce the wage below the subsistence level. In determining wages, not only economic but political and social forces also play an important role.

2.4 The method of Keynes

Keynes's method or framework in the *General Theory* is essentially short period. It's an extension of the Marshallian short period into the whole economy. Marshall, in his study of an industry, had a well-defined Short Period,[11] a period in which

> The supply of specialized skill and ability, of suitable machinery and other material capital, and of the appropriate industrial organization has not time to be fully adapted to demand; but the producers have to adjust their supply to the demand as best they can with the appliances already at their disposal. (Marshall [2013] 1920, 312–313).

For Marshall, the period is self-contained in that the stock of capital was given, through which he could analyse the given industry in isolation by keeping everything outside that representative industry "in the pound of C*eteris Paribas*" (ibid. 315; emphasis in original). The Marshallian short period is a static equilibrium position of output and price, which is brought about by balancing demand and supply under the given assumptions. Marshall uses the short period only for partial equilibrium analysis. Unlike Keynes, Marshall did not adopt the short period for analysing the entire economy, as "the time required for adjustment of the structure of fixed capital goods differed from one industry to the other" (Panico and Petri 2018, 8002). In Marshall, the long period method was still the relevant method for the economy as a whole. "For the nature of the equilibrium itself, and that of the causes by which it is determined depends on the length of the period over which the market is taken to extend" (Marshall [2013] 1920, 274).

[11] Marshall's short period ranged approximately from "a few months or a year" ([2013] 1920, 314).

Though Keynes used this Marshallian method, yet in his use, there were certain modifications in the general application of the method to the whole economy. For Keynes, the short period is a period that is not strictly self-contained nor static but rather open to influence by previous period investments decisions, expectations and uncertainty about the future.[12] For this influence of the past and future expectations on the existing capital stock of the present period, Keynes introduced the concept of the "user cost" in order to have a proper definition of the fixed capital stock.[13] Like that of Marshall, Keynes's short period is in equilibrium. However, the equilibrium is not that of output and prices but rather that of employment determined by the point of effective demand. As we shall discuss below, this employment is not a full employment level determined by existing resources but rather an underemployment equilibrium. However, Keynes certainly did assume a short period in the Marshallian spirit, as he states.

> "We take as given the existing skill and quantity of available labour, the existing quality and quantity of available equipment, the existing technique, the degree of competition, the tastes and habits of the consumer, the disutility of different intensities of labour and of the activities of supervision and organisation, as well as the social structure including the forces, … which determine the distribution of the national income. This does not mean that we assume these factors to be constant; but merely that, in this place and context, we are not considering or taking into"

[12] According to Sanfilippo (2011), Keynes' intention was not only to abandoned the Marshallian theory but also its method of short period method as historical time. "There are two reasons for this. First, because at the aggregate level the 'chronology' loses its sense, given that the length of time required to adjust capacity to demand conditions varies from industry to industry. Secondly, because Keynes is interested in identifying fundamental causal relations, independently of the duration of the period considered". On the contrary, Keynes used the *ceteris paribus* assumption "to isolate some 'short' and direct causal chains between the independent variables held to be significant and the dependent variables the model aims to explain" (ibid., 375–77).

[13] Keynes define user cost as "the sacrifice which he [the entrepreneur] incurs by employing the equipment instead of leaving it idle, which we shall call the *user cost* …The excess of this potential value of the equipment over ($G - A_1$) is the measure of what has been sacrificed (one way or another) to produce A"(Keynes [2010] 936, 21, 48; emphasis in original). Here G represents the total value of capital stock (both finished and unfinished), A_1 refers to purchases of intermediary goods from other entrepreneurs as inputs, and A refers to the total sales of output to consumers or other entrepreneurs. Hence, the user cost ($G - A_1$), refers to the capital (both finished and unfinished) stock of the entrepreneur which is used up in the production of A.

> "account the effects and consequences of changes in them." (Keynes [2010] 1936, 221)

The assumption of the period is often invalidated when aggregate savings and investments (which are flow magnitudes), expectations and uncertainty are brought into the picture. Investment decisions determine capital stock at any given period; however, investments are made based on expectations about future prospective yields, which depends on the aggregate demand. Once the importance of expectation is recognized, time enters into the analysis as an important variable. Expectations about yields on investments are formed in historical time and not in logical time. Hence, Keynes's method is not static, for the passage of time plays a crucial role. Keynes contends that certain variables can be assumed to be given in the short period as the variables changes slowly and have

> little relevant as to have only a small and comparatively negligible short-term influence … (i) the three fundamental psychological factors, namely, the psychological propensity to consume, the psychological attitude to liquidity and the psychological expectation of future yield from capital-assets, (2) the wage-unit as determined by the bargains reached between employers and employed, and (3) the quantity of money as determined by the action of the central bank. (ibid., 223)

Expectations are formed in an environment of an uncertain future,[14] and therefore the money is held as an asset, a store of value and not only as a medium of exchange as the neoclassical orthodoxy postulates. Thus, destroying the neoclassical maxim that "money is a veil" affects only the price level without any effect on output. Modern capitalism is recognised as a "monetary production economy", where money as an asset influences aggregate demand and therefore production decisions. Money serves as a link between the present and an uncertain future. The speculative demand for money which Keynes introduced as an important motive for holding money, determines the rate of interest, together with the given stock of money by the central bank, in the short period. This determination of the interest rate by purely monetary

[14] Keynes following his *A Treatise on Probability* (1921), makes the point that there is no objective basis upon which to estimate the probability of an uncertain future.

factors was a radical departure from the orthodox view of interest rate as an equilibrating factor determining equilibrium levels of aggregate investment and aggregate savings.[15] Keynes did not view savings as a postponement of consumption, for which interest was paid as a reward for abstinence. The decision to save does not entail a decision to invest. For Keynes, investment determines savings in the given short period, i.e., savings will adjust to any level of investment through changes in income. This is Keynes's point of effective demand, where investment determines output and employment levels, generally below the full employment point. The fact that investment and savings are determined by income and not by interest rate was a new idea as Keynes himself notes,

> "the initial novelty lies in my maintaining that it is not the rate of interest but the level of incomes which ensures equality between saving and investment. The arguments which lead up to this initial conclusion are independent of my subsequent theory of the rate of interest, and in fact I have reached it before I had reached the latter theory. But the result of it was to leave the rate of interest in the air."(Keynes 1937, 250)

Effective Demand and Expectations:

The point of effective demand determines the equilibrium level of employment and output, given by the intersection of the aggregate demand function and the aggregate supply function. Keynes defines aggregate supply as "the expectation of proceeds which will just make it worth the while of the entrepreneurs to give that employment" (Keynes [2010] 1936, 22). The amount of employment is dependent on the expected sale proceeds. On the other hand, aggregate demand is defined as the "proceeds which entrepreneurs expect to receive from the employment of N men" (ibid., 23). Here the amount of proceeds that the entrepreneurs legitimately expect to receive depends on the amount of employment and hence the demand for the output. The aggregate supply function is assumed to be given and stable, and therefore the point of effective demand is determined at the point where the aggregate demand cuts the supply function. The onus is put on the aggregate demand function in determining the level of

[15] Classical economists recognized transactionary and precautionary motive for holding money as a medium of exchange. Keynes added the speculative demand for money as a motive for holding money.

employment and output. Hence, the short period equilibrium of Keynes is clearly demand constrained. The aggregate demand has two important components on which employment depends – the consumption demand and the investment demand. According to Keynes, consumption demand "depends on the psychological characteristic of the community ... the propensity to consume", assumed to be fairly stable in the given short period. Hence, according to Keynes, investment demand is the "essence of the general theory of employment" (26). Therefore, given the aggregate supply function, employment and output are determined by aggregate demand, and since consumption demand is stable, it is the investment demand that eventually determines the effective demand level of output and employment. There is no reason to believe that there will be sufficient demand forthcoming to push the economy towards full employment level, except as a special case. "The economic system may find itself in stable equilibrium with N [employment] at a level below full employment" (27). The reason why sufficient investment may not be forthcoming is that investment depends on the expectation about the prospective yields of capital with an uncertain future.

According to Kregel (1976), Keynes brought in expectations and uncertainty to bring in a sense of realism into economic analysis and how different assumptions of expectations can influence the system. This was a complete departure from the orthodox neoclassical assumption of perfect foresight and knowledge about decisions and outcomes. In order to determine aggregate employment and output (the dependent variables) under expectations and uncertainty, the independent variables are "the propensity to consume, the schedule of the marginal efficiency of capital and the rate of interest" (Keynes [2010] 1936, 165). Assuming these sets of givens and independent variables, expectations play an important role in influencing investment and production decisions. At the beginning of the period, entrepreneurs expecting certain returns make their investment plan. Once resources are committed for investment, the multiplier mechanism starts working and creates a certain amount of employment and output until the savings completely adjust to the new level of investment (the point of intersection of the aggregate demand function on the aggregate supply function). The resulting employment and output so created may not be at the desired or the planned level. Expectations at the beginning of the period may not be realised. For whatever, maybe the expectations, once a decision for investment is made, it will generate a stable equilibrium of employment and output. In the face of this realised result, entrepreneurs may revise their

expectations and their investment plans. There is no doubt that expectations and uncertainty play an important role, but it was not the "distinguishing feature of his approach"(ibid., 210), for it was the principle of effective demand.

According to Kregel (ibid., 214), Keynes considers three different models of equilibrium. First, the long term expectation is assumed to be constant and independent of short term expectations, which is always realised. Second, the long term expectation is still assumed to be constant and independent of short-run expectation, which may not be realised. Finally, long term expectations are assumed to be changing as they are affected by disappointment in the short run. Kregel terms these three models as one of static equilibrium, stationary equilibrium and shifting equilibrium respectively. The first two equilibrium models were used explicitly in *The General Theory*, which muddies the independence of expectation from effective demand. As Keynes in his 1937 *Lectures* stated,

> if I were writing the book again, I should begin by setting forth my theory on the assumption that short-period expectations were always fulfilled; and then have a subsequent chapter showing what differences it makes when short-period expectations are disappointed. For other economists, I find, lay the whole emphasis, and find the whole explanation in the *differences* between effective demand and income; and they are so convinced that this is the right course that they do not notice that in my treatment this is *not* so (quoted in [Kregel 1976, 213])

Most economists after the *General Theory* viewed the incorporation of uncertainty and expectations as the most important feature of Keynes's theory. This gives rise to the interpretation of the underemployment equilibrium provided by the theory of effective demand resulting from non-fulfilment or disappointment of expectations. Hicks recognized the importance of expectation as he comments, "from the standpoint of pure theory, the use of the method of expectations is perhaps the most revolutionary thing about this book" (Hicks 1936, 240). Hicks used the same "method" to develop his temporary and inter-temporal equilibrium in his subsequent works. Hicks also initiated the 'Neoclassical synthesis' through his 1937 paper "Keynes and the Classics", which showed that there are rigidities in the short run, while full employment equilibrium will prevail in the long run. Economists in the Walrasian tradition (see

Leijonhufvud 1968) began to redeem Keynes as part of the general equilibrium theory. Keynes's theory was understood as a disequilibrium theory where unemployment prevails in the short period because of the violation of Walras' law of no excess demand or due to a coordination failure because of the presence of expectations.

Keynes use of the short period method for the whole economy without any corresponding concept of a long period position makes his theory to depend on liquidly preference and the marginal efficiency of capital which after all are based on subjective expectations, remnants of neoclassical theory (see Garegnani 1983c; Eatwell and Milgate 2011, 292)) This makes Keynes theory to be readily reabsorbed within the neoclassical theory, as a theory of the short period and associated with neoclassical long-period full employment equilibrium.

2.5 What is Post Keynesian Economics?

Post Keynesian Economics is a term that emerged in the early 1970s and is associated with those economists who endeavoured to provide an alternative system of economic theory as opposed to the dominant neoclassical economics, which was and is the prevailing orthodoxy in economics.[16] As one of the early pioneers writes, "To me, the expression post-Keynesian has a definite meaning; it applies to an economic theory or method of analysis which takes account of the difference between the future and the past" (Robinson 1978, 12)

During the Great Depression of the 1930s, neoclassical theory with its idea of the self-regulating market economy with the tendency for full employment, was unable to explain and resolve the prolonged and large-scale unemployment problem experienced by capitalist economies. This led to the so-called "Keynesian revolution" in economic theory with the publication of John Maynard Keynes' *The General Theory* ([1936] 2010). Whereupon, Keynes discredited the principle of the self-correcting mechanism, rather demonstrating that the capitalist economy faces underemployment due to a lack of sufficient demand. It must be added

[16] King (2002, 9; 2005, 378) states the term "Post Keynesians" was not used consistently. There is a distinction between "Post-Keynesian" and "Post Keynesian" Economics. Post-Keynesian economics is used to describe chronologically the economics after Keynes' *General Theory*. Post Keynesian (without the hyphen) economics is used doctrinally to describe the alternative development of Keynes' ideas.

that a Polish civil engineer turned economist Michael Kalecki inspired by Marx, reached the same conclusion as Keynes. Both Keynes and Kalecki's theory was based on the short period method, with the given productive capacity of the economy. The second jolt came in the form of Piero Sraffa's 1960 *Production of Commodities by Means of Commodities* (PCMC), along with his *Ricardo* edition revived interest in the old classical 'surplus approach' (discuss in section 2.3) which "has been submerged and forgotten since the advent of the 'marginal' method"(Sraffa 1960, v). The book provided an internal critique of the neoclassical conception of capital, invalidating the monotonic inverse functional relation between the interest rate and quantity of capital. This provided the basis for the now-famous "Cambridge controversies in capital theory" in the 1960sdiscrediting the logical consistency of the neoclassical theoretical structure. Young economists (mostly Cambridge educated economists) were inspired by the ideas of J M Keynes, Michael Kalecki and Piero Sraffa, who were considered the forbearers of Post Keynesian economics. An important reason for the emergence of Post Keynesianism was, according to King (2002, xiv), "a reaction against perversions of Keynes's original vision". These young Post Keynesians considered the neoclassical synthesis as subverting and subsuming Keynes' original ideas of effective demand, fundamental uncertainty and monetary production economy into the very theoretical system that Keynes sought to displace. Post Keynesian economists were convinced that the three great pioneers' works alluded to facets of an alternative theoretical system much more superior both in method and in theory than the prevailing neoclassical orthodoxy in understanding capitalism. The true objective of Post Keynesian economics lay in moving away from neoclassical economics and in extending and developing an alternative theoretical system through synthesising the ideas of Keynes, Kalecki and Sraffa. The Output, employment, and monetary theory of Keynes and the cycle and investment theories of Kalecki could better explain modern capitalist processes than the neoclassical theory of output ensuring automatic full employment. Sraffa reformulated the theory of relative price and distribution without invoking the neoclassical tools of subjective utility and marginal changes.

Cambridge economists like Joan Robinson, Nicholas Kaldor, Richard Kahn, Luigi Pasinetti, and others viewed these new ideas as a radical break from the dominant neoclassical theory. The task of these economists was two-pronged. First, to extend the analysis of Keynes's principle of effective demand to a long-run dynamic theory of growth, which led to the

development of the Cambridge growth theories of Harrod, Robinson, Kaldor et al. Second, critiquing the neoclassical theory as logically incoherent in its use of the functional demand and supply apparatus as well as making unrealistic assumptions about how capitalism functions. Sraffa's 1960 book provided the grounds for the capital controversies that provided an internal critique of the neoclassical distribution theory based on the marginal productivity of scarce factor inputs.[17] By the 1970s, the term "Post Keynesians" was used to describe not only those dissenting Cambridge economists but also those economists in Italy, America, Canada, Australia, etc.

2.5.1 Characteristics of Post Keynesian Economics

Several distinguishing features characterise Post Keynesian economics today, viz. a complete rejection of the neoclassical synthesis – the IS-LM model and the marginal productivity theories of prices and distribution, the principle of effective demand, an emphasis on historical or dynamic processes and analysis of distributional changes and economic growth.[18] The principle of effective demand is at the core of Post Keynesian analysis, that in a monetary production economy, the economy is demand constraint, and therefore the level of employment depends on the level of income, which can be increased only through an increase in investment demand. Investment and savings in the economy do not equilibrate at full employment through changes in the real interest rate, as neoclassical theory suggests. However, investment and savings are brought into equality through changes in the level of income. As the future is uncertain and expectations may vary, investment demand may not be sufficient to provide full employment and income.[19] Hence, underemployment is the general characteristic of any capitalist economy rather than full employment. Though Keynes sets his analysis in the short run, "for post-Keynesians, the principle of effective demand is always relevant, both in the short and in the long run" (Lavoie 2006, 13).

The second essential feature is that Post Keynesians focus their analysis on the dynamic processes rather than on static approach and comparison of equilibrium positions

[17] Robinson's (1953) article started off the debate on what does "the quantity of capital" mean in neoclassical theory, which is measured as an independent entity to the rate of interest. She acknowledges Sraffa for the insightful discussion they had during this period.

[18] Post Keynesian emphasis on historical time, has in recent times antagonized the classical/Sraffian long period position as set-in logical time.

[19] Expectations may never be realized due to fundamental uncertainty.

(comparative statics). History matters, and that present and future decisions are not independent of past decisions; time is irreversible. There is no perfect knowledge or foresight, but rather future is uncertain and unknown. The economic system is characterised by non-ergodicity exhibiting transmutability and organicism. The study of historical processes in historical time attains importance rather than postulating a long period equilibrium in logical time devoid of history and real-time. Investment decisions are taken now, which affects future decisions on productive capacity and future investment plans. In short, any given long-run position may or may not be in equilibrium, and it is not independent of the short period. Rather the long run is made up of a series of short periods (Kalecki, 1971, 165). Therefore, for Post Keynesians studying the path taken and the processes thereof, where small changes can create big shocks and effects (hysteresis), is more important than studying equilibrium positions. However, as mentioned earlier, this focus on historical time by Keynesians and Kaleckians has created tensions with the Classical/ Sraffian approach.

Though Post Keynesianism started as a promise to synthesise various radical views and provide an alternative to neoclassical economics, over time, Post Keynesian became an amorphous term to shelter any dissenting voice from mainstream economics. Today, there are various definitions of who and what constitutes Post Keynesian economics. There are also debates on who should be considered a Post Keynesian and which brand of Post Keynesian economics should be emphasised. Most economists today see Post Keynesian Economics as an umbrella term for those calling for a rejection of neoclassical theory without the ability to provide for a viable alternative economic theory. The reason for Post Keynesianism being marginalised is the lack of coherence and often contradictory analytical framework within Post Keynesianism. To understand the reason for the lack of cohesion and whether a coherent economic theory can be sewed together from the various strands, we examine the various strands within Post Keynesianism.

2.5.2 In search of Coherence

Buoyed by the Cambridge capital controversies in the 1960s, the revival of classical political economy and the efforts to extend the works of Keynes and Kalecki exuberated a general optimism among Keynesian economists. That the dominance of neoclassical theory both of the Walrasian and Marshallian variety was on the wane. The dawning of a new paradigm

was near, and that "post-Keynesian theory has the potential for becoming a comprehensive, positive alternative to the prevailing, neoclassical paradigm" (Eichner and Kregel 1975, 1294). There was an urgency and a need to weave a grand theoretical system combining Keynes, Kalecki and Sraffa's pioneering work that would rival the neoclassical theoretical system. Fontana and Gerard (2006) term this phase of Post Keynesian development the "Romantic Age". However, a grand synthesis was nowhere in sight. By the late 1970s, the hope of the early pioneers had given way to despair.

Even though in the Capital controversy debate, the neoclassicals conceded that there are logical inconsistencies in their conception of the 'quantity of capital' (see Samuelson 1966), the neoclassicals mostly ignored and side-lined the conclusions of the debate. For most Keynesians, this dampened their hope that the marginal analysis of value and distribution through the capital debate would soon be replaced by an alternative theory of output, value and distribution. When the neoclassicals did not heed to the logical error in their theory of capital, most Keynesians expounded for a more thorough critique of the neoclassical theory not only at the theoretical level but also at a methodological level. Robinson took the initiative to portray the Post Keynesian theory as having a distinct methodology from mainstream neoclassical theory. She expressed strong scepticism and distrust for any theory based on closed deterministic equilibrium concepts.[20] For Robinson, Post Keynesianism must not just be "another box of tricks" but must represent a "different habit of mind, to eschew fudging, to respect facts and to admit ignorance of what we do not know" (Robinson 1979, 119). Thus, Robinson emphasised framing the new theory in the context of historical time and not in the frozen ice of static equilibrium analysis set in logical time. The call to recognise the distinct methodological character of Post Keynesian economics led to a search for a methodological foundation. This increasing concern with methodological issues marked the end of the "Romantic Age" in the late 1980s and gave way to the "Age of Uncertainty". The consequence

[20] Her skepticism about equilibrium analysis was there from the early 1950s before the capital controversy, though it was Nicholas Kaldor (1972), who also put a systematic critique of the use of the concept of equilibrium in economic theory. It must be added that both Kaldor and Robinson did not disregard the concept of equilibrium wholly. She considered as a useful device, a first approximation in pointing out causal relationships while interpreting history (see section 5.3).

was that it brought out to the open the differences between the various strands of Post Keynesian economics. (Fontana and Gerard 2006, 63)

2.5.3 Coherence Through Methodology

In the "afterglow" of the capital controversies, as stated earlier, Joan Robinson recognised the importance of giving the Keynesian approach a distinct methodology. However, the desire to give a holistic method to the approach was given much more rigour and purpose by the second generation of Keynesians. Many argued that Post Keynesian "School should be *defined* in terms of *method* and not by reference to theoretical prepositions or policy proposals" (King 2002, 181).[21] This was aided in part by the rediscovery of Keynes's philosophy and the issue of formalism in economic theory (*ibid.,* 193).[22] The Keynesian methodologists argued that the Cambridge capital controversy did not succeed to bring about a revolution in economic theory – the overthrow of neoclassical economics because the debate was conducted within the neoclassical paradigm of equilibrium theory and formalism, and therefore

> the capital theory debates appear to have had even less impact on economic theory than the imperfect competition debates of the 1930s… The lesson to be drawn from this experience is that it is crucial for the success of scientific revolutions that alternative paradigms be expressed in terms of models and tools quite distinct from those of the ruling paradigm (Dow 1980, 372 -78).

The "Age of uncertainty" had truly begun in the sense that debate within Post Keynesians flared up as regards the appropriate methodology to represent the Post Keynesian worldview. Post Keynesian economics currently subscribes to three main philosophical approaches – critical realism, Babylonian mode of thought and non-ergodic approach. Although not new in epistemology, the method of "critical realism" was made popular in economics through the works of Tony Lawson (1989) and his colleagues in the 1980s. Critical realism in the context of economic analysis asserts the existence of 'real' objects independent of research inquiry and that they are linked through irreducible structures, causal mechanisms, powers and tendencies

[21] "I feel quite strongly that the way one defines Post Keynesianism is methodological, and that's why I've always thought it was important to be quite explicit about methodology". Sheila Dow (in King1995,154)
[22] In 1971 the Royal Economic Society published Keynes' Collected Writings.

(Lawson 1989). This task requires neither induction nor deduction but rather retroduction or abduction, which is "to move from the particular observations [of a real object] … to a theory of a mechanism intrinsic [to the object under study]. It is the movement, paradigmatically, from 'surface' phenomena to some deeper causal thing(s)" (Lawson 1994, 515).

Critical realism views society as a set of structures – social rules and institutions within which humans are "agents imbued with powers or capacities". The interaction between these social structures and agents is a historical process occurring in real-time and are mutually dependent. One cannot be reduced to the other, and they are "recursively related". Such interactions are dynamic and transformative and are more or less stable (Lewis 2004, 5–6). "The resultant system(s) is/are one where the accumulation of activity can change the grounds on which the activity occurs, so any causation can also be shifting in its forms. Consequently, a system is recognisably complex, historical, contingent and in process (an open system)" (Morgan 2016, 9). This is in contrast to the mainstream, which is a closed system based on deductivism and has the feature of "event regularities". "To explain an actual event or state of affairs is to deduce a statement of it from a set of initial or boundary conditions plus universal 'laws' (constant conjunctions of the form 'whenever event x then event y')" (Lawson 1997, 88).

The Babylonian mode of thought is generally associated with Sheila Dow (1985). The world is very complex to be explained by general theoretical structures and therefore argues for a plurality of theoretical and methodological structures. It is an open system, as Dow states:

> [The] approach is to employ several strands of argument which have different starting points d which, in a successful theory, reinforce each other: any argument, therefore, does not stand or fall on the acceptability of any one set of axioms. Knowledge is generated by practical applications of theories as examples, using a variety of methods. (Dow 1985, 14)

However, it is not an approach where "anything goes". Rather the different strands and structures must be consistent with the overall working of the system. Some criteria must be specified to "choose segmentations of the subject matter for analysis, the chains of reasoning to pursue, and the methods employed to pursue them" (Dow 2002, 14). Finally, Paul Davidson

(1982, 1996) regards Post Keynesian as a more general approach to economic theorising and considers neoclassical economics only as a special case.[23] That neoclassical economics is characterised by "ergodicity", meaning that it is a closed, deterministic and immutable system. The ergodicity axiom ensures that the past is a good guide to the future, and any stochastic process can be inferred from an objective probabilistic distribution, which will guide the variable(s) to its true value. On the other hand, Post Keynesian economics is characterised by "non-ergodicity", meaning that the history or past data cannot be efficiently upon to predict future events efficiently. Uncertainty is of the essence. Time and history are irreversible. Actions and choices made by agents in the economy are transmutable and path-dependent.

Broadly, the Post Keynesian methodologists conceptualise the economy as an "open system" in which "economic processes, sensible agents recognise that the environment in which they make decisions is characterised by the absence of programmed and predetermined processes and is creative, open, emergent and uncertain" (Dunn 2010, 19). Though Post Keynesians have yet to settle on the question of what methodological approach to adopt, differences still exist among methodologists. The general belief is that the Post Keynesian approach should be one that exhibits an open system approach, emphasising on transmutable and organic nature of phenomena, the aim is to explain rather than to predict (Arestis, Dunn and Sawyer 1999, 532). However, this emphasis on an open system approach of both the realist and the Babylonian thought would create rifts and fragmentation within Post Keynesianism itself.

2.6 From Coherence to Deep Chasm

By the early 1980s, the search for a coherent alternative theory had lost out to the din of pursuing methodological justification for the Keynesian approach. The obsession with methodology came at the price of isolating and creating a deep chasm with the various theoretical approaches that made up the Post Keynesian tent. As Fontana and Gerrard (2006, 63) state, "the increasing concern with the methodological originality of Post Keynesian economics served to exacerbate the disputes between and within the different strands of Post

[23] Bill Gerrard (1995) regards Keynes theory as a non-allocative mode of activity and classical theory as an allocation theory of scarce resources. He calls for a "post classical theory" that encompasses both Keynes's theory as well as the classical theory.

Keynesian economics". It is clear that the search for a set of a common methodological foundation upon which Post Keynesian economics was sought to be erected created huge methodological differences among the adherents of Keynes, Kalecki and Sraffa). The Keynesians emphasised the importance of money, historical time and uncertainty. The Kaleckians focused on business cycles, fluctuations around the trend, capacity utilisation, and mark up pricing under oligopolistic competition. Whereas the Sraffians focused on a long period theory of value and distribution based on the classical economists' logical separation of the theory of output and that of value and distribution.

According to Walters and Young (1997), Post Keynesianism cannot claim to represent an alternative school of thought to that of neoclassical orthodoxy. There is a lack of coherence in its methodological approaches, policy agenda or analytical frameworks of its various strands- the fundamental Keynesians, Kaleckians and Sraffians. Rather there are tensions and contradictions between the various strands as regards to the role and analysis of uncertainty, money and price theory. This also resulted in a need to redefine who and what constitutes Post Keynesian economics. Paul Davidson, the leading American Keynesian, advocated for a narrow definition of Post Keynesian economics. For him, any Keynesian research programme must be "to extract, integrate and update the original conceptual framework" and should start from Keynes's *Treatise on money* and *The General Theory*. A general theoretical framework in which non-neutrality of money, both in the short and long run affecting economic decisions, and irrevocable past and uncertain future must play a central role. Based on the methodological basis of an open system, the prospect of a synthesis between Keynesian and the Kaleckian approach appeared much stronger, excluding the Classical/Sarafian approach. Hamuoda and Harcourt (1998) advocate a 'Horses for courses' among the three major strands of Post Keynesianism – the fundamentalist Keynesians, the Kaleckians and the Sraffians (or the neo-Ricardians). That the search for coherence among various strands is a misplaced exercise, as they suggest in their conclusion:

> "Our own view is that this is a misplaced exercise, that to attempt to do so is vainly to search for what Joan Robinson called 'only another box of tricks' to replace the complete theory' of mainstream economics which all strands reject. The important perspective to take away is, we believe, that there is no uniform way of tackling all"

> "issues in economics and that the various strands in post-Keynesian economics differ from one another, not least because they are concerned with different issues and often different levels of abstractions of analysis." (Hamuoda and Harcourt 1988, 25)

However, the debate for coherence has raged on. The difference with the modern classical political economy (Sraffian) theory is that it is based on the long period position, which is alleged to be methodologically no different from the neoclassical equilibrium position. (see Carvalho 1984; Arestis, Dunn and Sawyer 1999; Hart and Kriesler 2014). Many found the Sraffian incompatible with other Post Keynesians and advocated to drop the Sraffian approach from the Post Keynesian tradition

> Sraffians are methodologically incompatible with other traditions within Post Keynesianism, … The inclusion of the Sraffian School under the Post Keynesian umbrella is highly contentious, given its closed system methodology. The time has come for Post Keynesianism to formally part company with the Sraffians and to jettison the burdensome accusation of negative critique that is chiefly identified with their contribution. … The coping stone of Post Keynesianism is its commitment to open systems reasoning. As such, any attempts to develop (coherent) links to other approaches must be within this framework. (Dunn 2000, 350)

From the preceding discussion, it is clear that "almost no one today regards 'Post Keynesian-Sraffian' economics as a single coherent school of thought … By the end of the last century [the year 2000], the Sraffians had been expelled (or, perhaps, had expelled themselves) from the Post Keynesian tradition" (King 2012, 314). Gary Mongiovi (2003) attributes the rift to the failure of the Trieste summer school [1981 to 1990], whose objective was to forge a unified methodological and analytical foundation for the Post Keynesian project. Despite all this, some Post Keynesians like Luigi Pasinetti, Henrich Bortis, Marc Lavoie and others still see that as grounds for possible coherence.

2.7 Conclusion

The chapter has identified and outlined three systems of economic theory. The discussion reveals the difference in emphasis of each system. In classical political economy, the process of competition is the method or frame through which the essential workings of capitalist production are revealed. The surplus approach lays emphasis on social class and production relations. As the modern capitalist economy is complex, it uses a sequential approach to theorising by logically separating the analysis of value and distribution with that of growth and accumulation.

There was a radical shift in the theory with the marginal revolution, though the object of analysis remained unchanged. However, with the change, in theory, the concept of competition also had to undergo a change, as we shall discuss in the next chapter. We discussed the core assumptions, the technical apparatus and the theoretical structure of the neoclassical system.

Neoclassical economics was found wanting in its explanatory power and internal logical consistency, this is brought out clearly by Keynes, Kalecki and Sraffa. The criticisms of neoclassical theory led to the emergence of Post Keynesian economics, which sought to present an alternative system of theory. However, this alternative system is besieged with methodological differences – A Keynesian-Kaleckian open system approach to theory based on the short period and the classical political economy (Sraffian) approach based on the long period positions. The difference in the method of analysis "relates to the different conceptions of competitive processes in modern capitalist economies, together with the question as to whether these forces can be associated with the generation of long-period equilibrium configurations" (Hart and Kriesler 2014, 3). However, before we explore these themes within Post Keynesian economics, the next chapter details the conceptualisation of competition as a dynamic process and as a static state within the context of the different theoretical systems discussed here.

Chapter 3
Competition in Classical and Neoclassical Economics

3.1 Introduction

The previous chapter discussed in some detail the three theoretical systems, in this chapter, we survey the historical development of the concept of competition and how the conception differs with different theoretical structures. We focus on the development of the concept of competition as a dynamic process and as a static state and how it relates to the "long period method," equilibrium and the market structure. Section 3.2 starts with a discussion on pre-Smithian notions of competition and discusses competition as a dynamic process in classical political economy and Marx. Section 3.3 continues with the discussion of competition as a knowledge discovery process in Austrian economics and its role in the coordinative mechanism of the markets. Section 3.4 breaks away from the process view of competition and focuses on the genesis of competition as a static concept within the context of a complete reorientation of economic theory with the marginalist revolution. The section ends with how perfect competition came to be the benchmark model and how it is used in a general equilibrium model. Section 3.5 introduces temporary and intertemporal equilibrium as a break in the neoclassical method away from traditional long period equilibrium to short period equilibrium with the object of bringing in realism and expectations in the model. Section 3.6 draws some summary and concludes the chapter.

3.2 Competition in Classical Economics

3.2.1 Pre-Smithian conception of Competition

Bert Tieben (2012) traces the development of equilibrium theory which relates directly to the nature of competition in terms of an "equilibrium vision", and in that vision Tieben identifies Dudley North (1641-1691) and Pierre de Boisguilbert (1646-1712) as the first to introduce the concept of equilibrium as a mechanism for a self-regulating economic system. Tieben argues that in their work, one can deduce "the start of two different visions on the nature of this self-regulating system, one focusing on the stability of this order and the other stressing

the disrupting effects of changes away from equilibrium" (Tieben 2012, 96–97).[1] North, in his *Discourses upon Trade* ([1681] 1907), has a basic analysis of equilibrium of demand and supply. Excess supply lowers the price as sellers attempt to undersell each other in order to get rid of the stock of commodities. On the other hand, excess demand raises the price as buyers compete to buy the commodity. Thus, the ebb and flow of demand and supply bring the market price to a stable equilibrium.[2] For Tieben, this adjustment is a dynamic market process, and although the idea of equilibrium of supply and demand was not new before the late 17th century, the early theories of equilibrium and competition lacked the "equilibrium vision", which is "the process of exchange between profit-driven individuals is a self-regulating order" (ibid., 99). Tieben claims that Dudley North anticipated Adam Smith's notion of the "invisible hand" – the idea that competition among self-seeking individuals brings about spontaneous economic order.

Similarly, for Boisguilbert, the economy is governed by natural order such that nature curbs abuse of any self-interest and brings about equilibrium. However, unlike North, this equilibrium is not stable but fragile, and any external disturbance such as state intervention moves the system away from the natural order. Therefore, the state should not intervene so that equilibrium can be maintained. Tieben argues that Dudley North and Boisguilbert started the transition from mercantilism to classical economics with a rudimentary equilibrium analysis of demand and supply.

On the Other hand, Aspromourgos argues that William Petty's theoretical analysis was far superior to any other economic writers in the 17th century and that "North's economics is much narrower and shallower than that of Petty—both with regard to substance and method—and is preoccupied with the immediate practical issues of interest abatement and recoinage" (Aspromourgos 1996, 149). Whereas, as discussed earlier in section 2.3.1 Petty is credited with the origin of the theory of social surplus – that all society produces some surplus, which became the core of classical economics. In his writings, Petty has three notions of prices – the nominal price of a commodity in terms of silver, the natural price as determined by the amount of labour time necessary to produce the commodity, and political price which bears some relation with

[1] Boisguilbert introduced the term "equilibrium" in economics. To Tieben, William Petty and John Locke did not have the notion of the economy being a self-regulating system.

[2] Tieben(2012, 103) denies the claim that Dudley North's work as an early anticipation of mathematical general equilibrium analysis.

the natural price. Political price is defined as "an excess of actual labour time embodied over necessary labour time in any trade" and "that political price will exceed 'natural price' to the extent that actual labour employed in production exceeds necessary labour time" (ibid. 1996, 26–27). For Petty, political prices and not natural prices (as in later classical economics) are the price towards which market prices tends to converge, and so competition does not play any role in eliminating inefficient methods of production as represented by political prices. This clearly indicates the pre-capitalist character of the society during Petty's time. However, through his surplus theory that focusses on production and the division of labour, Petty influenced Classical economics through Richard Cantillon.

It is with Richard Cantillon's "*Essay on the Nature of Trade in General"*([1755] 1954) that market competition came to the forefront. Richard Cantillon distinguishes between intrinsic value and market price. The intrinsic value "of a thing is the measure of the quantity of Land and of Labour entering into its production, having regard to the fertility or produce of the Land and to the quality of the Labour" (Cantillon [1755] 1931, 29). In other words, intrinsic value is the cost of production, and is assumed to be constant. On the other hand, market prices depend on the market condition, that is, "the amount brought to the market in relation to demand, competitive strategies by rival entrepreneurs, number of buyers and sellers and so on" (Thomas 2015, 18). Though market prices depend on a lot of contingencies, competition ensures that there is always a tendency for market prices to gravitate towards intrinsic values. Cantillon was the first to understand the role of the market and prices as an allocative mechanism. Markets can allocate land and labour to the most profitable avenue with market prices (below or above intrinsic value) as signal for resource allocation.

François Quesnay and the Physiocrats did not have an explicit discussion on competition. However, the *Tableau* described the economy in a state of equilibrium and order. As discussed briefly in section 2.3.1, the Tableau shows how reproduction happens year after year and is used to demonstrate how any change in productivity or prices in agriculture or manufacturing disturbs the current equilibrium, and a new Tableau is drawn showing the new equilibrium order. It is a tool for policy and is designed to compare the consequence of economic policies.

James Steuart (1712-1780) has an intricate and detailed discussion of competition. According to Steuart, in modern commercial society, the exchange value of the commodities is regulated by demand and supply relations. Competition brings about the equilibrium price, which contains the real value of the commodity and a mark-up for profits. The real value is the cost of production excluding profits and is made up of three elements –an average of direct labour time requirement, necessary subsistence and value of material inputs. The real value defines the floor below which prices cannot fall. In the market, the producers and consumers interact through merchants. Steuart introduces the concept of "double competition", which ensures market clearing and stability of the equilibrium prices. Double competition is when competition takes place both among the sellers and among the buyers. In all markets, "[competition] takes place on both sides of the contract at once, or vibrates alternately from one to the other. … Sometimes, it is found strongest on the side of the buyers, and in proportion, as this grows, the competition between the sellers diminishes. When the competition between the former has raised prices to a certain standard, it comes to a stop; then the competition changes sides, and takes place among the sellers, eager to profit of the highest price" (Steuart 1767, 196, 200). Double competition prevents excessive rise or fall of prices, it "refrains prices to the adequate value of the merchandise". However, "when *competition* is much stronger on one side of the contract than on the other", then we have simple competition also called "compound demand", it operates when demand (supply) is high, there will be competition among buyers(sellers) which raises(lowers) the price. But on the other side, sellers (buyers) compete to respond to the high (low) price. Thus, simple competition alters from one side to the other. There may be extreme situations where supply and demand do not balance as competition operates only on one side. In such cases, Steuart opines that competition is stopped by humanity or by "a certain degree of fair-dealing" (ibid. 203). However, "despite possessing an elaborate account of the working of competition, Steuart's theory of value and distribution lacks coherence. In particular, Steuart's account of profits obfuscates the distinction between natural and market prices"(Thomas 2015, 58)

Turgot made significant contributions to the concept of competition. For Turgot, competition not only works in the exchange sphere of adjusting market prices to normal prices, but the same competitive process also affects the production sphere as it eliminates differential prate rates on capital employed and equalizes the "rates of return on capital net of differential

risk and other returns for entrepreneurship or superintendence" (Aspromourgos 1996, 156) For market competition, Turgot identifies three types of prices. First, "esteem value" is the perception of the 'usefulness' (*utilite*) of the commodity, it is a subjective valuation. Second, in market exchange, the esteem value merges with exchange value or "current price" determined by supply and demand. Finally, fundamental value is defined as "what the thing costs to him who sells it, that is, the raw material costs, the wages of his labour, and the profits of his stock"(Groenewegen 1970, 181). Fundamental values are the long-run equilibrium prices to which exchange values converge through the process of competition. Although much richer in detail, Turgot's discussion of market exchange is quite similar to that of Cantillon and Steuart. His significant contribution is in recognising that competition brings about a uniform rate of return on capital. None, before Turgot had recognised that entrepreneurs or "undertakers" will employ their capital in the production of commodities which gives them the highest return, or withhold their new investment when there is loss. The mobility of capital influences output composition and prices in the market and ultimately results in a tendency towards a uniform rate of profit across all sectors as market prices move towards normal prices.

The idea of market prices adjusting to some normal values is not new. As discussed earlier, Dudley North, John Locke, Boisguilbert, and others much earlier had notions of how competition adjust demand and supply imbalances towards an equilibrium price. According to Aspromourgos (1996, 158–60), all these accounts only explain price fluctuations, there is no discussion of how the values are determined, and so the theoretical innovation in Petty and Cantillon is to conceive of a normal value determined by systematic forces which "would prevail under (conceptual) conditions in which all such disturbances are eliminated or resolved." The normal value anchors the fluctuations of prices and acts as a centre of gravity through the process of competition, and it is with Turgot that "the principle of competition or the role of arbitrage extended to the elimination of differential profits on capital advanced." Turgot's only weakness is that the theory of price determination and the concept of competition is not well integrated.

The above analysis clearly shows that even before Adam Smith *Wealth of Nations* ([1776] 1981), the analytical function of competition is the process that tends to eliminate excess profits and brings market prices towards natural/normal prices. As McNulty affirms, "the pre-Smithian period saw the gradual emergence of a body of literature in which price determination

through the principle of competition was coming to replace ethically and politically oriented price administration as the focus of economic analysis" (McNulty 1967, 396).

3.2.2 Competition in Classical Political Economics and Marx

Although the concept of competition as a dynamic process was not new or original to Adam Smith, yet his idea of "the competitive economy as a kind of self-regulating system, at least given an appropriate framework of law and property rights, is perhaps the most striking idea he contributed to the human sciences " (Aspromourgos2009, 65). Smith's conception of competition functions at two levels. First, unlike his predecessors, Smith succeeded in conceptualising competition as regulating price determination and income distribution. Second, as discussed in section 1.1, competition also provides the analytical basis on which to erect the theory of value, distribution and accumulation and brings forth the permanent and systematic forces acting upon prices. The process tends the variables under study towards the natural position. The natural position or the long period position is the end result of competition, though, in reality, the economy never reaches but tend towards the position as the structure of the economy constantly evolves with technological progress, consumption pattern, state interventions, and capital accumulation. Smith elucidates the natural position (or long-period position) in terms of natural prices.

> When the price of any commodity is neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the stock employed in raising, preparing, and bringing it to market, according to their natural rates, the commodity is then sold for what may be called its natural price. (Smith [1776] 1981, 126)

The natural price of any commodity depends on the cost, and the cost elements – rent, wages and profits should also be at their natural levels,[3]however, the actual price of a commodity may be either below, above or equal to the natural price.[4] According to Smith (ibid.,

[3] The determination of classical natural prices and income distribution is discussed in section 5.5.2. Here the discussion concerns only how market prices tend towards natural prices.

[4] Market prices is the price at which transaction occurs when there is a mismatch of supply and demand, and therefore is not a single magnitude. However, in order to compare with the natural price which is a single theoretical magnitude, Smith uses "the most common actual price in order to be able to speak of a singular market price magnitude"(Aspromourgos 2009, 72).

127), “the market price of every particular commodity is regulated by the proportion between the quantity which is actually brought to market, and the demand of those who are willing to pay the natural price of the commodity”. Those consumers who pay the natural price for any commodity are called “effectual demanders”, and the quantity demanded at the natural price is the “effectual demand”. However, if the output or the “the quantity of any commodity which is brought to market” is below the effectual demand, then there will be competition among the buyers, willing to pay higher to have the commodity. Then the market price will rise above the natural price,[5] the high market price also entails that the wages, profits and rent are also above their natural rates. This will attract more capital investment in the production of that commodity, resulting in increased output to satisfy the demand. As more quantity is brought to the market, market prices will fall, converging towards the natural prices. Similarly, when the quantity brought to the market exceeds the effectual demand, there will be competition among the sellers to dispose of the excess commodity, and hence the market price will fall below the natural price. The distributive variables which make up the market price will also be below its natural rate. This will encourage those producers that are unable to recover their cost to exit the production of the commodity. As capital employed decreases, the output level will also decrease, bringing in line with the effectual demand.[6] Market prices cannot be below natural prices for a long period, as natural prices define the floor minimum cost conditions with uniform natural rates of profit, rent and wages. “Therefore, the imbalance in the sphere of circulation (the discrepancy between the natural price and market price of a commodity) spills over to the sphere of distribution (the discrepancy between natural values and market values of wages, profits, and rent) and, finally, to the sphere of production (the intersectoral reallocation of productive resources and variation in quantities produced in the following periods)” (Salvadori and Signorino 2013, 160)

[5]The degree of deviation of the market price from the natural price will depend on three things – the deficiency or excess of the quantity actually brought to the market, the nature of the commodity(necessary or luxury), and the income and wealth of the buyers(Smith [1776] 1981, 127).

[6] Here, demand and supply explain the tendency of market prices to converge towards natural prices. Unlike the latter-day neoclassical economics, the natural price or normal price is not determined by demand and supply functions. Moreover, “Smith's effectual demand … [is] a *point,* and not a *schedule,* in the price-quantity space” (Garegnani 1998, 417; emphasis in original)

The adjustment of market prices towards natural prices happens because of free competition.[7] Adam Smith defined competition as "perfect liberty" – the free mobility of economic resources, capital and labour, across sectors searching for the highest rates of return.[8] Market prices always have a tendency to gravitate towards natural prices. The natural prices are formed under conditions of "perfect liberty" and therefore are theoretical prices. The natural price is an analytical device that defines natural conditions:

> "The natural price, therefore, is, as it were, the central price, to which the prices of all commodities are continually gravitating. Different accidents may sometimes keep them suspended a good deal above it, and sometimes force them down even somewhat below it. But whatever may be the obstacles which hinder them from settling in this center of repose and continuance, they are constantly tending towards it."(Smith [1776] 1904, 128–29)

As discussed in the earlier paragraph, natural prices brought about by competition defines the long period position upon which basis one can have a theory of value and distribution

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[7]Modern mainstream economics conceive of competition in Smith through the idea of the "invisible hand". The term explains competition as a regulating force that brings instantaneous order to markets through the "selfish" action of the individuals seeking their own good. Free market, without state intervention, through the workings of the invisible hand always leads to efficient outcomes. Modern economists consider the Smith's "theory of invisible hand" as the most central and influential idea in economics (Kennedy 2009, 240).

However, many scholars – Gavin Kennedy (2009), Emma Rothschild (2009) among others reject "invisible hand" as a theory in Smith's writings but rather a well-known "18th century literary metaphor" that Smith used to explain complex chain of events that leads to unintended consequences. For Smith the invisible hand was nothing more than "an ironic but useful joke" (Rothschild 1994, 319). Smith uses the term "invisible hand" only three times – once each in *History of Astronomy* (1795 posthumously), *The Theory of Moral Sentiments* (1759) and *The Wealth of Nations* (1776). In *the Wealth of Nations*, Smith mentions "invisible hand" only in Book IV, chapter II while discussing the behaviour of merchants who invest domestically rather than in foreign industry because of their own security. The chapter discusses international trade criticising mercantilist policies. In Book I and II, where Smith discusses markets, value, distribution and accumulation, there is no mention of "invisible hand". Moreover, in the modern notion of the 'invisible hand', the workings of the free market always ensure efficient and beneficial outcomes. However, in Smith, market processes do not always lead to good outcomes. "Smith gives over 60 instances in *Wealth of Nations* in books I and II of the malign consequences of self-interested actions" (Kennedy 2009, 255). For Smith, competition is the "self-interested individual pursuit of material gain – within a framework of generally law-abiding and otherwise self-disciplined behaviour, … in which there will be no (singular) winner; in particular, a system which tends to deliver the same 'prize' to all like contestants (uniform remunerations and prices)" (Aspromourgos 2009, 76–77).

[8] Though market price of all commodities continually gravitates towards natural price, there are circumstances that "keep up the market price, for a long time together, a good deal above the natural price." These could be because of natural monopoly, state sponsored monopolies, state regulations and trade secrets (1981, 130–32).

and lay bare the structure of the economy at any moment as the system continually gravitates towards the natural position. In other words, natural prices provide a guide for explaining the dynamics of the economy. However, natural prices are not fixed equilibrium points but depend "partly by the general circumstances of the society, their riches or poverty, their advancing, stationary, or declining condition; and partly by the particular nature of each employment" (ibid., 126). That is, the movement of natural prices depends on technology (production condition), the state of the economy and how it is growing.

David Ricardo, in his *Principles,* also focuses on "the laws which regulate natural prices, natural wages and natural profits" and regards market prices as temporary and accidental deviations from the natural conditions. He acknowledges that Smith "in the 7th chap. of the Wealth of Nations, all that concerns this question is most ably treated." (Ricardo [1817] 2005, 111). Ricardo emphasises the role of capital in gravitating the prices towards natural prices.

> It is then the desire, which every capitalist has, of diverting his funds from a less to a more profitable employment, that prevents the market price of commodities from continuing for any length of time either much above, or much below their natural price. It is this competition which so adjusts the exchangeable value of commodities, that after paying the wages for the labour necessary to their production, and all other expenses required to put the capital employed in its original state of efficiency, the remaining value or overplus will in each trade be in proportion to the value of the capital employed. (ibid.)

Competition in Marx:

For Marx, competition is the historical development of capital. He criticised the classical economics concept of competition as a historical, suggesting a concept of competition as "natural and universal".[9] Competition was thought of guiding the economy towards desirable social progress and as the "highest expression of human freedom." Instead, Marx argued that it

[9] Marx criticises Smith and Ricardo for not comprehending the historical character of competition, focussing only on individual capitals rather than total social capital. According to Marx for classical economists, competition is only discussed as a tendency towards a uniform rate of profit, but there is no discussion of how profits emerges or surplus value emerges (Chattopadhyay 2012).

is the development of a mode of production "through which capital accumulation becomes an independent force, detached from the goals of individuals and society. In this process, competition acts as an external coercive force, which imposes capital logic" (Palermo 2017, 1581). Competition originates with private property in the hands of a certain class – the capitalist and the class who do not own any economic resource has to sell their labour-power for a wage and engage in the production of commodities. According to Marx, the working of competition can be analysed only when the inner nature of capital is understood. Marx recognises the dual nature of capital – "total social capital" (the totality of capital) and "individual capitals" (each capitalist owns a fragment of the total). In *Capital* vol. 1 *and 2*, through simple and extended reproduction, Marx shows how total social capital generates surplus value by exploiting workers through various means.[10] The concept of total social capital abstracts from the concrete workings of competition. Here, competition "is not the cause of exploitation". However, competition is not absent but work implicitly "to enforce capital's law. … as a mechanism that governs the reproduction of class relations" (ibid. 1570), the workers are free to work for any capitalist, but they are compelled to work under some capital. Competition regulates both the circulation and accumulation processes.

In volume 3 of Capital, Marx discusses competition among individual capital, the concrete manifestation of competition. For Marx, competition does not give rise to profit but only regulates the allocation of profits to individual capitals based on the proportion of capital employed individually. The source of profit is the surplus value extracted through total social capital in the production sphere. Competition does not create profits but affects only its distribution. The role of competition is manifested in the tendency towards a uniform rate of profit across sectors, towards the economy's average rate of profit. The market prices tend towards the "prices of production" (that includes the average rate of profit). To explain how prices and profits gravitate to production prices, Marx recognised that competition works at two levels – competition within an industry and competition between industries.[11]

[10] Surplus value can be increased "either by an extension of the working day, or by a lowering of the real wage, or by an increase in the productiveness of labour, or, finally, by some combination of the three movements" (Sweezy 1946, 64-65).

[11] In *Wage-Labour and Capital* ([1847] 1933), Marx identifies three kinds of competition – competition among sellers, competition among buyers and finally competition between buyers and sellers. Here, Marx's treatment of competition is quite similar to James Steuart's "double competition" and is envisioned as two opposing armies in

> Competition first brings about, in a certain individual sphere, the establishment of an equal market-value and market-price by averaging the various individual values of the commodities. The competition of the capitals in the different spheres then results in the price of production which equalises the rates of profit between the different spheres. This last process requires a higher development of capitalist production than the previous process. (Marx 1909b, 138)

For the first level of competition within an industry or sector, firms within the industry produce identical products which are a close substitute for each other. Each firm competes for a larger market share by price-cutting its competitors through innovation that reduces cost and increases labour productivity. The result of competition within each industry leads to the establishment of the same price for the product – "the law of one price." However, the individual firms within the industry will have different rates of profit. Firms with lower unit costs will have a higher rate of profit as compared to other firms with higher unit costs. This is because "some of the elements of production, such as location, climate, natural resources, management and the like, are not easily reproducible and because the innovative business activity and expectations are not the same" (Tsoulfidis and Tsaliki 2019, 223). According to Marx, as "prices are the monetary expression of values," the law of one price dictates that there will be only one value, called market value defined as "the average of the actual market prices over a period". The market value, in turn, is an expression of commodity value. The one price or market value for the identical good within an industry is determined by the socially necessary labour time required to produce the commodity in the industry. Therefore, the market value of the commodity within the industry will be regulated by the firms with the best conditions of production (uses less than socially necessary labour time) and the firms with the worst conditions of production (uses more than the socially necessary labour time). Which group of firms will have a "decisive effect on the standard of sectoral value depends on the numerical ratio or proportional size of the groups. That is, the value will be determined by the group that

battle. "The result of this competition between buyers and sellers will depend upon the relations between the two above-mentioned camps of competitors, i.e., upon whether the competition in the army of buyers or the competition in the army of sellers is stronger. Industry leads two great armies into the field against each other, and each of these again is engaged in a battle among its own troops in its own ranks. The army among whose troops there is less fighting carries off the victory over the opposing host" (ibid., 21)

predominates over the others by whatever mechanism" (Chattopadhyay 2012, 75). Thus, actual market prices "or rather the deviations of market-prices from market-values" are regulated by demand and supply. However, market values are determined in the production sphere and "regulates the proportions of supply and demand, or the centre around which supply and demand cause the market-prices to fluctuate" (Marx 1909b, 139).

Competition also operates between industries or sectors; at this level the task of competition is to establish a uniform general rate of profit across sectors.[12] The general profit rate is the average profit rate of the economy. Like the market value, which is determined in the production and act as the gravitation point of actual market prices, the average rate of profit is also determined in the production sphere and is the rate towards which the actual rate of profits gravitates. The average rate of profit is determined by profits that come from the surplus value extracted through total social capital. The average rate of profit determines "a set of production prices, defined as cost price plus average profit" (Horverak 1988, 286). When labour and capital are misallocated across sectors, the actual rate of profit will differ from the average rate of profit, so the market prices will also deviate from their production prices. According to Marx,

> "competition levels the rates of profit of the different spheres of production into an average rate of profit and thereby transforms the values of the products of these different spheres into prices of production. This is accomplished by continually transferring capital from one sphere to another, in which the profit happens to stand above [or below] the average for the moment. The fluctuations of profit due to the cycle of fat and lean years, following each other in any given line of industry during given periods, must be taken into consideration, of course. … These movements balance one another more or less and thereby create a tendency to reduce the rate of profit everywhere to the same common and universal level."(Marx 1909b, 160)

If the rate of profit in an industry is higher than the average rate of profit, the market price will be higher than the production price. Then capital will move into the industry, accelerating

[12] It is to be noted that competition at both levels – within an industry and across industries work simultaneously. However, in order to understand better the workings of competition, we assume that competition within industries has brought one price for each commodity (with different profit rates among firms) and then discuss how competition works across industries or sectors.

accumulation, this will increase output produced and reduce the market price towards production price. Converse will happen if the rate of profit in an industry is lower than the average rate, hence competition ensures the mobility of capital and labour and the tendency towards the general rate of profit and production prices.[13] However, competition across industries does not mean that profit rates actually becomes uniform to the average rate of profit, it just implies that there is a continual tendency to converge in the long period. Moreover, the average rate of profit of the economy cannot be known a priori. Rather it is a "hypothetical average" to understand the movement of capital.

As discussed above, competition between capitals at both levels within industries and between industries drive capital accumulation. However, competition also brings out the inherent contradiction within capitalism. As Marx argues,

> the development of capitalist production makes it constantly necessary to keep increasing the amount of the capital laid out in a given industrial undertaking, and competition makes the immanent laws of capitalist production to be felt by each individual capitalist, as external coercive laws. It compels him to keep constantly extending his capital, in order to preserve it, but extend it he cannot, except by means of progressive accumulation. (Marx 1909a, 483–84)

Each individual capitalist has the desire to have a greater share of the profit, and therefore they reinvest a greater portion of the profit in every production cycle. In order to extract more surplus value and increase labour productivity, competition between capitals stimulates technological progress and "changes in the organisation of the labour process." Capitals that cannot innovate are swallowed by other innovating capitals, and in the long run, competition pushes capital to

[13] There is an apparent contradiction in competition within and between industries. How does the tendency towards a uniform rate of profit across sectors reconcile with differential profit rates among firms within an industry? The answer is "regulating capital". Competition acts not for all capitals but to a specific type of capital. "At any moment of time within any given industry, there are a set of capitals representing the *best generally reproducible condition of production* in that industry. … the *regulating conditions of production*—the ones with the lowest reproducible (quality-adjusted) costs in the industry" (Shaikh 2016, 265). Regulating capital gives the reproducibility of new investments. It determines the rate of return on new investment (For a detail discussion of the role regulating capital and its empirics see Shaikh [2016] and [Tsoulfidis and Tsaliki 2019)]

concentrate with few large capitalists.[14] There is an inherent contradiction in the workings of competition and accumulation, as competition "tends to increase constant capital, both in absolute terms and in relation to variable capital. Over time, the valorisation of constant capital by living labour tends to become more and more problematic." This results in falling average rate of profit bringing capitalism to a crisis. Thus, competition show "the essential contradiction of capital accumulation: the same profit motive behind the success of innovating capitals is, in fact, the cause of the crisis of capital as a whole. Individual rationality and systemic irrationality are two aspects of capital's rationale" (Palermo 2017, 1576).

The analytical role of competition in Marx is quite similar to Smith, Ricardo and other classical economists of the surplus approach. The prices of production, which includes the average uniform rate of profit, is equivalent to Smith and Ricardo's "natural price." Just as natural price, the "price of production" describes the average or natural condition towards which the whole economy gravitates through competition. The price of production and the average rate of profit for any industry cannot be derived a priori (before surplus extraction through total social capital) and is a theoretical concept that is not fixed but changes with capital accumulation. The concept of prices of production just as natural prices is required for understanding the structure of the economy at any moment in terms of relative prices, income distribution (exploitation in Marx) and level of capital accumulation. However, competition in Marx is a much deeper concept, it not only leads to a tendency for the law of one price within an industry and a uniform rate of profit across industries, but it is also the driving force of

[14] Advocates of "Monopoly capitalism" argues that the centralisation and concentration of capital leads to monopolisation of capital. Hilferding was the first to argue that competition dominated the economy before the late 19th century, but since then monopoly powers have superseded the competitive mechanism. Monopoly capital argument has since then developed by Lenin, Sweezy, and Baran among others. Monopoly capitalism leads to a hierarchy of rates of profit depending on the degree of monopoly and the growing surplus disposed and realised at a global scale through the support of the state. The prices are not determinate as it depends on the degree of monopoly. Monopoly capitalism came under heavy criticism from traditional Marxists as it is quite similar to the neoclassical perfect and imperfect competition (see sections 3.4, and 4.3), as the degree of competitiveness depends on the size and the number of firms in the market (Shaikh 2016, 355). "It is, therefore, analytically illegitimate to oppose 'monopoly capitalism' to 'competitive capitalism' as two distinct phases of capitalism … All capitalism is competitive, in the fundamental sense … of the opposition between capital in general and the working class. None of these [monopoly capital] aspects of the rule of capital can be grasped through the quantitative approach to competition, focusing narrowly on the number of 'independent' producers on the market" (Chattopadhyay 2012, 74)

capitalism in its role as imposing the "immanent laws of capitalist production".[15] The same competition that drives accumulation also steer capital to crisis and stagnation.

3.3 Austrian Market Coordination Through Competitive Process

Early Austrians like Carl Menger, Böhm-Bawerk and Friedrich von Wieser did not have a clear common understanding of competition. While some rejected competition as an end state others saw competitive tendencies as a useful metaphor to explain exchange value.[16] The disagreement over how to conceptualise competition and how much it should be stressed in the workings of the market has spilt over even to modern Austrians. However, all modern Austrians outright reject the perfect competition model (discussed in section 3.4), which is characterised by homogeneous commodity, free entry, and perfect knowledge. As Austrian focus on subjectivism, the economy is seen as a decentralised open-ended system with uncertainty, thereby raising the issue of coordination of individual plans. This coordination problem places competition as a market process at the centre of Austrian theory. Given the institutional arrangement of the markets, individual agents make a set of choices or preferences – a plan to allocate his/her scarce resources to the most efficient use. The function of the market is to coordinate these individual plans. However, individuals do not have all the necessary knowledge and "data" to arrive at a perfectly coordinated order instantaneously. Agents have to continually revise, adapt and modify their plans as they learn and discover more about the underlying market conditions and other agents' plans. This process takes time and is the very process of competition through which agents discover which goods are scarce or how scarce

[15] As capital develops, competition pervades al spheres of interaction. Competition not only imposes capital's logic in the production sphere but also on the social sphere of human interaction. "From a coercing mechanism of the capital-labour relation, it becomes the general coercing mechanism of the capitalist society. … competition tends to impose itself at a subjective level … that increasingly contaminates social life and tends to generate even a competitive human nature." (Palermo 2017, 1574)

[16] According to Bert Tieben, "Menger denied the validity of the equilibrium concept as an end-state but also refused to speak of a market process towards such a state … Böhm-Bawerk stressed the indeterminacy of"market exchange as a negotiating procedure. Nonetheless, he believed that in the real world the pull towards equilibrium was the dominant force behind the market process … Wieser had an ambiguous attitude towards the concept of economic equilibrium. On the one hand, he aimed to give realistic explanations of the market mechanism and its equilibrium tendency. On the other hand, he exaggerated the social costs of disequilibrium adjustments because he feared that such changes could lead to a collapse of the market system as a mechanism for the coordination of activities"(Tieben 2012, 301).

and valuable the goods are. Competition brings about equilibrating tendencies to the market and explains how the market generates mutual adjustment of decentralised decisions.[17]

Through his "the meaning of competition" (1948), published from a lecture in 1946, Friedrich Hayek is attributed as the first to define competition as a process.[18] He sharply criticises perfect competition for assuming away the process of competition, depriving scope for all the activities that the verb "to compete" describes. Perfect competition "confines itself to defining conditions in which its conclusions are already implicitly contained and which may conceivably exist but of which it does not tell us how they can ever be brought about" (Hayek 1948, 94). Whereas according to Hayek, competition should explain the process by which the given "data" are adjusted. He particularly points out the assumption of given complete knowledge and perfect foresight are unrealistic.[19] No individual has complete knowledge; rather, there is "dispersed information".

> "The economic problem of society is thus not merely a problem of how to allocate "given" resources-if "given" is taken to mean given to a single mind which deliberately solves the problem set by these "data." It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, "it is a

[17] Ludwig Von Mises, Fredrick Hayek and Austrians uses the term 'catallaxy' for market economy in order to better describe the emergent order brought about by the mutual adjustment of diverse individual plans through the markets.

[18]According to Kirzner (Kirzner 2000, 208 and 210), in the first half of the 20thcentury perfect competition dominated discourse in economic theory. "No one in the profession, it appears, had seen (or at least made explicit) the crucial difference between competition as a state of affairs and competition as a driving, dynamic process" … "economists seemed (in retrospect, almost incredibly) entirely unaware of the sharp distinction between the two possible uses of the adjective 'competitive,' namely, either as describing a process or as describing the equilibrium outcome (of some undefined process) seen as an already attained and settled state of affairs" (Kirzner 2000, 208,210).

[19]Oskar Morgenstern ([1935] 1976), pointed out that assumption of perfect foresight is unrealistic because "the individual exercising foresight must thus not only know exactly the influence of his own transactions on prices but also the influence of every other individual, and of his future behaviour on that of the others, especially of those relevant for him personally" and these individuals are "not ordinary men, but rather, at least to one another, exactly equal demi-gods, in case the claim of complete foresight is fulfilled"(Morgenstern 1976, 173). Moreover, assuming perfect foresight when individuals' plans are interdependent produces "*an endless chain of reciprocally conjectural reactions and counter-reactions*" and therefore "u*nlimited foresight and economic equilibrium are thus irreconcilable with one another*" (ibid.,174; emphasis in original).

> "problem of the utilisation of knowledge which is not given to anyone in its totality." (Hayek 1948, 77–78)

For Hayek, in a decentralised economy, the problem is one of knowledge, and the process of competition is a knowledge discovery procedure. Hayek further elaborates on the idea in "Competition as a Discovery Procedure" ([1968] 2002), competition is a procedure/process for the discovery of those relevant knowledge communicated through the price system reflecting changes in relative scarcities of goods since no one has the totality of knowledge.[20] The process of competition involves "disappointing or defeating some particular expectations or intentions" (ibid: 180) for market order to come about. According to O'Driscoll and Rizzo (1996, 101), Hayek explicitly integrates endogenous learning into the competitive process. For Hayek, competition fills the knowledge gaps through discovery and learning, bringing mutual adjustment of individual plans and also ensuring that goods will be produced at the cheapest possible cost and sold at the lowest possible price.

Ludwig Von Mises also articulated market competition as a process, beginning from his critique of socialism in the 1920s. Mises argued that under socialism, there is no mechanism like the market prices and, therefore, impossible to achieve a rational and efficient allocation of resources. This triggered the now famous "socialist calculation debate". Mises rejected the concept of the market, which is always in equilibrium, where buyers and sellers have no influence over the market, and prices are determined outside the market by an auctioneer, and where all the individual plans are always reconciled perfectly. For Mises, such an always ideal equilibrium market is redundant, as there is no place for purposeful human action. Mises saw the market as a competitive process:

> "The market is not a place, a thing, or a collective entity. The market is a process, actuated by the interplay of the actions of the various individuals cooperating under the division of labor. The forces determining the-continually changing-state of the"

[20] For O'Driscoll and Rizzo(2002, 102) "There are five general characteristics of knowledge with which a Hayekian view of competition is concerned. Knowledge is (1) private, (2) empirical, (3) often tacit, (4) not all gained through price signals, and (5) often the source of surprise"

> "market are the value judgments of these individuals and their actions as directed by these value judgments. The state of the market at any instant is the price structure, i.e., the totality of the exchange ratios as established by the interaction of those eager to buy and those eager to sell. … The market process is entirely a resultant of human actions. Every market phenomenon can be traced back to definite choices of the members of the market society."
>
> "The market process is the adjustment of the individual actions of the various members of the market society to the requirements of mutual cooperation. The market prices tell the producers what to produce, how to produce, and in what quantity. The market is the focal point to which the activities of the individuals converge. It is the centre from which the activities of the individuals radiate." (Mises [1949] 1998, 258‑59).

Competition for Mises like Hayek's is a social phenomenon. The driving for the market process is provided by "speculating entrepreneurs" intending to seek profits taking advantage of price differentials in the market. Entrepreneurs

> are the first to understand that there is a discrepancy between what is done and what could be done. …it is the competition of profit-seeking entrepreneurs that does not tolerate the preservation of false prices of the factors of production. The activities of the entrepreneurs are the element that would bring about the unrealisable state of the evenly rotating economy if no further changes were to occur. (ibid. 333, 335)

The market is in a continual correction process instigated by entrepreneurial competition for profits. Provided that there are no outside changes, this process will eventually lead to a price structure where all profits are squeezed out and coordination of plans established. However, Mises suggested that this end state equilibrium may never be actually realised in reality because of uncertainty inherent in purposeful action. Therefore, for Mises, the process of entrepreneurial competition only generates equilibrating tendencies, as market processes continually change due to institutional changes and the action of the entrepreneurs. In the Misesian competitive process, entrepreneurs are the main agents who act on the changing "data" of the market. Entrepreneurs themselves do not know the true price structure or the efficient resource

allocative vector. Opportunities for Pure profit emerge because the alert entrepreneurs can guess or judge the future prices of the goods and factors of production and the future state of the market more correctly than other people do. Moreover, they act on these opportunities through the inherent uncertainty. Mises views the role of the entrepreneur as purposive human action bringing about coordination in the market.

Taking inspiration from the works of Hayek and Mises, leading Austrians such as Israel Kirzner, Ludwig Lachmann, Gerald O. Driscoll, Mario Rizzo et al. have developed and worked on the nature and concept of competition and equilibrium and its role in Austrian economics.[21] Appendix C.3 discusses more on the nature of Austrian economics, further developments and debates on the nature of the competitive process, and whether it brings about coordinative equilibrium or disequilibrium.

3.4 Competition as a State: Perfect Competition

3.4.1 The Genesis of Perfect Competition

In modern mainstream economic theory, "Perfect competition" as a definition of competition occupies a central position from which all mainstream economic principles are derived. According to Stigler (1957), the concept of competition was treated with casualness as "intuitively obvious" by classical economists. It was only with Antoine Augustine Cournot's *Research into the Mathematical Principles of the Theory of Wealth* ([1838] 1897) that gave the first formal treatment of competition. Interestingly Cournot's mathematical analysis was about the state when all competitive process has ceased, rather than about the process of competition among producers. Starting from an analysis of duopoly, he moved to a model of "unlimited

[21] Some within the Austrian tradition have criticized the Austrian preoccupation with competition and equilibrium models as this is not the core agenda of the Austrian research programme. "Fatal for the theoretical core of the Austrian School, was the displacement of its theory of price, … [and] Another strain had begun to develop along the lines spelled out by Menger's other student Friedrich von Wieser, who followed the Walrasian path of developing price theory within the framework of general equilibrium"(Mises [1949] 1998, introduction to scholars edition, vi). For them, Austrian economics is about value and exchange and not about knowledge and equilibrium. However according to Kirzner, knowledge discovery and entrepreneurial process in no way compromise "the traditional centrality, within Austrian economics, of systematic market co-ordination and consumer sovereignty" (1992, 11), rather they provide better insights.

competition". It is a situation when the effects of competition have reached their limit such that the output size of each firm is insignificant with respect to the total industry output.

> The effects of competition have reached their limit, when each of the partial productions $D_k$is *inappreciable*, not only with reference to the total production $D = F(p)$, but also with reference to the derivative $F'(p)$, so that the partial production $D_k$could be subtracted from D without any appreciable variation resulting in the price of the commodity. (Cournot 1897, 90; emphasis in original)

For Cournot, this hypothesis of competition is applicable for a multitude of goods. He extensively applies the marginal analysis, in which the equality of prices and marginal cost is characterized as 'unlimited competition'. When price exceeds the marginal cost, monopoly emerges. This definition of competition implies a very large number of sellers, and a single price of a homogeneous commodity as no individual seller can influence the price. Thus, Cournot brought forth the essential character of perfect competition, which would be improved and perfected over the next few decades.

The next major development in perfect competition comes with Stanley Jevons' *Theory of Political economy* (1888). Jevons considered exchange as the most important process in the whole of economics. The concept of "perfect market" is defined as part of his theory of exchange. For Jevons, the concept of competition is embedded in the idea of the perfect market. A market is said to be "theoretically perfect" when it satisfies two conditions (i) That there is "perfectly free competition, so that anyone will exchange with anyone else for the slightest apparent advantage" (ibid. 74), and (ii) "when all traders have perfect knowledge of the conditions of supply and demand, and the consequent ratio of exchange". In such a market, "there can only be one ratio of exchange of one uniform commodity at any moment" (75). The idea of a "perfectly uniform or homogeneous" commodity having a single uniform price is what Jevons termed as the "law of indifference". That in the same market, there cannot be two prices for the same homogenous commodity implies that "*the last increments in an act of exchange must be exchanged in the same ratio as the whole quantities exchanged."* (78; emphasis in original). Given two commodities x and y, then

$\frac{dy}{dx} = \frac{y}{x}$. Stigler (1957, 6) rewrites it as, if x_i exchanges for y_i at P_y and P_x prices

Then $\frac{P_y}{P_x} = \frac{y_i}{x_i}$ for all i

This definition of the market, just like that of Cournot implies a large number of traders so that no single trader can appreciably affect the price. Not every market functions perfectly but to Jevons, "the theoretical conception of a perfect market is more or less completely carried out in practice" (74). However, it must be pointed out that Jevons was well aware of the distinction between static and dynamic analysis. Jevons acknowledges that exchange is a dynamic process

> The real condition of industry is one of perpetual motion and change. Commodities are being continually manufactured and exchanged and consumed. If we wished to have a complete solution of the problem in all its natural complexity, we should have to treat it as a problem of motion—a problem of dynamics. (Jevons 1888, 78)

Nevertheless, owing to the complexity of the problem, he ventures to treat the exchange as a purely statical problem. His focus is on equilibrium exchange and therefore assumes that commodities are not exchanged continuously but only in fixed amounts till equilibrium is reached. According to Stigler, in the evolution of perfect competition, Jevons emphasised the role of knowledge and, with his "perfect market", merged the concept of competition and the market (discussed later in the section).

In his *Mathematical Psychics* (1881), Francis Ysidro Edgeworth attempts to give a rigorous definition of perfect competition. He defines competition as a field in which there is free communication, and individuals are willing and able to contract and re-contract throughout the competitive field.[22] Additionally, Edgeworth defines perfect competition as a field with properties that lend favourably to mathematical analysis.

> "The conditions of a perfect field are four; the first pair referrible to the heading multiplicity or continuity, the second to dividedness or fluidity.
>
> I. An individual is free to recontract with any out of an indefinite number, …"

[22] Edgeworth defines competition analogous to a field in mathematics. In an algebraic sense, a field is defined as a set on which operations of addition, subtraction, multiplication and division can be performed. Similar to this, Edgeworth defines competition as a field with reference to contracts, "consists of all the individuals who are willing and able to recontract about the articles under consideration" (Edgeworth 1881, 17).

> "II. Any individual is free to contract (at the same time) with an indefinite number; ... This condition combined with the first appears to involve the indefinite divisibility of each article of contract …"
>
> "III. Any individual is free to recontract with another independently of, without the consent being required of, any third party, ..."
>
> "IV. Any individual is free to contract with another independently of a third party; ..."
>
> "The failure of the first [condition] involves the failure of the second, but not vice versa; and the third and fourth are similarly related."(Edgeworth 1881, 18–19)

From the above, it is clear that for perfect competition to prevail, we require an indefinitely large number of individuals, independent self-seeking individuals, and the divisibility of the commodities traded. As discussed earlier, a large number of independently acting individuals in the market is required so that no single seller or buyer can influence the price or have monopoly powers. Perfect competition also requires divisibility of commodity because the demand and supply functions need to be continuous. Otherwise, even a unit change of the commodity will lead to large changes in its price. Also, given that there are a large number of individuals, divisibility of commodity ensures that each will have only an infinitesimal quantity.

What Edgeworth achieved was to define perfect competition as a model, in which mathematics now defines the characteristics of perfect competition. In Edgeworth, there was no hesitancy like his processors to theorise a dynamic and complex reality. Edgeworth's efforts to bring economics to par with physical sciences resulted in a static model of perfect competition.

3.4.2 Marshall's Dynamic Competition in Static Theory

Alfred Marshall did not contribute much to the development of perfect competition. In his writings, perfect competition is mentioned only once to reject the existence of such a market. However, there is a rich analysis of free competition in determining value and distribution and the method adopted to deal with such dynamics. Marshall's highly influential book *Principles of Economics* was published in 1890, it solidified marginalist ideas as the dominant orthodoxy. He established "the general theory of the equilibrium of demand and supply" as the "Fundamental Idea". Marshall was well aware of the dynamic and complex nature of economic reality and therefore put forward the method of partial equilibrium:

> "The element of time is a chief cause of those difficulties in economic investigations which make it necessary for man with his limited powers to go step by step; breaking up a complex question, studying one bit at a time, and at last combining his partial solutions into a more or less complete solution of the whole riddle. In breaking it up, he segregates those disturbing causes, whose wanderings happen to be inconvenient, for the time in a pound called *Cœteris Paribus.* The study of some group of tendencies is isolated by the assumption *other things being equal:* the existence of other tendencies is not denied, but their disturbing effect is neglected for a time. The more the issue is thus narrowed, the more exactly can it be handled: but also, the less closely does it correspond to real life. Each exact and firm handling of a narrow issue, however, helps towards treating broader issues." (Marshall [2013] 1920, 304; emphasis in original)

Marshall emphasised the continuity of theoretical development from classical to the marginalist.[23] The *Principles* was offered as a middle path, combining the ideas of classical economists and that of the marginalist ideas. Through his demand and supply equilibrium theory, he attempted to synthesise "utility" as the demand function and "cost of production" as the supply function for his theories of exchange and distribution. Marshall compares demand and supply laws with the symmetrical blades of a scissor. The demand function is derived from consumers' preferences and the law of diminishing marginal utility. The individual will allocate his scarce resource to consumption in such a way that the marginal utility is equal for each unit of resource. Thus, each individual price will be a measure of marginal utility. The market demand function is just an aggregation of the individual demand functions. Similarly, the supply function is derived from diminishing returns to factor inputs and the alternative uses of the given resource, ranked according to profitably. In order to have symmetry with demand function,

[23]Marshall argued that marginalist supplemented the classical theory, and "have extended, developed and sometimes corrected them and often have given them a different tone by a new distribution of emphasis; but""very seldom have subverted them"(Marshall 2013, xix). However according to Bharadwaj ([1989] 2017, 155), "the old doctrines were indeed subverted and Marshall's theorizing played a major role in abandoning the old and in heralding and establishing the new".

Marshall defined cost of production in terms of disutility, called "real cost".[24] Moreover, to ensure the equilibrium of the firm and to have an upward sloping supply curve, industries are isolated by the method of partial equilibrium and only economies of scale that are external to the firm but internal to the industry are considered.

The theory was generalised and "extended to cover the entire range of problems - of production, consumption and distribution - and subjective valuations of individuals, regarded as optimising agents" (Bharadwaj [1989] 2017, 155). However, such attempts to reconcile two systems of theories with jarringly different methodology and characteristics resulted in contradictions and inconsistencies that show up clearly in his discussion of competition and the firm's growth.

Marshall does not assume that competition is perfect as it requires "perfect knowledge of the state of the market". This might be true of some specialised markets like "Lombard Street, the Stock Exchange, or in a wholesale Produce Market". However, this is not true for the labour market or the majority of the produced commodities. For Marshall, in actual markets, competitiveness depends on the extent of access to information. Thus, competition is a process that may lead to a partial or temporary monopoly.[25] This competitive process is tied to the firm's growth. Marshall reinterprets Smith's "division of labour" and defines internal economies and external economies as:

> "We may divide the economies arising from an increase in the scale of production of any kind of goods, into two classes—firstly, those dependent on the general development of the industry; and, secondly, those dependent on the resources of the individual houses of business engaged in it, on their organisation and the efficiency of their management. We may call the former *external economies*, and the latter *internal economies*." (Marshall [2013] 1920., 221; emphasis in original)

[24]Real cost includes both subjected and objective elements. "The exertions of all the different kinds of labour that are directly or indirectly involved in making it; together with the abstinences or rather the waitings required for saving the capital used in making it: all these efforts and sacrifices together will be called the *real cost of production* of the commodity"(Marshall [2013] 1920, 282; emphasis in original).

[25]Marchionatti (1992), and Stigler (1957) both notes that Marshall's discussion of competition as a dynamic process is very similar to that of Adam Smith's discussion. However, Stigler equates this similarity dismissively as "informal and unsystematic"

Internal economies of scale occur when there is large scale production as the firm size grows. The advantage of large-scale production is the increase in the skill and introduction of new machines and methods. External economies occur when there is a geographical concentration of various industries and the introduction of new technology because of the development of the economy as a whole. External economies of scale could be external to the firm but internal for its industry or external for both the firm and its industry. Firms could take advantage of such economies of scale to become a monopoly. However, a firm cannot grow indefinitely; its monopoly can only be partial and temporary. Marshall introduces the counter forces to monopoly – the rise of diminishing returns, diffusion of technological change, "the difficulties of marketing; and finally, the technical constraints on the exploitation of internal economies" (Marchionatti 1992, 562). The growth and decay of firms are discussed through the metaphor of trees in a forest.[26] As firms grow and then stagnate and decay, "at the turning point, there is a balancing or equilibrium of the forces of life and decay" (Marshall 1920, 269). This equilibrium must be a moving equilibrium given the life cycle of the firm. Within an industry, there will be firms in various stages of the "life cycle", the passage of time exerts various influences on the cost and prices. Hence, to determine a unique normal relation between cost of production and price, he describes an equilibrium mechanically as a "stone hanging by an elastic string, or of a number of balls resting against one another in a basin" (ibid.). He is forced to put the dynamics generated by the passage of time in the straitjacket of the "stationary state" and isolate the different markets and industries using the method of partial equilibrium, along with the stationary state.[27] Marshall also introduces the concept of the "representative firm" or the average firm to study the equilibrium of industry when the firms have increasing returns.

[26] "we may read a lesson from the young trees of the forest as they struggle upwards through the benumbing shade of their older rivals. Many succumb on the way, and a few only survive; those few become stronger with every year, they get a larger share of light and air with every increase of their height, and at last in their turn they tower above their neighbours, and seem as though they would grow on for ever, and for ever become stronger as they grow. But they do not. One tree will last longer in full vigour and attain a greater size than another; but sooner or later age tells on them all. Though the taller ones have a better access to light and air than their rivals, they gradually lose vitality; and one after another they give place to others, which, though of less material strength, have on their side the vigour of youth"(Marshall 2013, 263).

[27] "In the stationary state all the conditions of production and consumption are reduced to rest: but less violent assumptions are made by what is, not quite accurately, called the *statical* method. By that method we fix our minds on some central point: we suppose it for the time to be reduced to a *stationary* state; and we then study in relation to it the forces that affect the things by which it is surrounded, and any tendency there may be to equilibrium of"

> "Our representative firm must be one which has had a fairly long life, and fair success, which is managed with normal ability, and which has normal access to the economies, external and internal. … that the "representative" firm remains always of about the same size, as does the representative tree of a virgin forest, and that therefore the economies resulting from its own resources are constant: and since the aggregate volume of production is constant, so also are those economies resulting from subsidiary industries in the neighbourhood, etc." (ibid. 265, 305)

Only with the stationary state and the representative firm can there be a determinate theory of value for a commodity with demand and supply in equilibrium, just as constant returns balance increasing and diminishing returns for the average firm. Marshall could have assumed that every firm was of the same size in the stationary state. However, he considered the representative firm as a first step towards "the difficult problem of the interaction of countless economic causes". It served only as a stop-gap approach in analysing the dynamics of firms' competition and growth.[28] He was well aware of the limitations of the stationary state and partial equilibrium method.

> But nothing of this is true in the world in which we live. Here every economic force is constantly changing its action, under the influence of other forces which are acting around it. Here changes in the volume of production, in its methods, and in its cost are ever mutually modifying one another; they are always affecting and being affected by the character and the extent of demand. Further all these mutual influences take time to work themselves out, and, as a rule, no two influences move at equal pace. (ibid., 306)

What we see in Marshall is the description of competition and firm as a dynamic evolutionary process. However, as these concepts are framed into a static demand and supply equilibrium

"these forces. A number of these partial studies may lead the way towards a solution of problems too difficult to be grasped at one effort." (ibid., 306-307)

[28] However, in the hands of Pigou and Viner the representative firm was changed to the "equilibrium firm". The firm has a U-shaped average and marginal cost curves, which depicts increasing, constant and decreasing returns, and so there is a unique functional relation between cost and output. At the lowest point of the average cost curve where marginal cost bisects from below, the firm is in equilibrium with constant returns. There is no reference to the dynamic "life cycle" of the firms.

theory, their dynamism is sacrificed for statics. It also results in contradictions and inconsistencies within the structure. In the 1920s, the Marshallian theory and its developments came under heavy criticism (see section 4.2) for its logical inconsistencies and empirical invalidity.

3.4.3 Clark's Static Competition

In the United States, the latter half of the 19th century saw the growth of "trusts", "combinations", and oligopolies that dominated the manufacturing sector. According to Morgan (1993, 565), American economists interpreted the emergence of oligopolies and cartels as "modern competition". It was a complex and diverse phenomenon that led to the varied conceptualisation of competition – "competition could be an activity, a process, a game, an economic institution, an agency of natural laws, or even a fundamental law of nature". All these notions of competition portray a dynamic process. John Bates Clark, one of the leading theoretical economists, early in his writings viewed competition as a moral law, with just income distribution sanctioned by God. The emergence of oligopolies is not ideal but still a part of the providential design. Clark envisions competition as an evolutionary dynamic process that results in oligopoly. Later he develops the idea of "potential competition", the threat of new firms to rein in oligopolistic firms and keep prices at competitive levels[29]. Potential competition is as good as active competition if there are no unfair obstacles from the large firms. Oligopoly does not mean the end of competition as it still operates among large firms.

However, there was a drastic shift in Clark's conception of competition with, *The Distribution of Wealth* ([1899] 1908), from his earlier notion of competition describing a dynamic process to that of competition in a static theory. The emphasis is on the theory of value and distribution based on final productivity or marginal productivity of labour and capital, and competition ensures the determination of normal prices, wages, interests and profits, the analysis is carried out within a static framework. Both Marshall and Clark acknowledge that naturally, all societies are complex and dynamic and so take the aid of static analysis as a step to understand the whole dynamics. However, there is also an important difference between the

[29]John F, Henry (1995, 68) draws a similarity between Clark's potential competition and modern theory of contestable markets "Clark was able to 'rescue' competition through a rather ingenuous argument that strikes one as an antecedent of the modern theory of 'contestable markets' which attempts to rescue competitive theory (and conclusions) within the framework of non-competitive economic structures."

two. Marshall uses his static partial equilibrium frame to slice up time; it is a stop gap approach to a full-fledged dynamic analysis. His notion of competition as a process had to be fitted into a static theory which created inconsistencies and contradictions in his analysis. For Clark, the static method is also an isolating method for the study of dynamics, but unlike Marshall, both static theory and dynamic theory in Clark are complementary in understating the various aspects of reality. Static theory lays bare the fundamental and systematic forces working in the society. For this, society is reduced to a stationary state, perfect and free from any disturbance or change, a frictionless reality. To Clark, this description of static state though imaginary deals with fundamental reality as the state is "imaginary only by its omissions; for it presents an essential part of the forces that act in the real, dynamic world" (ibid., 215). The static laws represent

Essentially the static law is competition among capital and labour that brings about natural prices, profits and wages. Competition operates in a static state, unlike classical and Austrian economics, where competition is dynamic. Clark defines dynamics as those that cause variation in the natural values and those that change the structure of the society, such as – changes in population, capital accumulation, changes in the method of production, changes in industrial structure and consumer preferences.[30] However, static laws are the dominant forces as they work not only in a stationary state but also in a dynamic world. Dynamic forces create conditions for the static forces to work as it tends to establish normal values for that given condition, but dynamic forces can cause fluctuation and variations around the normal values. When dynamic forces cause to change the structure of the society creating new conditions, the static forces also reorganise to new normal or natural values. Static laws "as they work in an actual and dynamic society, never give the same rate at different dates, but rather an endless succession of static rates" (219). The object of static force is to flesh out the national conditions of the society, but dynamic changes constantly frustrate the static forces from realising the natural values as society grows and change.[31]

[30]This is study of actual prices, wages, profits and interests and their variation around their normal values.

[31]"It would be reached, if we were to paralyze the dynamic forces all at once and wait long enough for the slowest static adjustments to be made. The state toward which society is now tending, at the outset of the long period, is one that cannot be completely reached until the slowest adjustment that static law calls for has had time to complete itself" (J. B. Clark 1908, 229).

It is interesting to note that for Clark, static does not mean absolute rest, there is movement in both statics and dynamics. He recognises only those changes or variations in the social structure as dynamic. “Changeless in its population, its local abodes, its modes of production and the forms of its wealth, such a society would live, indeed, but it would show no change in its organic form. Having life, but not growth, it would be what we identify as a static society” (42). Mere physical activities or movements within a particular social structure is not dynamic but rather static. Once this distinction is clear, then competition is the static force working to bring about natural values.

> What are called "natural" standards of values and "natural" or normal rates of wages, interest and profits are, in reality, static rates. They are identical with those which would be realised, if a society were perfectly organised but were free from the disturbances that progress causes. Reduce society to a stationary state, let industry go on with entire freedom, make labor and capital absolutely mobile—as free to move from employment to employment … and you will have a regime of natural values. (ibid., 26)

Similar to the classical economists’, Clark’s conception of competition is an organising force that brings prices to their natural level and equalises the productive powers of all labour and capital, i.e., wages and profits are at their natural rates. However, unlike classical economists, where competition brings about dynamic changes of technology and structure through movements of capital and labour in search of higher returns. Here competition works in a tranquil state where capital and labour are mobile devoid of any dynamic change. Indeed, Clark brought together the concept of “stationary economy and competition”. With this, perfect mobility of labour and capital, which was hitherto implicit, became an explicit assumption of perfect competition. Mobility of resources as part of perfect competition, a static determinate model, is not a contradiction for Clark once we recognise that, in his analysis, mobility and competition operate in a static state.

3.4.4 Knight’s Perfection of Competition

A complete and systematic conceptualisation of Perfect competition came in Frank Knight’s *Risk, Uncertainty and Profits*(1921)s, in which the assumptions of perfect competition

and its implications were brought out clearly. The study of perfect competition in which changes and fluctuations are eliminated by abstraction serves as the basis for studying the actual economy characterised by the uncertainty of the future. Knight brings out clearly the assumptions of perfect competition, which hitherto been partial and implicit. The important assumptions are

> 2. We assume that the members of the society act with complete "rationality." … they are supposed to "know what they want" and to seek it "intelligently".
>
> 4. We must also assume complete absence of physical obstacles to the making, execution, and changing of plans at will; that is, there must be "perfect mobility" in all economic adjustments, no cost involved in movements or changes. … In addition, the production process must be constantly and continuously complete. … The exchange of commodities must be virtually instantaneous and costless.
>
> 5. It follows as a corollary from number 4 that there is perfect competition. There must be perfect, continuous, costless intercommunication between all individual members of the society.
>
> 6. Every member of the society is to act as an individual only, in entire independence of all other persons. … Individual independence in action excludes all forms of collusion, all degrees of monopoly or tendency to monopoly.
>
> 9. All given factors and conditions are … expressly given, to remain absolutely unchanged. (ibid., 76–79)

In perfect competition, equilibrium is brought about by the equality of demand and supply functions, when in the commodities market, the utility ratios of each commodity are equal to the price ratios, and in the factors market, there is an established uniform rate of wage and profit for both labour and capital respectively. The realisation of perfect competition requires static conditions – the absence of unpredictable changes. In such a theoretical society, there is always a tendency towards equilibrium. According to Knight, the most important condition for the achievement of perfect competition is "the assumption of practical omniscience on the part of every member of the competitive system" (ibid. 107), so that exchanges can happen only at one

price for each commodity including labour and capital.[32] However, in reality, no individual can possess perfect knowledge, and the tendency to approach equilibrium is frustrated by unforeseen changes to the conditions of competition.

Knight critiques J. B. Clark's view of dynamic change (discussed earlier) as the cause of profit. However, according to Knight, profit in Clark's conception is temporary as the effect of any dynamic change that creates profit is petered away if competition works without any hindrance. Thus, in Clark, profit is dependent on the friction created by dynamic change. According to Knight, "this procedure of taking changes in conditions as the explanation and cause of profit is that it overlooks the fundamental question of the difference between a change that is foreseen a reasonable time in advance and one that is unforeseen" (ibid., 35). Change will create profit only if it creates ignorance about the future. It is imperfect knowledge of the future as a result of the change that causes profit and not just mere change.[33] There are certain ways to deal with unknown changes. A priori probability and statistical probability are two ways of ascertaining future events. However, there are situations where we cannot ascertain the future in any discernible way. For example, most business and investment decisions are so unique that cannot be reduced to any objective and measurable probability. One can only have a rough estimate or opinion and hope for favourable results. Social progress that causes uncertainty is either due to deliberate action and intent of humans or incidental.[34] For Knight, the most fundamental factor that creates true uncertainty has to do with increase of knowledge. This inevitably leads to inventions, improvements in technology, organisation methods, or the discovery of new resources. Another source of complex uncertainty is changes in human wants. These uncertainties cannot be reduced to an objective quantitative probability. This "true

[32]If every individual possesses perfect knowledge, the future would be known and be exactly like the past. In such a situation, Knight (1921, 207)remarks that there will be no need for entrepreneurs and enterprise to organise productive activity. For Knight, it is uncertainty that prevents the perfect workings of competition and brings about the profit for the entrepreneur (discussed in the following pages).

[33]Knight emphasis that the problem is not one of complete absence of knowledge but rather the variability of the degree of knowledge one has about the future (ibid., 199).

[34]Knight distinguishes between two types of changes – natural changes and changes through human action. Natural changes according to Knight are always predictable to some degree, they are either fluctuations from a constant condition or very slow changes that do not make any difference to human calculation about his future actions (ibid., 316).

uncertainty" is what prevents competition from working out into perfect competition. Knight distinguishes between risk and uncertainty:

> The practical difference between the two categories, risk and uncertainty, is that in the former the distribution of the outcome in a group of instances is known (either through calculation a priori or from statistics of past experience), while in the case of uncertainty this is not true, the reason being in general that it is impossible to form a group of instances, because the situation dealt with is in a high degree unique. (ibid., 233)

By distinguishing between risk and uncertainty, Knight was accounting for the emergence and importance of entrepreneurship and enterprise(Cowan 2016, 60). According to Knight, there are two important ways to deal with uncertainty – consolidation and specialisation. Consolidation is done through insurance, which eliminates uncertainties by grouping similar instances and converting them into measured risks.[35] Specialisation deals with situations where it is impossible to define objectively the uncertainties involved. Specialisation is carried out through the instrument of speculation. In society, occupations differ in terms of the kind and amount of knowledge, judgement and abilities individuals have. Entrepreneurs are "those with confidence in their judgment and disposition to 'back it up' in action specialise in risk-taking" (Knight 1921, 270). They are a special social class that speculates about an uncertain future and take investment decisions. The entrepreneurs organise production, while the working class furnish them with productive services. Thus, specialisation is what gives rise to the enterprise and wage system of industry.[36] With this specialisation of functions, there is also a

[35]Insurance by grouping instances of risk is usually done by an external agency outside the firm. However, there is a limit to what an external agency can do "because of the peculiarly obstinate connection of a *moral hazard* with this sort of risks. The decisive factors in the case are so largely on the inside of the person making the decisions that the 'instances' are not amenable to objective description and external control." (251). Therefore, instead of an external agency carrying out the consolidation on behalf of the firm, consolidation of risks and uncertainties are done within the firm. This is one of the important causes of growth in the size of business establishment.

[36]Specialization and consolidation are intimately connected. Specialization of uncertainty bearing in the hands of entrepreneurs implies concentration, and concentration involves consolidation. Organized activity or enterprise reduce uncertainty by consolidating or grouping "the decisions of a particular individual and estimating the proportion of successes and failures, or the average quality of his judgments as a group"(ibid. 293). Again, in corporate organization, "the minute divisibility of ownership and ease of transfer of shares enables an investor to

differentiation of reward. Entrepreneurs earn profit by undertaking uncertain investments and being successful uncertainty-bearer. "Profit is“ simply the difference between the market price of the productive agencies he employs, … “and the amount which he finally realises from the disposition of the product which under his direction they turn” (ibid., 277). Thus, the presence of true profit depends on the uncertainty of the entrepreneur’s speculative estimation and judgement of the future.

3.4.5 General Equilibrium and Perfect Competition

In his *Elements of Pure Economics* ([1874] 1954), Leon Walras developed general equilibrium theory in mathematical terms. Pure economics is the study of price determination in the market under the “hypothetical regime of perfectly free competition”. For Walras, competition is the essence of market equilibrium. He gives the example of the stock exchange of London and Paris as ideal well-organised markets to understand the phenomenon of exchange and competition. Though commodity markets may not work in the same way, according to Walras, one can prove and generalise the proposition that competition is the superior general rule by constructing a mathematical model of exchange and production of several commodities.

The simplest of general equilibrium models is that of pure exchange without production. The model is presented here as discussed in Lionel McKenzie (1987). Given the consumer tastes and preference by the utility function $u$with initial stock of goods w. Let there be$n$ goods and m agents in the market, andw_i^h the quantity of the i^{th} good held by the h^{th} agent. Let $u^h(x),\ where\ x = (x_1, x_2, \dots, x_n)$be the utility derived by the h^{th} agent from consuming these *x* quantities of the *n* goods. The demand function gives the equilibrium quantities that will be traded by the agent as a function of market prices. At the prices $p = p(p_1, \dots, p_n)$ and the quantities x^h, the h^{th} agent will be in equilibrium, given that $u^h(x)$ is maximum at x^h overall values of *x* and satisfies the equation, $\sum_1^n p_i x_i = \sum_1^n p_i w_i^h$.If the utility function is smooth and concave, then the maximising quantities *x* will be unique and be a function of prices, $x^h = f^h(p)$. The aggregate sum of all the individual demand functions gives the market demand function. Equilibrium in each market is attained when excess demand is zero, i.e., supply equals

distribute his holdings over a large number of enterprises”(254). This diffusion as well as consolidation diffuses risk and provide a higher degree of regularity and predictability in her total return.

demand for each commodity. Given the market demand function $f(p) = \sum_1^m f^h(p)$, the markets will be in equilibrium when a price vector p allocates the goods $(x^1, x^2, \dots, x^m)$in such a way that there is equilibrium of the individual agent, $x^h = f^h(p)$ and also equality of demand and supply, $\sum_{h=1}^m x^h = \sum_{h=1}^m w^h$. As there are *n* goods in the economy, there will be *n* scalar equations, $\sum_{h=1}^m f_i^h(p) = \sum_{h=1}^m w_i^h$, to determine the *n* equilibrium prices, p_i. The equilibrium quantity demand that maximises utility for individual agents as well as in the market is invariant to changes in the price level, and the quantity demand varies only with changes to relative prices of the goods. As the agents are assumed to be locally non-satiated, and the utility is maximized over the initial stock of goods, a reallocation of goods cannot increase the utility of one agent without reducing the utility of another. Thus, the equilibrium is efficient. This property is known as Pareto optimal.[37]

Walras also introduces production into general equilibrium, suppose$z = (z_1, \dots, z_r)$ be the quantities of the productive services and$g^i(z)$ with $i = (1, \dots., n)$ be the production functions to produce the n goods. Let p and $q$be the prices for the goods and the factor services respectively. At given prices q, the activity that minimizes cost for producing any good are represented by the production coefficients $a^i(q)$. The utility function of the agents now modified and includes the productive services as $u^h(x, z)$.The individual agent will be in equilibrium when (x^h, z^h) quantities are traded, and it maximizes $u^h(x, z)$ satisfying the equation,$\sum_1^n p_i x_i = \sum_1^r q_i z_i$. The maximizing quantities will be a function of their prices, $(x^h, z^h) = f^h(p, q)$. Market equilibrium requires three things. First, as a consumer of goods and provider of factor services, each agent must be in equilibrium, $(x^h, z^h) = f^h(p, q)$. Second, each agent as participants in production must also be in equilibrium, $p_i = \sum_{j=1}^r q_j a_j^i(q)$. Finally, market equilibrium also requires that the supply of and demand for factor services must equal to produce the goods demanded, $\sum_{h=1}^m z_j^h = \sum_{h=1}^m \sum_{i=1}^r x^h a_i^j(q)$.

What we have shown are the conditions for equilibrium in a simple exchange model and a production model. According to Walras, for the existence of such an equilibrium, the number of equations and the number of variables to be determined must be equal. However,

[37]This is the First Fundamental Theorem of welfare Economics. The corollary of which is that any Pareto optimum can be realized as a competitive equilibrium with a redistribution of some initial stocks - this is the Second Fundamental theorem.

this counting of equations does not guarantee a solution to the system. It was through the effort of Abraham Wald who showed that equilibrium exists using fixed point theorem. A complete solution with neoclassical assumptions to the existence of equilibrium was provided in the 1950s with the Arrow-Debreu-Mckenzie model.

As discussed so far, general equilibrium only describes the condition and state of equilibrium in an economy. The model does not provide the process by which there is a natural tendency for equilibrium. This is the problem of stability. Walras proposed a *tâtonnement* process which suggests that when markets are not in equilibrium, prices adjust in proportion to the levels of excess demands for the commodities (Kirman, 2016). How do prices adjust towards equilibrium? Walras assumes perfect competition with a large number of individuals but are not passive price takers. At the centre of the tâtonnement process, there is an imagined "auctioneer" who sets a tentative price and individuals quote prices at which they are willing to buy and sell, and then the auctioneer adjust the tentative price, and so on. Here prices adjust without exchange, and the process goes on till the excess demand for all goods are eliminated, only then does exchange happen. The tâtonnement is a virtual process that does not take time but happens instantaneously.[38] In a model with production which takes time to produce goods, the tâtonnement is improbable.[39] Moreover, the adjustment process to a unique and stable equilibrium requires that a huge amount of other information is necessary along with the coordinative mechanism of the prices system. However, even with the increase in the information required, the process does not guarantee convergence from arbitrary initial prices. These problems with the competitive process of Walrasian general equilibrium are implications flowing from Sonnenschein (1972), Mantel (1974) and Debreu (1974). Their result showed that aggregate behaviour could be derived consistently from the underlying assumptions of

[38]Though Walras model is static, he was aware that in reality markets do not completely adjust as the underlying conditions continually change. The market "is perpetually tending towards equilibrium without ever actually attaining it, because the market has no other way of approaching equilibrium except by groping, and, before the goal is reached, it has to renew its efforts and start over again, all the basic data of the problem, e.g. the initial quantities possessed, the utilities of goods and services, the technical coefficients, the excess of income over consumption, the working capital requirements, etc., having changed in the meantime. Viewed in this way, the market is like a lake agitated by the wind, where the water is incessantly seeking its level without ever reaching it." (Walras 1954, 380)

[39]Walras discussed the *tâtonnement* only with regard to a pure exchange model, and does not do so for the production model.

individual preferences and rationality and hence does not guarantee the stability of general equilibrium.

In the next section, we briefly discuss how with the introduction of temporary and intertemporal general equilibrium, the traditional long period method was abandoned in favour of the short-period method. The reason given for such a break was to introduce more realism by bringing in time and price expectations into the analysis. However, critics argue that the abandonment of the long period method "was due to weaknesses of the dominant theory of distribution and, in particular, of the conception of capital" (Garegnani 1983b, 130).

3.5 Temporary and Intertemporal Equilibrium

Garegnani (1983b) and Milgate (1982) argue that the early marginalists including Marshall used the Smithian method of long period normal position to study the persistent and competitive process at work in a non-stationary economy. Though the marginalist/neoclassical theoretical structure was different from that of classical political economy, "the notion of 'long period positions' as 'centres' of gravitation was fundamentally the same in the two cases and did not depend for its application on the hypothesis of a stationary (or steady-state) economy"(Garegnani 1983b, 132–33).

Through the works of Lindahl, Myrdal, Hayek, and Hicks in the 1920s and 1940s, there were efforts to move away from the "static" long period stationary state towards a more dynamic equilibrium method. By the 1960s, temporary and intertemporal equilibrium method had become the standard for neoclassical theory of price and distribution. The reason for such a change is that the long period method was interpreted as a study of the stationary state and therefore criticised for its lack of realism and dynamism and for introducing uncertainty and expectations into economic analysis. The starting point for such a change in method, away from long period equilibrium is Walras' assumption that the capital endowment is heterogenous, a given vector of physically different capital stock. However, by the fourth edition of his *Elements,* Walras understood the difficulties of such an arbitrary initial condition, as the capital stock may not be compatible with long period equilibrium. Therefore, Walras introduces the *tatonnement* process of "tickets" or "pledges" so that the system converges to a long period equilibrium(Kurz and Salvadori 1995, 440–41). Unlike Walras, Hicks retains the assumption of

the given vector of capital stock and seeks a solution by changing the method of analysis – short-period equilibrium.

Hicks's *Value and Capital*(1946) provided the most influential work in abandoning the long period "stationary method" and in adopting a method in which the economy is conceptualised as dynamic "where every quantity must be dated … not merely as a network of interdependent markets, but as a process in time" (Hicks 1946, 115–16). For Hicks, this notion is best represented as a series of temporary equilibria.

Temporary equilibrium analyses markets in the short period (the present period) in which agents have price expectations about the future price. Suppose expectations are not realized at the end of the period. In that case, expectations are revised at the start of every period until equilibrium is established, where each individual's anticipated plans are realised with equality of demand and supply at the equilibrium price. On the other hand, intertemporal equilibrium is of the same species as that of temporary equilibrium, first developed by Hicks and furthered by Arrow and Debreu. It analysis "*short-period* positions of a market economy *in sequence over time"* (Milgate 1982, 127; emphasis in original). The market periods are assumed to be of equal intervals. Commodities are defined not only in terms of their physical characteristics but also in terms of time and location, and accordingly, they have different relative prices. All markets, both present and future, are open at the beginning of the first period interval, and all trades are executed for all times. This is the assumption of complete futures markets. That is, all the commodities for all time and place are traded at one time, and "the resulting prices are present-value prices. They are prices which have to be paid in the present, irrespective of the date at which commodities are delivered. Thus the price of steel available fifty-two weeks hence would be a price paid 'this week' for steel to be delivered in one year's time" (Howard 1983, 85). Therefore, by assumption, there is no problem of price expectations. If, however the commodities are exchanged and delivered period by period, there is no tendency or time for adjustment of actual prices to equilibrium prices, except by initial price coincidence, as the commodities are time specific (Fratini 2019).

Both temporary and intertemporal equilibrium methods do away with the long period equilibrium method and so do not imply a uniform rate of profit on the capital stock. Therefore, in each period, capital stock is assumed to be given or inherited as inputs from the

past period. “the capital goods available at the beginning of the first period have the character of ‘primary’ factors of production and can thus be treated on a par with scarce natural resources, such as land. The income a capital good yields its owner is again similar to the rent of land. These capital goods, together with the other primary factors, are used to produce consumption goods and new means of production in correspondence with intertemporal preferences of consumers, coping with the ever present problem of scarcity as best as possible, given the initial endowments and the available technical alternatives” (Kurz and Salvadori 1995, 465). Thus, capital is not a factor of production, but are commodities with specific in terms of date and location.

The adoption of the short period method of temporary and intertemporal equilibrium marked a major shift away from the long period method (interpreted as a “stationary state or steady state”).[40] Although the reason given for such a shift was to bring in more realism, historical time, uncertainty and expectation, however, critics of neoclassical economics argue that the reason for such a change in method was not because of a growing concern to imbibe realism but to avoid the theoretical difficulty in defining the quantity of capital beyond the neoclassical one-commodity world. For until this new development, marginalist theory treated capital as an endowed resource of a single magnitude with a variable form that can adapt to accommodate any type of technology and any amount of labour. Therefore, there was “a growing awareness of the inconsistencies of the notion of ‘capital’ as a single factor, necessarily a quantity of exchange value, therefore not measurable independently of what its quantity was supposed to contribute to determine, relative prices. … the shift avoided the indefensible conception of capital as a single factor without entailing a need to abandon the marginalist/neoclassical conclusions on the tendencies operating in market economies” (Petri 2017, 4). Advocates of intertemporal equilibrium (neo-Walrasian equilibrium) argue that the theory is not susceptible to the Capital theory controversies, which exposed the neoclassical treatment of capital as a factor of production. That intertemporal equilibrium is immune to “re-switching and reverse capital deepening”. However, “studies have shown… that problems of multiplicity and instability linked to re-switching can arise in a different class of neo-Walrasian”

[40]According to Petri, “the attempts, carried out in the1970s and 1980s, to arrive at a formalized theory of temporary equilibria came to a complete halt, owing to grave difficulties with the formalization, and with the existence, of temporary equilibria under sufficiently general assumptions”(Petri 2017, 5).

"models, namely stationary models characterized by zero net accumulation in each period" (Fratini 2019, 12). Thus, the debates on the notion of capital and the theoretical structure of intertemporal equilibrium still continue (see Petri 2017;Fratini 2019). However, it is clear that neoclassical/mainstream economics no longer subscribe to a long period competitive equilibrium but rely on intertemporal equilibrium for their microfoundation.

3.6 Conclusion

This chapter started with a discussion of competition as a dynamic process, and that both classical political economy and Austrian economics conceived of competition as a tendency towards order (though the economy never settles in equilibrium). For classical political economy, the competitive process does not refer to any specific market structure but rather refers to an organizing concept. Given the basic institution and organization of capitalism, competition is the medium through which we isolate and abstract, and lay bare the objective nature and attributes of production, distribution, exchange and growth the "objects of analysis") embedded within the actual society. The competitive process is manifested in the "long period method" or the "long period position" towards which the economy continually gravitates but never settles as the "long period position" themselves changes with changes in the economy. The long period position is nothing but the position determined by natural prices, and as the natural prices are theoretical prices, an analytical device that defines the natural position that acts as a "point of reference or orientation" to flesh out the basic structure of "competitive capitalism". However, beyond the "first principles" of capitalism, the "objects of analysis" are also influenced and determined by institutions – specific to the economy, its history, the dynamics of capital accumulation, culture, politics and such. Studying and examining these factors helps in understanding the varieties of capitalism with its characteristics. We shall discuss the long-period method in more detail in section 5.4.

For Austrians, the competitive process is to explain the coordinative power of the markets, given that individuals act independently (methodological individualism).[41] However

[41]However, (see Appendix C.3) some Austrians like Lachmann have a Shacklian view of the economy characterised by unexpected changes and fundamental uncertainty preventing any role for competition to have any

for classical political economy, the competitive process is brought about by the behaviour of the capitalists (entrepreneurs) seeking the highest rate of profit in the capital advanced. Similarly, for the Austrians, the coordinative process is brought about by alert entrepreneurs discovering and taking advantage of hitherto unknown opportunities in the market.

Though Austrians and Classical economics have very different theoretical structures (see section 2.3 and Appendix C.3.1), the conceptualisation of competition is very similar. Though neoclassical theoretical structure shares some affinities with the Austrians, for the neoclassical, competition came to be defined in static terms as enshrined in the perfect competition model. George Stigler (1957) takes a "cumulative view" (see section 2.1) of the development of perfect competition as it evolved from classical economists to the refined formal form in the work of Frank Knight. However, within neoclassical economics, what we see from section 3.4, are two strands of ideas in the development of perfect competition. On the one hand, mathematical economists such as Cournot and Edgeworth formalized competition as an exact formal concept from which definite conclusions can be derived. On the other hand, Jevons, J. B. Clark, and more so Marshall acknowledged the dynamic nature of competition and exchange. However, this notion of competition had to be restrained to a static one, as it was embedded into a static theory of demand and supply.[42] Competition came to be identified explicitly with market structure, and the theory or explanation shifted to the exchange sphere in which the "objects of analysis" or variables were determined through the equilibrium of supply and demand functions. It was Marshall who discussed competition by distinguishing between short period and long period. He introduced the short period method and partial equilibrium with the aim to bring practical relevance to the analysis of competition and price determination. However, Marshall's short period is a slice of time and therefore always corresponds to a long period, given the "ceteris paribus" condition. But as discussed in section 3.5, there was a dramatic shift in method

equilibrating tendencies. But this does not amount to theoretical nihilism as institutions provide the right stability and flexibility for coordinating individual actions in the economy

[42] Frank Machovec(1995) argues that, the classical concept of competition as a dynamic process dominated up to the 1920s (till Marshall), which means that early neoclassical economists had a process view of competition, with the exception of Walras, and Edgeworth. Machovec does take into consideration the paradigm shift from classical political economy to the static neoclassical theoretical structure. For him, it was only with Knight's *Risk and Uncertainty* that the classical concept of dynamic competition was "jettisoned" in lieu of a technical model of competition which could provide concrete mathematical predictions. For Machovec, "perfect competition is a legitimate example of a Kuhnian revolution—a sharp discontinuity in the profession's approach to the ideas connoted by the term 'competitive market'" (ibid. 305).

within neoclassical/mainstream economics, the abandonment of the long period with short period general equilibrium to imbibe price expectations and realism.

By the first quarter of the 20th century the concept of competition had been stripped down to a static notion and formalised into the perfect competition model. The model became the benchmark work-horse model for economic theory; however, it was not without criticism for its lack of empirical reality that slowly precipitated into the "cost curve controversies" in the late 1920s, calling for discarding the perfect competition model. The next chapter deals with these issues, the imperfect competition revolution and other alternative concepts of competition to perfect competition

Chapter 4
The Imperfect Competition Revolution and Competition in Post Keynesian Economics

4.1 Introduction

The present chapter has discussed attempts to present an alternative notion of competition within neoclassical economics. As discussed in the previous chapter, by the early 1920s, the perfect competition model had become the benchmark for economic theory. However, because of its static notion of competition, it brought forth assumptions that aided more in solving for equilibrium as an ideal position, rather than using assumptions for abstracting to highlight the key features in the workings of capitalism. By the late 1920s, dissatisfaction with the model had grown for its lack of empirical content and theoretical emptiness. Thus, it started the cost controversies and the first imperfect competition revolution, discussed in section 4.2 and 4.3 respectively. However, given the deductivist-formalist approach of neoclassical economics that emphasise on model prediction and determinism, perfect competition returned with much rigor discussed in section 4.4, and although imperfect competition was revived in the 1970s, it played only a second fiddle to perfect competition to explain deviations and special case, this is discussed from sections 4.4 to 4.6.The chapter concludes with section 4.7 taking a turn towards Post Keynesian notion of competition reviving the ambitions of imperfect competition revolution but through Kaleckian microfoundations,

4.2 Internal Critiques of Perfect Competition and Cost Curve controversies

Marchionatti (2001, 51) states that in the 1920s dissatisfaction with the neoclassical theory of value arose first in the USA and then in the UK, which questioned Marshall's theory on logical consistency and practicality. That theory was considered inconsistent "between the static base and the dynamic superstructure". The coexistence of increasing returns with competition was identified as a major problem within the theory. This is so because the problem deals with the construction of the supply curve of the firm and of the industry, an important half

of the Marshallian scissor blade, which along with demand, determines the value of any commodity.

Arthur Cecil Pigou, the successor to Alfred Marshal at Cambridge, reconciled Marshall's falling long-run supply curve with the price-taking aspect of perfect competition through the concept of economies that are external to the firms but internal to that industry. However, in doing so Pigou gave up "the inter-industrial characteristic of external economies and their irreversibility, therefore renouncing to consider the dimension of time. This exclusion represents the most evident difference between Marshall's treatment of the problem and Pigou's" (ibid., 52). Allyn Young and Frank Knight criticised Pigou's narrowing down of external economies as logically incoherent and unrealistic. Knight (1925, 333) remarked that "Until a plausible example is brought forward, the category of decreasing cost under stable competition remains an 'empty economic box'". The expression "empty economic box" became the lexicon of the debates in the 1920s questioning the empirical validity and logical consistency concerning the cost and supply curve, perfect competition, and value theory.

4.2.1 Empirical Invalidity of Perfect competition

Empty Economic Boxes Debate:

In his "Of Empty Economic Boxes" (1922), John H Clapham, an economic historian, expressed that Marshall and Pigou's concepts of increasing, constant and diminishing returns are empty boxes as they cannot be filled with empirical data of real-life industries.[1] He makes his point by taking the example of the hat industry and the various input industries to produce hats. He found it difficult to classify the various industries as operating under increasing or constant returns.[2] For Clapham, there are also difficulties conceptualising a rate of returns for an industry and deciding which industries should be classified as experiencing increasing or

[1] Clapham writes that in Marshall's *Industry and Trade*, there are only "two references to Constant Returns-one in a footnote-and a handful of references to Diminishing and Increasing Returns *in Allgemeinen*, not so far as he can find in close relation to the facts of those British, French, German and American Industries". Again in Pigou's The Economics of Welfare "there is not even one illustration of what industries are in which boxes, though many an argument begins – 'when conditions of diminishing returns prevail' or 'when conditions of increasing returns prevail', as if everyone knew when that was"(Clapham 1922, 305)

[2] Constant returns is just a mathematical point in which the tendencies of increasing returns and diminishing returns balance out. However, "It is inconceivable that a method can ever be devised for so measuring these real but infinitely subtle and imponderable tendencies" (Clapham 1922, 310)

diminishing returns. Furthermore, even if the industries are categorised accordingly, practically, they may be of no relevance. There is also a problem in conceiving "an industry", as the good may be produced under differing returns to scale depending upon the geographical location and the production conditions. Thus, there is no such thing as a uniform standard good produced by an industry.

Similarly, when one talks of output increments due to a unit increase in the quantity of resources, how does one conceive of a "unit of resources", as each unit of resources may not be homogeneous. Furthermore, when industry output increases, the theory takes into consideration only the output increase due to an increase in capital and labour and organisational efficiency but ignores the role of inventions. However, to understand the growth of an industry, inventions, size and organisation play equally important roles and to separate and measure their contributions is difficult and unrealistic.[3]

Pigou (1922) acknowledged that there are difficulties filling the laws with concrete empirical data but that the concepts of increasing and decreasing returns are still useful to economic theory. These laws are just parts of the general theory of value; they may not be practically useful directly, but useful in that they light and inform about the theory of value and so must not be judged in isolation.

> Even regarded as boxes, and empty ones at that, the categories of increasing and diminishing returns are not mere ornaments. Knowledge about them cannot, indeed, on the hypothesis of their eternal emptiness, help us in a positive way, but it can help us a great deal in a negative one. It enables us to discover with absolute precision what assumptions are implicit in the statements about economic causation (upon which action is often based) that politicians and other such persons are accustomed to make for the guidance of the public. (Pigou 1922, 462)

Pigou concludes his reply by suggesting that it is difficult but not impossible to fill the theory with empirical data. When better statistics and data are available, the task can be solved.

[3]It is as much difficult to measure "unit of inventiveness" as to measure "unit of normal managerial capacity"(ibid., 311)

John Maurice Clark's Workable/Effective Competition:

The other criticism that perfect competition is not realistic came from J. M. Clark's "Towards a Concept of Workable Competition" (1940), which was further developed in his book *Competition as a Dynamic Process* (1961).[4] He accepts that perfect competition is a normative ideal, but the model does not provide reliable guidance in actual conditions or a working approximation to that ideal. The concept of effective competition was developed as "an escape from the negative conclusions stemming from the Chamberlin-Robinson group of [imperfect competition] theories in which it appeared that all feasible forms of competition in industry and trade are defective in the same direction in which monopoly is defective, from the standpoint of the services competition is supposed to render" (J. M. Clark 1961, ix).[5] Therefore, an attempt is made to formulate a practical concept of competition. In the real world, competition is in some imperfect forms.

> But it will mean something if we can find, after due examination, that some of these forms do their jobs well enough to be an adequate working reliance -more serviceable, on the whole, than those substitutes which involve abandoning reliance on competition. And it will be useful if we can learn something about the kinds and degrees of "imperfection" which are positively serviceable under particular conditions. (J. M. Clark 1940, 242)

Effective competition seeks to amend the standard analytical structure of economic models in such a way that it avoids both extremes of imperfect competition being too strong or too weak. The character of competition depends on a large number of conditions. According to Clark, long-run cost and demand curves are much flatter than short-run curves, and there is no optimum

[4]In the book, Clark changes "workable" to "effective competition", "because 'workable' stresses mere feasibility and is consistent with the verdict that feasible forms of competition, while tolerable, are still inferior substitutes for that 'pure and perfect' competition which has been so widely as a normative ideal"(J. M. Clark 1961, ix). He develops a much broader conception of the theory as compared to his previous article, and discusses not only price competition, but also innovations, product differentiation, sales and competition over distance.

[5]Effective competition was developed as response to imperfect competition theories in the 1930s. For Clark, both perfect competition and imperfect competition are abstract and imperfect competition is just qualitative departure from the ideal, with no quantitative measure of competition.

size of the firm. In theory, product differentiation is treated as a special case, but rather it is the general case. “It is an inseparable feature of the most essential operation of the freely progressive economy: the operation of constantly finding new products in which to embody its constantly increasing productive power, and products that consumers will take”(J. M. Clark 1961, 212). The reason for innovations and product differentiation is because competition can be viewed as a series of “initiatory moves and defensive responses” between firms, and the competitive process is to be explained in terms of the character of the move, the timing of the response and the uncertainties connected with it. Firms that initiate change can gain in the interval as it takes time for other firms to develop a response, then ensues a game of move and response in which each firm tries to keep ahead of others through innovations and product differentiation. The outcome of this process is “neither perfect equilibrium nor an oligopolistic stalemate, but a continuing give-and-take of moves and responses” (ibid., 472). Clark examined several types of conditions that might result from the sequence of moves and responses in competition and the interplay between aggressive and defensive forms of competition. Effective competition provides a method for making less exact but realistic judgements of market conditions. It is a dynamic theory that favours a descriptive analysis as dynamic theory cannot be confined to models of determinate equilibrium.

J. M Clark’s effective competition as a dynamic theory may seem similar to the classical or Austrian economists’ notion of competition as a dynamic theory (discussed in section3.2.2). However, the foundations are very different as the idea of effective competition is tethered to the static perfect competition model as the ideal standard.[6] What Clark attempts to do with his “workable/effective competition” is to dynamise perfect and imperfect competition with indeterminate equilibrium. The concept instigated some discussion in the 1950s and 60s, but it failed to catch the fancy of economists as an alternative theory of competition because of the dominance of determinate mathematical models. Effective competition offered only an indeterminate descriptive analysis with no consensus on the measure to judge competition.

[6]“the enquiry goes back to my father’s [J. B. Clark] basic conception that the analysis of static equilibrium … is properly not an end, but an introduction to the study of dynamics, in which it should find its fulfilment” (J. M. Clark 1961, ix).

4.2.2 Logical Inconsistencies of Perfect competition

Piero Sraffa entered the debate on the "laws of return" began by Clapham with an article in 1925 (in Italian) and later 1926 (in English).[7] The main point raised in the paper is that increasing returns (decreasing cost) and decreasing returns (increasing cost) originated in different parts of classical economics, and that the "laws of returns" are incompatible with both partial equilibrium method and perfect competition, such that one cannot construct an industry supply curve, except for two empirically irrelevant instances.

According to Sraffa in classical economics, diminishing returns was associated with the theory of distribution to explain rent of the land, while increasing returns was discussed in the context of social division of labour as part of the analysis of production and accumulation. Marshall and neoclassical economists introduced modifications to the two laws.

> "As regards the law of diminishing returns … [was] generalised from the particular case of land to every case in which there existed a factor of production … The law of increasing returns, however, had to be subjected to a much more radical transformation: the part played in it by the division of labour –now limited to the case of independent subsidiary factories coming into existence as the production of an industry increases-was greatly restricted; while consideration of that greater internal division of labour, which is rendered possible by an increase in the dimensions of an individual firm, was entirely abandoned, as it was seen to be incompatible with competitive conditions. On the other hand, the importance of "external economies" was more and more emphasised-that is, of the advantage derived by individual producers from the growth, not of their own individual undertakings, but of the industry in its aggregate." (Sraffa 1926, 537–38)

[7]The paper titled "Sulle relazioni fra costo e quantita prodotta", was published in *Annali di economia.* The criticism of Marshallian theory and method attracted the attention of Edgeworth and Keynes, and led to the publication of "The Law of Returns Under Competitive Conditions" (1926) in *The Economic Journal*. The first half of the article provides a summary of the Italian version, and the second half discusses imperfect competition as a possible solution to the limitations of Marshallian theory.

The two tendencies were then unified into a single "law of non-proportional productivity" (law of variable proportions in case of firms and returns to scale in case of industry). Through this, the cost is expressed as a function of the quantity produced. Thus, we get a supply function, and it is one of the bases for the theory of price, the other being the demand function deduced from the marginal utility.[8] Not only do the two laws of increasing and decreasing returns originate in different spheres, but they are two very distinct theories. Decreasing returns is associated with – when a scarce factor is combined with other factor inputs varying proportions, whereas increasing returns is associated with changes in the scale of production (Sraffa 1925, 5).

Sraffa showed that a rising industry supply curve could not be derived from the collective cost curve of the firms. Given that diminishing returns (increasing cost) result from variation in the proportion of factors of production, if a scarce factor is constant only for the industry as a whole but not for the individual firms., then they can combine the inputs in any proportion without influencing the price of that input. Hence, it is possible that

> while the industry has increasing cost, the single cultivator [or producer] might, up to a certain point, increase his production while lowering his own private cost of production, because he can take advantage of the economies of large-scale production, and yet, without being forced to intensify the exploitation of the constant[scarce] factor, can obtain for himself a large quantity of it at the expense of his competitors. But although this is possible for each producer separately, it is not possible for the totality of producers, and therefore the sum of a series of individual [supply] curves of this kind is absurd, since each one of them is valid only on the condition that the production of the individuals remains unchanged. (ibid., 22)

Moreover, suppose various industries commonly use a scarce factor of production, then a small increase in the production of a commodity that requires the scarce factor "will necessitate a more intense utilisation of that factor, and this will affect in the same manner the cost of the

[8]There is a fundamental symmetry between demand and supply that determines value "The 'cost of production principle' and the 'final utility' principle are undoubtedly component parts of the one all-ruling law of supply and demand; each may be compared to one blade of a pair of scissors" (Marshall 2013, 675).

commodity in question and the cost of the other commodities into the production of which that factor enters … the modification in their price will not be without appreciable effects upon demand in the industry concerned"(Sraffa 1926, 539). Thus, the industry's supply curve under expansion is not independent of the supply curves of the other industries, this interdependence cannot be neglected as the effects on cost are direct and substantial. Hence, it is violating the assumption of partial equilibrium. The only way the supply curve of an industry can remains independent of others and be compatible with partial equilibrium is that if the industry employs only a small portion of the shared scarce factor. Then, as the production of the commodity increases, it will draw only small doses of the scarce factor. So, the increase in cost for all industries will be practically negligible. Only in this case, the partial equilibrium approach holds, and the industry is said to operate at constant cost. However, this situation "is available only for the study of that minute class of commodities in the production of which the whole of a factor of production is employed" (ibid.).

Sraffa then considers increasing returns (decreasing cost), which emerged as a generalisation of the fact that "the cost per unit product for a firm, decreases with an increase in the quantity of the commodity produced by that firm"(Sraffa 1925, 23). This is because as the output of the firm expands, it takes advantage of superior methods of production brought about by the greater social division of labour. However, the concept of increasing returns must have certain restrictions in order to construct an industry supply curve within the frame of partial equilibrium. First, "reductions in cost which are due to 'those *external* economies which result from the general progress of industrial environment'… must, of course, be ignored, as they are clearly incompatible with the conditions of the particular equilibrium of a commodity". Secondly, "reductions in cost connected with an increase in a firm's scale of production, arising from internal economies or from the possibility of distributing the overhead charges over a larger number of product units, must be put aside as being incompatible with competitive conditions"(Sraffa 1926, 540).[9] The only 'economies' that confirms to partial equilibrium and perfect competition are those which are external to the firm but internal to the industry.

[9] Sraffa (1925, 24) "The cases in which productivity grows as a consequence of variations in the size of the single firm cannot be accommodated in the theory of price determination in a regime of free competition, since it is clear that, if a firm can decrease its cost without limit by increasing production, it would continue to reduce the selling price until it had acquired the whole market."

However, this type of economies is purely hypothetical and rarely met. Moreover, even if such external economies exist, "they are not likely to be called forth by small increases in production" (ibid.).

Sraffa clearly demonstrated that the neoclassical construction of the supply curve, the method of partial equilibrium and therefore the theory of value, under decreasing and increasing returns, is not logically consistent. The theory is logically consistent only for a few highly exception situations – when industries operate at constant costs but are empirically and practically irrelevant. Sraffa's criticism of Marshallian theory is quite different from that of John Clapham or later J. M. Clark, as the latter attempts to refine and rehabilitate Marshall's theory to make it empirically relevant. Whereas Sraffa, after attempting to rescue Marshallian theory from its logical inconsistencies (see below), finally abandons the method and the theory altogether.

Sraffa's Attempted Rescue of Marshallian Theory:

To deal with non-constant returns, Sraffa first suggests adopting a simultaneous general equilibrium method but rejects the approach as its "complexity, however, prevents it from bearing fruit, at least in the present state of our knowledge, which does not permit of, "even much simpler schemata being applied to the study of real conditions. … It is necessary, therefore, to abandon the path of free competition and turn in the opposite direction, namely, towards monopoly" (ibid., 541–42). Sraffa suggests imperfect competition and sketches its characteristics, which is realistic and can deal with non-constant returns. Imperfect competition is a common and normal feature of the economy, as the supposed obstacles to perfect competition are not mere frictions but permeant and stable conditions. Individual firms can deliberately affect the market prices, and almost all firms produce under conditions of increasing returns.[10] According to Sraffa, when the firms want to increase production, the chief obstacle is not an increase in the cost of production "but in the difficulty of selling the larger quantity of goods without reducing the price, or without having to face increased marketing expenses" (543). Firms have to incur marketing expenses such as advertising to increase their market share. The general market for any commodity is subdivided into "series of distinct markets"

[10] Marshall in his *Principles* ([2013] 1920, 324), in a footnote suggests that firms that experience increasing returns can become monopolists.

with each firm enjoying a privileged position as a monopolist for their segment. This is because, in the market, the consumers have diverse preferences that range "from long custom, personal acquaintance, confidence in the quality of the product, proximity, knowledge of particular requirements and the possibility of obtaining credit, to the reputation of a trade-mark, or sign, or a name with high traditions, or to such special features of modelling or design in the product as-without constituting it a distinct commodity intended for the satisfaction of particular needs-have for their principal purpose that of distinguishing it from the products of other firms "(544).

Therefore, any firm that aspires to extend beyond its own market must incur heavy marketing expenses and affect the elasticity of demand of its rivals. Each firm exercises monopoly powers through the degree of elasticity of demand, the less elastic the demand for the commodity, the greater is the firm's hold in the market. With some exceptions, firms generally do not have an "absolute monopoly" on their product.[11] So, when firms increase their marketing expenses to have a larger market share, competition intensifies as the elasticities of demand increase. The significance of the elasticity of demand being a variable is that even though firms have "freedom in fixing his prices, whenever he increases them, he is forsaken by a portion of his purchasers, who prefer to spend their money in some other manner" (546).

Sraffa suggests that the analysis of imperfectly competitive firms must be generalised for the whole economy, a stable and determinate equilibrium is possible.[12] However, it "does not mean that generalising statements can be made regarding the price corresponding to that equilibrium; it may be different in the case of each undertaking and is dependent to a great extent upon the special conditions affecting it" (549). However, by the late 1920s, Sraffa had abandoned imperfect competition and moved later towards constructing a general theory of prices with the interdependence of industries based on objective factors rather than utility or subjective factors.[13] It was a reconstruction of the classical theory of value culminating in "*Production of Commodities by Means of Commodities"* (1960).

[11]A firm is said to be an absolute monopoly, if it controls a unique natural resource, or it has legal privileges or that the firm produces a unique product with no substitutes. For an absolute monopolist the elasticity of demand is equal to unity.

[12]The present analysis of imperfect competition neglects the influence of potential competition of new firms attracted by high monopolist profit.

[13] Through studying the unpublished archives of Sraffa, Marco Dardi (2001) suggests two hypotheses why Sraffa abandoned imperfect competition. The first was Sraffa's claim that the equilibrium which will prevail through the

The symposium on Increasing Returns and the Representative Firm:

Pigou (1927) was the first to respond to Sraffa's criticism of Marshall's theory, the paper deals with variations in aggregate cost due to changes in the scale of output of the particular commodity. He assumes that the relative value of the factors of production remains constant because it is not possible to assign a clear meaning to costs when the relative value of the factors changes as the scale of output changes. Therefore, he confines the study only to those commodities "which individually employ so small a proportion of each of the several factors of production that no practicable changes in the scale of their output could sensibly affect the relative values of these factor" (Pigou 1927, 192). Within this frame, Pigou agrees with Sraffa that "it is impossible for production anywhere to take place under conditions of increasing cost" (ibid., 193). However, with regard to decreasing cost (increasing returns), Sraffa claims that decreasing cost is incompatible with competition because of internal and external economies. Pigou accepts that internal economies are not compatible with competition but argues that external economies special to particular industries can give rise to decreasing costs that can be computable with competition. Sraffa had argued that these types of external economies are "very improbable that a small increase in the scale of production of one industry should lead to any appreciable external economies" (ibid., 195). However, according to Pigou, this is illusory as the absolute size of the increase does not matter. What matters is "the ratio between this increase, expressed as a proportion of previously existing costs, and the increase of output, expressed as a proportion of previously existing output; and there is no reason why the ratio between two quantities which are both of the second order should not itself be of the first order" (ibid.). Pigou (1928) continued with the study of the relationship between variation in industry's supply curve and changes in the scale of output and developed further Marshall's internal and external economies. Most industries are made up of many firms in which the outputs of some individual firms are small relative to the whole industry's output, and at any moment, some

independent actions of a number of firms would tend to be the same as in the case if all the firms were under a single monopolist (Sraffa 1926, 549). Richard Kahn in his "Fellowship Dissertation of 1928-29" showed that under imperfect competition, if all the firms took decisions independently of each other, then the "equilibrium will be a function of the assumptions that each firm makes about its rivals' conduct" (Dardi 2001, 129). In the analysis of imperfect competition, Sraffa objective was to purge all subjective elements in the determination of equilibrium such as mutual interactions and interdependence among firms and "those aspects of the buyers' preferences that determine the degree of imperfection". However, this was unavoidable and may be this was one of the reasons why Sraffa abandoned imperfect competition (ibid., 131).

firms will be expanding while others will be declining. Thus, while the industry as a whole is in equilibrium, the tendencies to contract and expand of the firms will cancel out, but the individual firms will not be in equilibrium. Pigou solved this analytical complication by introducing the device of the "equilibrium firm".

> "There can exist someone firm, which, whenever the industry as a whole is in equilibrium, in the sense that it is producing a regular output y in response to a normal supply price p, will itself also individually be in equilibrium with a regular output x_r. The conditions of the industry are compatible with the existence of such a firm, and the implications about these conditions, which, whether it in fact exists or not, would hold good if it did exist, must be valid. For the purpose of studying these conditions, therefore, it is legitimate to speak of it as actually existing. For any given output, then, of the industry as a whole, the supply price of the industry as a whole must be equal to the price, which, with the then output of the industry as a whole, leaves the equilibrium firm in equilibrium."(Pigou 1928, 239–40)

Though the equilibrium firm may seem similar to Marshall's representative firm, it is not. For Pigou, firms can be of all varieties of size. The only requirement is that there be one firm of average size that fulfils the conditions of the equilibrium firm. This construction enabled Pigou to argue that once internal economies reach their limit for the equilibrium firm, but as the industry output continue to increase, the increase in output of the equilibrium firm can be attributed only to external economies. Thus, the "equilibrium firm" device, which experiences economies external to it but internal to the industry as a whole, reconciles increasing returns with competition.

In 1930, *The Economic Journal*'s symposium on "Increasing Returns and the Representative Firm" was organised by Keynes as the editor with contributions from Robertson, Sraffa and Shove. Robertson responds to Robbins' (1928) criticism of the usefulness of the 'representative firm', arguing that "the Representative Firm still seems to me to be a fruitful and indeed an indispensable instrument in the construction of a theory of value"(Robertson 1930,

80).[14] The concept of representative firm is essential to understanding increasing returns because it helps to understand how competitive equilibrium can be reconciled with increasing returns arising from internal economies for the individual firm. For Robertson, "the growth of the industry and the growth of its constituent firms frequently proceed more or less *pari passu*". So, if an industry experience increasing returns and is out of equilibrium, with demand price in excess of supply price. Then the individual firms will scramble, "regardless of the actions of their neighbours, to reap the direct advantages of largescale organisation and plant". For Robertson, Marshall's famous metaphor of "the trees of the forest" was meant to convey this idea that an increasing returns industry can exist within which there are competitive firms, not monopolies. Thus, equilibrium can be conceived with "the representative firm working under conditions of decreasing cost, with price equal to the average costs of that firm …, and with the industry as a whole obeying the law of increasing return" (Robertson 1930, 87–88). Robertson gives the metaphor of a firm named, "Messrs. Smith and Robinson," as a representative firm with all its properties at a certain moment but does not have the quality to expand indefinitely. Meaning that as the industry expands and reaches a new equilibrium, the firms will be larger as compared to the old equilibrium Sraffa rephrases Robertson's argument as:

> "the new firms will not be the same old firms which existed in the old state of things. Indeed, all the old firms may have perished in the process, being unable to expand their output, without an increase of costs per unit; the old representative firm, Messrs. Jones and Robinson, will have gone bankrupt owing to the competition"

[14]According to Robbins, the concept of representative firm is inappropriate to deal with theory of value, static and partial equilibrium, stationary state, competition and dynamic changes. For Robbins, the concept is not only unnecessary but is misleading as it cloaks the heterogeneity of productive factors especially that of entrepreneurial and managerial abilities. Therefore, "what is normal profit for one will not be normal profit for another, that is all. There is no more need for us to assume a representative firm … All that is necessary for equilibrium to prevail is that each factor shall get at least as much in one line of- production as it could get in any other"(Robbins 1928, 393). Advocates of Marshallian theory argue that competition eliminates the incompetent entrepreneurs such that in the long period every producer has at least average ability (representative firm) and earns a normal rate of profits. Robbins disagrees because even in the long period we should find some who are very capable, some who are "average," [and] some who are at the margin of entrepreneurship" (ibid., 402).

Robertson (1930) denies that in the long period, all producers are adjusted to the average ability, what it means is that there is a "continuous flow into industry of business men of sub-normal capacity, so that as any one of them is driven to give up the struggle by the competition of more capable persons, another, doomed ultimately to the same fate, can be relied on to take his place" (Robertson 1930, 82), moreover, Marshall pointed out that unlike land, human beings can develop their talents. Hence in the long run, one can use the representative firm as a mode, with normal profit and cost to which actual firms tend to approximate (ibid., 83).

> "of the new representative firm of Messrs. Smith and Brown, who produce a larger quantity at a lower cost than the former did. ... the 'representative firm' … is not a firm, but a position occupied by a firm, and while the occupant becomes another, the position remains the same."
>
> "Therefore, while a particular firm cannot be in equilibrium at a point of diminishing costs on its supply-curve because it would be driven to increase its output, the representative firm can be in equilibrium under similar conditions; because in its case an increase of the quantity produced implies (not an increase in the output of a particular firm, but) the substitution of a larger firm for a smaller in the representative position. So that each successive point on the""supply-curve of the representative firm corresponds not only to a different quantity produced, but also to a different firm producing it."(Sraffa 1930, 91)

Robertson is aware that the argument for the representative firm cannot be cleared up mathematically, but the concept is the best possible solution as it "throws an ampler flood of light on the turmoil of what happens in real life"(Robertson 1930, 89).

Sraffa (1930) offers a sharp criticism of Robertson's paper, he argued that both firms and the industry can grow simultaneously. If the firms can increase their output at a lower cost, why did it not happen before the expansion of the industry, and why do new larger firms, if they can produce at lower cost appear only in the new and not in the old position of equilibrium? Sraffa concluded that Marshallian theory is not logically consistent and unrealistic. Unlike in his 1926 article, in the symposium, Sraffa did not mention imperfect competition as a possible solution but instead called for discarding the Marshallian theory. From all these, Robertson's argument for the representative firm brings out the contradiction, just as in Marshall (see section 3.4.2), in attempting to contain dynamic processes in the straitjacket of static theory.[15]

[15]Allyn Young (1928) and Joseph Schumpeter (1928) both criticised the static nature of partial equilibrium emphasis the dynamic nature of increasing returns. According to Young (1928), economies which are external to the firm but internal to the industry provides only a partial view and obscures certain important aspects. Moreover, "not all of the economies which are properly to be called external can be accounted for by adding up the internal economies of all the separate" (1928, 528). For Young, external economies are economy wide phenomena that

Shove (1930) argued that the device of the 'representative firm' is not necessary for competitive equilibrium. As mentioned earlier equilibrium of the industry does not mean that individual firms are in equilibrium, some may be expanding, while others may be contracting, and so the tendencies cancel each other out, leaving the aggregate output unchanged. To Shove (ibid., 105-10), internal economies can be reconciled with competitive equilibrium because internal economies of the firms are counteracted by diseconomies and so does not yield any net economy if the aggregate output remains unchanged. The two important obstacles for the firm are transport cost and marketing cost. It may be possible that internal economies predominate diseconomies of the firm, resulting in an increase in output with a reduced average cost. The solution for this problem is the element of time. In Pigou and Robertson's analysis, time is absent, which is a crucial point as it determines the pace at which firms grow. If a firm can increase its output to any required size instantaneously, then internal economies would predominate and be incompatible with competitive equilibrium. However, expansion takes time as newly installed equipment takes time to yield output at the desired level, and during this interval, other things can change. Therefore, for Shove, a firm's cost function is not a function of only two variables (its own output and industry output) but the function of three variables – its own output, the industry's output and time. Thus, it is the Marshallian 'life cycle' of the firms that explains the existence of a large number of competitive firms. According to Marchionatti (2001, 69), Shove proposed a Marshallian dynamic equilibrium analysis without the representative firm.

leads to capital accumulation and social division of labour among industries. He reinterpreted Smith notion of increasing returns that led to social division of labour which is limited by the extent of the market (aggregate demand). However, given the dynamic nature of external economies, division of labour among industries and the market (demand) progress and propagates in a cumulative way.

Schumpeter (1928) also criticise the static equilibrium method as inadequate and misleading to analyse change and progress which is the fundamental character of a capitalist society. Innovation is the special function of entrepreneurs that brings about change and growth. Innovation may include discovery of a new process of production, a new market, a new product, a new resource or marketing techniques. All these alter the static structure of the theory – "the main causation is the one from improvement to expansion and cannot adequately be dealt with by static analysis at all" (ibid. 369).

4.3 The Imperfect Competition Revolution

Besides perfect competition and monopoly, economists recognised and analysed other forms of markets such as Cournot's quantity setting non-collusive oligopoly model, Bertrand's price-setting oligopoly models and Edgeworth capacity constraint oligopoly firms that lead to indeterminacy of equilibrium. Marshall was also aware of "special markets" that did not fit into either perfect competition or monopoly – the basic analytical tools for competition and markets. However, most economists then thought that these "special markets" or oligopoly firms are hybrids and a mixture of perfect competition and monopoly. Therefore, the general theory of value, distribution and output was based on perfect competition. In this regard, the contribution of Joan Robinson and Edward Chamberlin to the theory of imperfect competition and monopolistic competition respectively can be considered as a revolution in economic theory in that they sought to replace perfect competition with a supposed more realistic imperfect competition as a foundation for economic theory. Though the imperfect competition revolution, which started in the early 1930s, quickly unravelled by the late 1950s, it had a lasting legacy and influence on economics

Sraffa suggested imperfect competition as a possible solution to the problems in Marshallian theory of competition and value – that of logical inconsistency and practical irrelevance. Richard Kahn was the first to develop such a theory in his thesis *The Economics of the Short Period* written around 1928-29 but punished only in 1989. According to Marcuzzo (1994, 2003), Khan observed that during the 1920s, firms earned profits while producing below full capacity, which could not be explained by perfect competition, which is characterised by the price being equal to marginal cost at full capacity. The plants and machinery remain unchanged in the short period, so the quasi-fixed cost remains unchanged, but the prime cost changes with output. At below capacity output, the marginal prime cost is constant and equal with the average prime cost, and so the cost curve is horizontal till full capacity is reached, then it becomes vertical (ibid. 1994, 29). Thus, the cost curve is a reverse L- shape, and firms operate below capacity with price above average prime cost as firms had downward-sloping demand curves. The equilibrium price and output are determined as in monopoly. Using the statistics of coal and cotton industries, Kahn showed that firms in the short period are imperfectly competitive as they face a downward sloping demand curve and price exceeds the average prime cost. However, Kahn's work on imperfect competition went unnoticed outside of Cambridge in

the 1930s though he actively helped Joan Robinson write her book on imperfect competition (Robinson 1969, xiii).

4.3.1 Robinson's Imperfect competition

Robinson's *The Economics of Imperfect Competition* was one of the two books published in 1933 that brought about the imperfect competition revolution. Just as Kahn, Robinson's book an "attempt to carry out his pregnant suggestion that the whole theory of value should be treated in terms of monopoly analysis" (ibid.). She approached the problem through the application of marginal revenue,[16] average and marginal cost curves. Robinson discusses how under an industry, where each firm has some monopoly powers achieves equilibrium in the long run. Her model of imperfect competition is in equilibrium when the firms in an industry earn a normal profit (when prices equal average cost), such that there is no tendency for new firms to enter the market nor for old firms to exit. The model is discussed with the help of Figure 4.1 (ibid., 1969, 94–95). The left-hand side diagram presents the short-run situation, in which firms have downward sloping demand curves (AR) earning abnormal profits, $EFGH$. The equilibrium of the individual firms is determined when marginal revenue equals marginal cost at point E, with equilibrium output Q and price OF. But the industry as a whole is not in equilibrium at E as the abnormal profit $EFGH$ will attract new firms to the industry.

In Figure 4.1, the right-side diagram presents the long-run situation. As new firms enter into the industry, the abnormal profits are competed away and the downward sloping demand (AR) curve of each firm reduces and moves leftwards till the point E, where the AR curve becomes tangent with the average cost (AC) curve, and at the same time, the marginal cost (MC) equals marginal revenue (MR).Thus, for both firm and industry, full equilibrium

[16]Roy Harrod was the first to introduce the concept of 'marginal revenue' in a 1928 article "Notes on Monopoly and Quasi-Competition" submitted for *The Economic Journal* but was rejected by Keynes on a different ground. Harrod finally published "Notes on Supply" but by then other economists had derived the marginal revenue function (Marcuzzo 1994; Pérez Caldentey 2019). In this regard, Brakman and Heijdra (2001) remarks on Sraffa not using marginal revenue for imperfect competition is unwarranted and misplaced. They opine that "Sraffa added to the confusion rather than solving the problem of combining increasing returns and the theory of market competition. The error Sraffa made was that he did not distinguish between price and marginal revenue, which was remarkable because the concept of marginal revenue had already been developed in a mathematical appendix in Marshall's Principles, in which he restates the monopoly theory developed by Cournot"(Brakman and Heijdra 2001, 6).

"requires a double condition, that marginal revenue is equal to marginal cost, and that average revenue (or price) is equal to average cost" (ibid., 94).

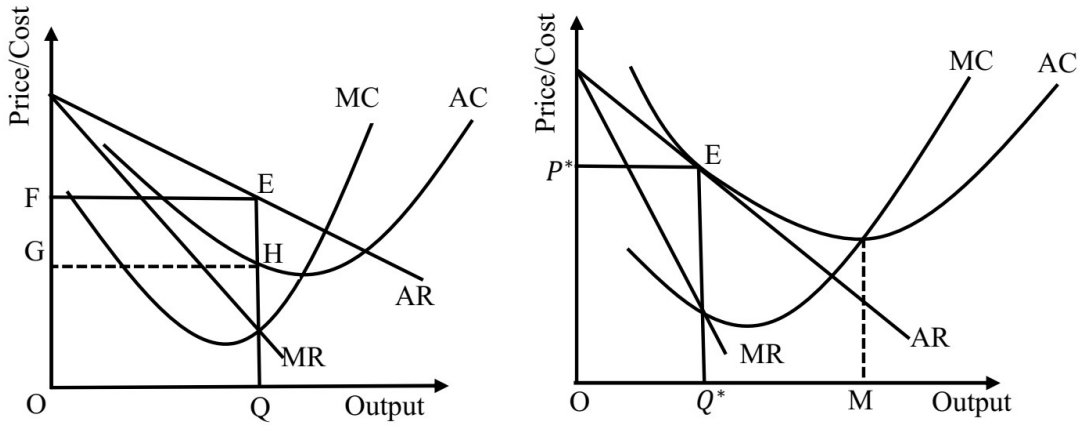

Figure 4.1: Robinson's model of Imperfect Competition

The long-run equilibrium is determined at point E, with OQ^* output and price OP^*(equal to the average cost). In equilibrium, each firm earns only normal profit, however as price exceeds marginal cost, the equilibrium output OQ^* is smaller than in perfect competition, where the output (OM) and price (RM) is determined at the minimum average cost (equal to marginal cost). Hence, in imperfect competition equilibrium, there is excess capacity

4.3.2 Chamberlin's Monopolistic Competition:

The other book that initiated imperfect competition as a generalised model for economic theory was Edward Chamberlin's *The Theory of Monopolistic Competition* ([1933] 1962). Though Chamberlin's and Robinson's books are often clubbed together for bringing about imperfect competition, Chamberlin always contended that his theory was different from Robinson's, and he was the first to develop monopolistic competition independently in the early 1920s that culminated in a Ph. D thesis in 1927 under the supervision of Allyn Young[17].

[17]Lefteris Tsoulfidis (2009, 32) argues that Chamberlin may have been indirectly influence by Sraffa as Edgeworth who had encouraged Sraffa to publish his 1925 Italian article in English in 1926, was in contact with Allyn Young, who "was well informed of the ideas circulating on both sides of the Atlantic". Therefore, "Chamberlin may be right, when he claims that his contribution was independent; however, we are allowed to speculate that his ideas were not independent at all of the intellectual milieu on both sides of the Atlantic, although he was not fully aware of the details of these developments in economic theory".

Chamberlin, in his model, emphasises product differentiation. “Each ‘product’ is rendered unique by the individuality of the establishment in which it is sold, including its location (as well as by trade-marks, qualitative differences, etc.)” (Chamberlin 1962, 63). Chamberlin discusses the group or industry equilibrium in which each firm is a monopolist, yet its market is intertwined with many such competing firms. Each firm has a slightly differentiated products, and it is assumed that consumer preferences are evenly distributed among the different product varieties. Product diversity should actually give rise to different cost conditions, but Chamberlin “proceeds under the heroic assumption that demand and cost curves for all the ‘products’ are uniform throughout the group”(ibid., 82). The theory also assumes that when output changes, the group as a whole operates under constant cost conditions. Chamberlin also assumed that there is sufficiently large number of firms such that “any adjustment of prices or of ‘product’ by a single producer spreads its influence over so many of his competitors that the impact felt by any one is negligible and does not lead him to any readjustment of his own situation” (83). Thus, each firm takes the behaviour of its rivals as given. There are many such groups and that each group is small relative to the economy as a whole.

Chamberlin’s model of monopolistic competition is discussed with the help of Figure 4.2. He introduces two demand curves. The d curves describe the market for the product of any one individual firm, assuming all other firms keep their product and prices unchanged. The d curves show the variation in sales of any individual firm when it changes its price, assuming others do not change their price. On the other hand, the D curves represent the market share of any individual firm on the assumption that all the other firms in the group also set identical prices. The demand curve $d$of the individual firms is much more elastic than the group demand curve D, because any price variation by an individual firm is matched by the other firms as well, and so no firm can capture the market of others. The elasticity and location of the group demand curve D depend on the number of firms within the group.

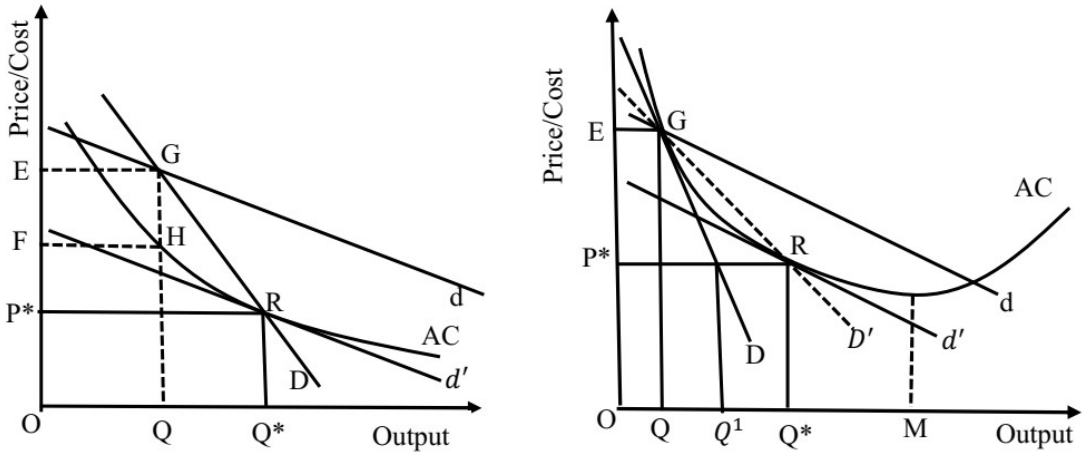

Figure 4.2: Chamberlin's model of Monopolistic Competition

In Figure 4.2, the left-side diagram presents the situation in which the number of firms in the group is fixed, and the right-side illustrate the situation when firms can enter (or exit) into the group attracted by high profit (or loss) (ibid., 90–93). In the left side diagram, with the given number of firms in the group, each firm charges OE price, produces OQ output, and earns high profits denoted by the area EFGH. However, this situation will not be sustained for long because any firm can reduce its price to increase sales and profit, assuming that other firms will not react to the price change. However, all firms have the same incentive to cut prices and increase their profits. Therefore, the *d* curves will slide down along the *D* curve as prices are lowered. This downward movement of the *d* curve will continue till $d'$is tangent to the AC at point R. At this point, prices are lowered to OP*, and output has increased to OQ*. This is the equilibrium point as beyond the point R, the cost of producing a larger output outweighs the price at which it can be sold. Each firm in the group earns a normal profit, as included in the cost of production. The monopolistic group equilibrium with the given number of firms is such that output is produced below full capacity, which is at the minimum average cost under perfect competition.

In the right-side diagram of Figure 4.2, short-period equilibrium is at G with OE prices, OQ output, however the high profits attract new firms to the group. As the number of firms increases in the group, the D curve shifts leftward and becomes more inelastic and is

tangent to the AC curve at G. The equilibrium point G is unstable as each firm has the incentive to lower prices on the assumption that other firms will not follow suit. Hence, all firms will start lowering their prices, and so the individual firm's demand curve d will slide down along the group demand curve Dtillthe d' curvebecomes tangent with the AC curve at point R, it may seem like an equilibrium has been reached with price OP*. However, the number of firms is so large, as given by the steep inelastic D curve, that each firm's output is OQ' instead of OQ*. At this point, most of the firms are making a loss by selling OQ' output at OP* price as the demand is too small even to cover the cost. Loss-making firms will start leaving the group, and as the number of decreases, the D curve shifts to the right to D' till it becomes tangent with the AC curve and the d' curve at point R. The new group demand curve D' is more elastic than the previous D curve, and so the remaining firms have a larger share of the market demand, with each firm producing OQ* output. Once again just like in the previous case of the given number of firms, the final equilibrium point of this model is also below full capacity output OM. The existence of excess capacity and welfare loss to the consumer is the hallmark of imperfect and monopolistic competition.

According to Lefteris Tsoulfidis (2009), though there are minor differences between Chamberlin's and Robinson's analysis of imperfect competition, both theories are quite identical in their long-run equilibrium conclusions. Chamberlin did not use the marginal revenue and marginal cost curves as in this approach, one has to determine "first the equilibrium quantity and then the price, something that for him was unrealistic". However, "it is abundantly clear though that once we have the average curves, the marginal ones are implicit, and their equality determines the points of optimum decisions" (35). Both models attempt to generalise and extend the Marshall-Pigouvian theory towards a more realistic theory of competition and firm behaviour using Marshallian tools, and it showed perfect competition as the special case and market imperfections as the general case. Imperfect competition theory also equipped economists to study price discrimination and antitrust policy. It also led to the development of industrial organisation theory.

4.4 The Return of Perfect Competition

Though Imperfect competition theory was touted as an alternative to perfect competition, it was not a complete and generalised theory. There were multiple models of imperfect competition as one could introduce various imperfections such as changing consumer preference, information requirements, geography, institutions, and various non-economic factors. Imperfect competition was heavily criticised both from a theoretical and methodological perspective. First, from a theoretical view, the models can be so open-ended that the equilibrium of the individual firm was not guaranteed. John Hicks, in his *Value and Capital*(1946, 83–85), rejected the monopolistic competition theory because equilibrium under monopoly is indeterminate, which "must have very destructive consequences for economic theory". Therefore, imperfect competition cannot be the foundation for his value and capital analysis. He proceeds with the assumption that most firms "do not differ very greatly from perfectly competitive markets". Archibald (2018, 9089)criticised the definition of "group" in Chamberlin's theory. Generally, a group is defined if a set of products can be isolated "such that (i) cross-elasticities of demand between them are 'large' and (ii) cross-elasticities of demand between all members of the set and its complement are 'small'", however, there is no proper way to determine what is a large cross elasticity from what is a small cross elasticity. Archibald also mentions that Kaldor (1934, 1935) suggested that "chains of overlapping oligopolies might be empirically more likely than competitive groups operating in virtual isolation from other groups". The assumption that firms continuously assume that their rivals will not react to price changes and that each firm was assumed to be strategically naïve and independent was also heavily criticised.

Second, from a methodological standpoint, as the models were indeterminate, there was a strong reaction from mainstream economists – especially George Stigler and Milton Friedman, arguing that imperfect competition models in their guise to be realistic are unscientific. They defended that perfect competition should be the normative benchmark for economic theory. Even though its assumptions are unrealistic, it has powerful predictive content making it an exact scientific model just as the physical sciences. Finally, it should not be discounted that there was also an ideological undertone beneath the arguments for positivism in economics. Imperfect competition theory with its indeterminacy of a unique and stable equilibrium, needing state intervention policies to correct market imperfections, was seen as an

antithesis to the tranquil and stable free-market capitalism provided by perfect competition. Hence, perfect competition was back at the centre of economic theory, and imperfect competition was considered as special case deviations from it.

4.5 The Second Wave of Imperfect Competition

According to Brakman and Heijdra (2001, 2), there were two reasons for the failure of the Robinson-Chamberlin theory. First, the imperfect competition theory was overshadowed by the Keynesian revolution. Secondly, and more importantly, though they emphasize increasing returns and monopoly powers for the firms, there was no proper mathematical modelling of monopolistic competition. The papers by Michael Spence (1976), and Dixit and Stiglitz (1977) brought a resurgence of monopolistic competition theory, giving impetus to what is popularly called the "second imperfect competition" revolution. Brakman and Heijdra again argue that the timing was perfect as economies around the world had suffered stagflation in the early 1970s, which had exposed the frailties of perfect competition. Therefore, economists were much more receptive to the idea of imperfections through uncertainty, returns to scale and strategic behaviour of firms. Moreover, unlike the first wave of imperfect competition where there was no generalised mathematical model but rather a series of models, Spence's and Dixit-Stiglitz's models are a generalised mathematical Chamberlinian model of monopolistic competition. We shall briefly discuss the essence of the Dixit-Stiglitz model (drawing from [Brakman, Garretsen, and van Marrewijk 2001; Brakman and Heijdra 2001; J. P. Neary 2001]), which assumes constant elasticity of substation (CES) of the utility function.

The economy has two sectors – agriculture and manufacturing. Let us assume that the agriculture sector is characterised with perfect competition and producers a homogenous good Z. The manufacturing sector is assumed to be characterised by monopolistically competitive firms producing under conditions of internal economies of scale, a large variety of different goods bundled as M, which are close substitutes of each other. The aggregate utility function of a representative consumer is a Cobb-Douglas function –

$$U = Z^{\delta} M^{1-\delta} \quad Where\ 0 < \delta < 1 \tag{4.1}$$

Stiglitz and Dixit assume a constant elasticity substitution function (CES) for the sub-utility of manufactures *M,* which has *N* varieties of good and X_i represents consumption of the i^{th} variety:

$$M = \left[\sum_{i=1}^{N} X_i^{\rho}\right]^{1/\rho} \quad Where\ 0 < \rho < 1 \tag{4.2}$$

The CES assumption ensures that M is symmetric, which means that all the firms in the sector have identical cost and market shares. Each firm produces only one variety, and so the number of varieties is equal to and determined by the number of monopolistic firms in the sector. The parameter ρ is the cross-partial elasticity of substitution. If $\rho < 1$, then the products are good but imperfect substitutes for each other. Therefore, ρ represents the "love of variety' effect or "preference for diversity" of the consumers. In the limiting case, if $\rho = 1$, then the goods are a perfect substitute for each other such that they are identical products and variety vanishes, the manufacturing sector becomes perfectly competitive.

Now, if a consumer has an income *I*, working either in the agriculture sector or the manufacturing sector. Her consumption pattern and how she will allocate her income for the goods from both sectors depends on her utility preference. Her budget constraint is given as:

$$Z + \sum_{i=1}^{N} P_i X_i = I \tag{4.3}$$

The homogeneous good *Z* is chosen as the numeraire $P_z = 1$, through which all other prices, income and output are measured. P_i is the price of the i^{th} product variety. To optimally allocate her income, the consumer has to solve a two-step budgeting procedure. First, she has to decide how to optimally allocate her income between the agricultural good *Z* and the manufacturing goods *M*. Second, she has to decide how the allocated amount to the manufacturing sector *M* have to be spent on the different varieties of goods so that her utility is maximised. For the first problem, the consumer has to maximise the utility function in equation (4.1) subject to the budget constraint (4.3). The solution is given in equation (4.4) and (4.5):

$$Z = \delta I \tag{4.4}$$

$$P_M M = (1 - \delta) I \tag{4.5}$$

After income has been optimally allocated between agriculture and manufacture, the next step is to maximise her utility from consuming a variety of manufactured goods given in equation (4.2) subject to the budget constraint (4.5). The solution derived is the consumer demand function for each variety of goods:

$$X_i = (1-\delta)\left(\frac{P_i}{P_M}\right)^{-\varepsilon}\left(\frac{I}{P_M}\right) \tag{4.6}$$

$$Where\ \varepsilon = \left(\frac{1}{1-\rho}\right) and\ P_M = \left[\sum_{i=1}^{N} P_i^{1-\varepsilon}\right]^{1/(1-\varepsilon)} \quad for\ i = (1,2,\dots N)$$

P_M is the exact price index to represent the prices of the different varieties of goods as a group. Given the maximising utility quantity of each variety, P_M is the price of one unit of M.

For the supply side of the economy, labour is the only factor of production and is assumed to be perfectly mobile across sectors and firms. Hence, there is a uniform wage rate W in the economy. The Production of the homogeneous good Z in the agricultural sector is characterised by constant returns to scale under perfect competition. Given the total labour force L in the economy, a fraction λL of the total labour works in this sector. Then, the production of Z is given by $z = \frac{1}{\beta}\lambda L \quad where\ \ 0 < \lambda < 1$. The production in the monopolistically competitive sector is characterised by internal economies of scale, since the firms in this sector are symmetric, the technology and cost functions are identical. Each firm produces its product variety as:

$$X_i = \frac{1}{\beta}(L_i - F)\ \ and\ L_i \geq F \tag{4.7}$$

Where, X_i is the output of the i^{th} firm producing a particular variety, L_i is the amount of labour used by the firm,F is the fixed cost in terms of labour. Before producing the output, each firm must spend a minimum "overhead labour cost". β is the constant marginal labour requirement. The total cost of each firm to produce X output is $W(F + \beta X)$. The profit function of each firm is total revenue minus the total cost and is denoted by

$$\Pi_i = P_i X_i - W[\beta X_i + F] \tag{4.8}$$

Each firm will maximise the profit function subject to its price elasticity of demand, which is constant at ε (derived from equation (4.6)) for all the firms as they are symmetric. The first-order condition of profit maximisation determines the price of each unit of X

$$P\left(1-\frac{1}{e}\right)=\beta W$$

Using the earlier relation $\varepsilon = \left(\frac{1}{1-\rho}\right)$, we get the price $P=\frac{\beta W}{\rho}$ $where\ \rho>0$ (4.9)

The marginal cost of output is βW, and in perfect competition, it should be equal to price. However, since sector M is monopolistic, each firm charges a "mark-up" price over and above the marginal cost. The mark-up is determined by the elasticity of demand ε. If the demand is inelastic, the mark-up is higher, and if demand is more elastic, the mark-up is lower.

Now, if profits are positive, it will attract new firms to the market, and they will start producing a new variety of goods. New firms will continue to enter till profits are driven down to zero. The equilibrium output for each firm is determined by substituting equation (4.9) into (4.8) and solving for X, we get

$$X=\frac{F(\varepsilon-1)}{\beta} \quad (4.10)$$

The equilibrium output depends on F and β from the production function of manufacturers and the constant elasticity of demand ε. The equilibrium level of output does not change and is the same for all varieties of goods. Since each firm produces only one variety of goods, we can determine the equilibrium number of firms by dividing the total workers engaged in manufacturing by the labour required to produce a particular variety of goods. For that, we know that since $L_z=\lambda L$ is the share of labour engaged in the agricultural sector, then $L_M=(1-\gamma)L$ is the labour force working in the manufacturing sector, and from (7), we can derive the amount of labour required to produce a particular variety $L_i=(\beta X+F)$. Thus, the number of firms is given by $N=\frac{(1-\gamma)L}{(\beta X+F)}$ Substituting equilibrium output in equation (4.10), we get:

$$N=\frac{(1-\gamma)L}{\varepsilon F} \quad (4.11)$$

The Dixit-Stiglitz model captures the important aspects of the Chamberlin model and much more, its focus is on product differentiation. The simple and specific assumptions of the model

make it easy for formalism. The model quickly became the standard way to model imperfect competition and found many applications in industrial organisation, international trade, endogenous growth theories, and macroeconomics. The first application in international was by Paul Krugman in the late 1970s and early 1980s, which supplanted the Heckscher–Ohlin theory based on perfect competition. The new trade theory based on the Dixit-Stiglitz model explains intra-industry trade and trade in intermediate goods between nations with identical factor endowments.

Similarly, the growth theory was given a new thrust in the 1980s and early 1990s through the works of Paul Romer, Robert Lucas and others. In the Solow-Swan growth theories based on the assumption of perfect competition, long-run growth is exogenously determined by technology. On the other hand, the new growth theories are based on some formulations of imperfect competition that endogenize technology or human capital that brings about increasing returns to capital or labour productivity. In macroeconomics, the Dixit-Stiglitz model provided the microfoundation of imperfect competition to New Keynesian economics to explain price and wage rigidity or stickiness in the short run.

Though the Dixit-Stiglitz model has found many applications, it has been internally criticised for its unrealistic and simplifying assumptions. The CES production function of varieties, equation (4.2), now called the "Dixit-Stiglitz production function", has been criticised for presenting a homogeneous manufactured good as variety. As discussed above, the model assumes that each intermediate input X_i is assumed to have the same marginal cost and elasticity of substitution that enter symmetrically (in the same proportion) into the production of each variety, which results in identical cost structures for all firms. Though there may seem to be N varieties of goods produced with as much as different methods of production, given the assumption of constant returns to scale and the same input proportions in each firm, there is actually only one homogeneous manufactured good "masquerading as variety" (see [Park 2007]; also see [Samuelson 1962] and its criticism by [Garegnani 1970]). Moreover, the model's main focus is on product differentiation and that the representative consumer demands an equal amount of all the product variety. However, it may happen that each consumer buys only some of the products or that she may buy different quantities of different varieties according to her taste and preference. The Dixit-Stiglitz model also conflates the elasticity of

demand and the taste for diversity. The two parameters are distinct and may be varied independently, but the model assumes that they are identical and has the same measure ε. The most important limitation of the model is that, just like the Robinson-Chamberlin model, it ignores the strategic behaviour of firms. It assumes that "each firm ignores the effects of its price-output decision on the industry price index. … also ignore the 'Ford effect': the impact of their own pricing behaviour on income"(P. J. Neary 2001, 178).

4.6 Imperfect Competition: From Revolution to Reaffirmation

The Dixit-Stiglitz model is regarded to be much more successful than the first imperfect competition revolution, for it found application in many fields in economics. The model is a reformulation and extension of Chamberlin's monopolistic competition mathematically. Though the models of both the two waves of imperfect competition are quite similar in their conclusions, the models differ in the purpose it was put to use. The first imperfect competition models were developed as an alternative to perfect competition as the basis for analysing competition and value. Though the Robinson-Chamberlin models had abstraction and simplifying assumptions, the objective was to start the economic analysis from a position in which realistic elements of firm behaviour and market competition were taken into consideration. Hence, one can consider it a revolution in economic theory as it sought to replace perfect competition as the benchmark for economic theory. However, it did not succeed.

The second wave of imperfect competition starting from the Dixit-Stiglitz model was a much-subdued theoretical development compared to the first one. It did not pursue a lofty objective as the Robinson-Chamberlin models by offering an alternative. Rather, the Dixit-Stiglitz model was a necessity to fill a lacuna by providing microfoundations for macroeconomic models. Its objective is to enrich, not to replace, the perfect competition models and provide an explanation for prices and wages rigidity or stickiness[18]. Various models were developed on the basis of the Dixit-Stiglitz model that seeks to explain market failure through

[18] Stiglitz hoped that "the Dixit–Stiglitz model can also be thought of as a benchmark, within the theory of monopolistic competition". There is no argument for the model to replace Perfect competition is still accepted as the benchmark as they are "Pareto efficient: the invisible hand ensures the efficient workings of the market, and no government, no matter how efficient, can improve upon the efficiency of the market's resource allocation" (2001, 146).

various imperfections such as asymmetric information, bounded rationality, missing markets, etc. These models have become the staple for New Keynesian economics for explaining. However, these imperfections are short-run fluctuations, and that perfect competition is still the long-run ideal benchmark for competition and value analysis. In mainstream economics, imperfect competition is generally considered a special case of perfect competition in which competition is Pareto inefficient. Therefore, imperfect competition is characterised as "wasteful competition" compared to the benchmark Pareto efficient, perfect competition. This is reflected in the fact that incorporating monopolistic competition in macro models has become the standard way to study inefficiency and firm behaviour, but "despite this widespread usage, it is, in the end, not all that clear that imperfect competition matters all that much. From a quantitative perspective, many studies that include market power at reasonable levels do not find much difference in results relative to the [perfect] competitive model" (Cooper 2001, 396).

Starting from the late 1970s, the role of imperfect competition became subservient to perfect competition. It was used to explain departures from or obstacles to perfect competition. Instead of providing an alternative explanation for a general theory of competition and value, it operated to reaffirm perfect competition as the normative ideal. However, Post Keynesian economics seeks to explain the determination of value and distribution based on imperfect competition. The ambition is similar to Robinson-Chamberlin's model in that Post Keynesians strive to construct their theoretical system with imperfect competition as the benchmark. However, unlike the Robinson-Chamberlin model, which is an extension of the Marshallian-Pigouvian theory, Post Keynesians draw inspiration from Kalecki's analysis of imperfect competition. The next section discusses the Post Keynesian conception of competition in some detail.

4.7 Competition in Post Keynesian Theory

Concerning the analysis of competition, Post Keynesian draws much more from Kalecki than Keynes. Keynes brought out his effective demand theory that results in unemployment equilibrium with the assumption of a given "degree of competition" or pure competition. For Kalecki's theory of effective demand, the underlying assumption is that of

imperfect competition,[19] and was very critical of the perfect competition model and considered as "most unrealistic assumption, not only for the present phase of capitalism but even for the so-called competitive capitalist economy of past centuries: surely this competition was always in general very imperfect. Perfect competition, when its actual status of a handy model is forgotten, becomes a dangerous myth" (Kalecki 1991, 98). Kalecki was equally dismissive of free competition as unrealistic – "free competition, as an assumption, may be useful in the first stage of certain investigations, but as a description of the normal state of capitalist economy it is merely a myth" (Kalecki 1990, 252). For Kalecki and Post Keynesians, monopoly is deeply rooted in capitalism, and that competition is generally imperfect.

Post Keynesians generally divide the economy into two sectors – a sector such as agriculture and primary raw materials, where products are almost homogeneous, and prices are determined by demand and supply mechanisms. Thus, the prices are said to be "demand determined" as supply is limited or inelastic in the Marshallian short period. On the other hand, the prices of manufactured goods and services are "cost determined" as the sector is characterised by imperfect competition or oligopolies. The firms have monopoly powers and have reserve capacity to respond to quick changes in demand (Kalecki 1971, 43–44). The firms set and follow mark-up pricing or full cost pricing, or other similar alternatives (see section 5.5.1). The prices set are not market-clearing prices but rather reflect the adaptability and investment behaviour of the firms to grow in an uncertain environment (Hart and Kriesler 2014, 7). Though firms can set their price, their oligopoly power is limited by "the competition of its industry, the substitutes for its products, and the risk of drawing new firms into its market. … There is no automatic transmission of costs into prices" (Shapiro 2003, 67). Therefore, for Post Keynesians, as there is limited scope for price competition, it shifts to product differentiation and ways to minimise cost, advertising, technological progress, competition for accessing financial resources. In short, competition in Post Keynesian economics has a Schumpeterian flavour in which competition among firms depends on three things, "differences in the quality and thus value of the goods being produced and in their methods of production; differences in

[19] According to Osiatyński (1990) and Sawyer (2001, 253), Kalecki intially formulated the theory of effective demand with the assumption of "free competition", which "issuggestive of the idea that Kalecki did not view imperfect competition as fundamental to theexplanation of unemployment and of the role of aggregate demand."

the desire and capacity of the firms to expand; and differences in the desire and capacity to innovate in order to improve products and methods" (Metcalfe 2013, 119).

The discussion shows that the Post Keynesian notion of competition is that of imperfect oligopolistic competition. Firms being imperfectly competitive is reminiscent of the first imperfect competition revolution, in that it seeks to replace perfect competition as the basis to explain prices, distribution and output. However, there are also important differences between the two. The imperfect competition models of the 1930s and that of the 1980s were built on the basis of neoclassical theoretical structures, whereas for Post Keynesians, modern firms have acquired oligopoly powers, quite similar to the monopoly capital school – through growth and accumulation. Moreover, with its denial of free competition, much like that of the neoclassical and the monopoly capital school, the Post Keynesian conception of competition is tied with a particular market structure, in which the number of firms determines the nature of competition. Furthermore, for Post Keynesians, the economy is characterised by fundamental uncertainty. Firms are "institutions for mitigating uncertainty. … To thrive, firms seek to control the market, growing through acquisitions and dominating the supply chain. The large firm thus emerges as a planning response to the uncertain nature of markets" (Dunn 2011, 209, 333).[20]

Post Keynesians' emphasis on fundamental uncertainty is overarching such that it rejects any role for free competition in bringing about long-period natural positions. Only the Marshallian short period is given an analytical role as beyond that period, nothing definite can be said about the objects under study. As discussed earlier in section 3.4.2, Marshall, in order to manage the complex and dynamic nature of reality, slices time into various periods – market period, short period, long period and secular movements. The short period is taken to mean "few months or a year" (Marshall [1920] 2013, 314–15).[21] Post Keynesians embraces the Marshallian method of the short period and partial equilibrium analysis just as

[20] For Post Keynesians, the objective of firms operating in an uncertain environment is not profit maximization but rather "power is the ultimate objective of the firm: power over its environment, whether it be economic, social or political. … At a more fundamental level, perhaps, the search for power procures security to the individual owner or to the organization" (Lavoie 2014, 128–29). The quest for power both at the organizational and individual level drives them to maximize the growth rate of the firm.

[21] With regard to the Marshallian short period, there are debates whether it implies a period with a given capital stock and resources or whether it implies an actual length of historical time (see Harcourt 2016). Most Post Keynesians in the Keynesian-Kalecki tradition defines short period as historical time in which there is little room

> "Keynes fully embraced Marshall's inclination to forgo analytical rigour in pursuit of increased realism, and adopted Marshall's partial (or 'particular') framework … to reduce the complexities of time and uncertain knowledge in economics to manageable proportions. The role of money and the indeterminacy of expectations associated with uncertainty could not have been effectively portrayed within a general equilibrium framework. For these same reasons, partial analysis remains the chief analytical technique used by post-Keynesian economists, who emphasise mutual determination, with causality playing a key role."(Hart and Kriesler 2014, 6)

Hence, the Post Keynesian notion of imperfect competition is defined only for the short period. According to Robinson (1962, 690), "the short period is here and now, with concrete stocks of the means of production in existence. Incompatibilities in the situation will determine what happens next".[22] Yet, Post Keynesians consider "competition is a dynamic process, not an end-state or a static situation" (Lavoie 2014, 127). Therefore, in order to study the dynamics, the economy's long run is considered as the result of a chain or a series of short periods, working through uncertainty as it transitions from one period to the next. Each period inherits from the past the material conditions of production and "crucial decisions" and commitments made in the present will influence the future i.e., "the influence of those long run factors [is] operational only through the filter of expectations. … In Keynes the future is telescoped into the present by entrepreneurs' expectation" (Carvalho 1984, 225). For Davidson, money is the link between the present and an uncertain future. The cycle and trend of economic processes become inseparable, "the actual historical path of economic activity … is not one which can be decomposed into separate and logically independent secular trend and short-run trade cycle aspects." (Davidson 1978, 8). The consequence of such a conceptualisation of the

for substantial change in capital stock, and that entrepreneurs facing an uncertain future must forecast her expected change in demand and make investment decision for the next period.

[22]With regard to the Marshallian short period, there are debates whether it implies a period with a given capital stock and resources or whether it implies an actual length of historical time (see Harcourt 2016). Most Post Keynesians in the Keynesian- Kaleckian tradition defines short period as historical time in which there is little room for substantial change in capital stock, and that entrepreneurs facing an uncertain future must forecast her expected change in demand and make investment decision for the next period.

economy is that only descriptive explanations of the economy's cycles within a particular frame is possible as the economy is bounded by fundamental uncertainty. However, though uncertainty is a fact of reality, entrepreneurs and agents work through uncertainties and do undertake long term investment decisions based on some expectations about the current rate of profit and the existing levels of economic activity. The notion of tendency towards long period position provides "the objective basis of different states of expectations" and the "systematic objective outcomes arise from these different states of expectations"(Bharadwaj 1991, 95–96).[23]Restricting the economic analysis to particular frames enables us to study pricing, distributional shares and cycles. However, this leaves out important questions about the underlying structure of the economy, such as what determines income distribution (wage rate and profit rate) and relative prices and what determines growth and accumulation, unless one adopts the method of long-period positions.

It is clear from the discussion that Post Keynesians of the Keynes-Kaleckian tradition seeks to bring realism into economic analysis by focusing on short period partial analysis, historical time, money, expectations as the economy is burdened with fundamental uncertainty. The analysis of competition as a general dynamic force, a medium that brings out the general and regulating tendencies of the economy, which is analysed through the method of long-period positions as reference points, is fervently rejected as unrealistic, ignoring uncertainty, history, technological changes and that long run is assumed to be independent of "short run adjustments" (see Hart and Kriesler 2014; Harcourt 2016; Carvalho 1984). For Post Keynesians, competition as a dynamic process is related to market competition, and does not assign any methodological role to competition as a way of extracting underlying general principles from the complex workings of the economy.

Instead, as discussed earlier in section 2.5.3, from the 1980s, Post Keynesians moved away from "substantive theorising" of the economy and towards a methodological conception of the economy at the level of social ontology, with the aim to describe the real economy as it is, which is viewed as an open-ended system with radical uncertainty dependent

[23]Marcuzzo(2021, 316) contends that "Bharadwaj's emphasis on the 'objective basis' is to be interpreted as refusal to appeal to non-observable entities, like individual utility functions, but rather to look to custom, social norms and the like. Investigation into decision-making under uncertainty, opinion formation and subjective evaluation of future events is not banned from the theory"

upon human agency, social processes, institutions and history. Unlike classical political economy and other heterodox traditions that rely on substantial theory to engage with mainstream economics, with the methodological revolution, Post Keynesian seeks to re-orient economics on a different basis and approach, it is a

> "non-deterministic approach to economics … that comprises three levels: the *empirical* domain of experience and impression, the *actual* domain of events, and the *deep* or *real* domain of structures, powers, tendencies and generative mechanisms. … the aim of economic science is then explanation and not prediction. … to provide *causal explanations* of concrete economic phenomena which are couched in terms of discursive, abstract, but nevertheless descriptively adequate statements of the phenomena concerned, as opposed to other approaches that by their own admission represent fictitious idealisations."(Dunn 2004, 34, 39,42)

And once the methodology is set, the agenda and purpose of Post Keynesians is to

> "identify those structures, mechanisms, and so on, that allow us to think about questions of employment, output, growth, inflation, and distribution, and from which we can retroduce scientific statements about observable outcomes to explanations in terms of the causal mechanisms that facilitated or produced these outcomes' … it seeks to investigate the specific institutional structures that generate different levels of employment across different epochs, cultures and continents. From this perspective Post Keynesian economics can be viewed as a specific mode of enquiry into developed capitalist economies."(ibid., 43–44)

This reorientation of the Post Keynesian project has created a deep chasm and divide with the modern revival of classical political economy and Marxian political economy. More importantly, the rift has widened with Post Keynesians criticising and rejecting the classical notion of long period method and all forms of equilibrium theorising as mathematical deductivism and akin to mainstream economics.

4.8 Conclusion

The chapter has provided an excursion from imperfect competition to alternative notions of competition in Post Keynesian economics. After the cost controversies that exposed the empirical and theoretical emptiness of perfect competition at the heart of neoclassical theory, there were attempts to provide an alternative foundation to competition – the imperfect competition. This precipitated a plethora of imperfect competitive models, that lacked predictability and a general deterministic model, which are both important features for neoclassical theory based on deductivism-formalist approach. And so, the idealised perfect competition recouped its position as the benchmark model within neoclassical economics. Imperfect competition was revived in the 1970s not to bury and replace perfect competition but to validate perfect competition as the ideal, and play a subservient role, to explain deviations from the ideal state.

On the other hand, Post Keynesians through the works of Kalecki, placed imperfect competition as a realistic abstraction of the market structure in the real world, to provide an alternative theory of prices, distribution and growth. Imperfect competition was placed within the ambit of the Marshallian short-period partial equilibrium analysis, as the real world is characterised by uncertainty and expectations about the future.

The next chapter carries forward the discussion on Post Keynesian by examining its emphasis on the method of short period partial analysis and its notion of equilibrium. We then, compare it with the classical long period method based on free competition. It will be argued that the criticisms directed towards the classical long period and equilibrium method is unfounded and that it still serves an important role in economic theory.

Chapter 5
Equilibrium and Method in Classical Political Economy and Post Keynesian Economics

5.1 Introduction

The present chapter continues the discussion of Post Keynesian and classical political economy (Sraffian) concepts of competition, equilibrium and method and how they differ from that of neoclassical/mainstream theory. Section 5.2 discusses the meaning of short period and long period in Post Keynesian economics, followed by their understanding of equilibrium in section 5.3. Section 5.4 clarifies that the classical/Sraffian "long period method" is not the same as the neoclassical long period stationary state or the Marshallian long period, rather it is the method of abstraction to study the structure and the viability condition of production. And that at the foundational level, the Classical/Sraffian method of analysis is compatible with Post Keynesians' ideas about open system equilibrium and method of abstraction.

In section 5.5, the discussion is on how the different conceptions of competition, equilibrium and method are operationalised in the theories of value and functional distribution of income. Neoclassical theory of value and distribution is not discussed here, as it has been critically engaged with while discussing perfect competition and imperfect competition models. In particular, in neoclassical theory there is simultaneous determination of value, distribution and quantities in both factor and goods markets. Section 5.5.1 discusses the Post Keynesian theory of pricing and distribution and their limitations. Similarly, section 5.5.2 discusses the Classical (Sraffian) theory of value and distribution, its interpretation and how Ajit Sinha's new interpretation of Sraffa's prices is incompatible with the overall method of classical political economy.

5.2 The Short-period and Long-period in Post Keynesian Economics

As discussed in section 2.5.2, with the failure of the Cambridge capital controversy, Post Keynesians moved toward a methodological critique of economics, which included an abhorrence towards any equilibrium theorizing, especially that of long period stationary states. Long-period equilibrium was viewed only as fictitious idealisation, based on logical time, devoid of real history and causal processes. Kaldor (1972) and Robinson (1974, 1980) more so, pioneered the notion that economic analysis must do away with the equilibrium method and instead focus on explanations in real historical time. From the 1970s onwards, Robinson's main argument against neoclassical economics had changed, arguing that the problem of "measurement of capital" and the internal logical inconsistencies of the demand and supply theory is secondary to the problems of adopting the method of equilibrium analysis by neoclassical economics, as it neglects uncertainty and history (Robinson 1974). Equilibrium was seen as static without "causation and no change", which studied and compared only "logically possible positions" (Robinson, 1980, 132). She emphasised the importance of historical time and analysing events through the Marshallian short period method. However, Robinson defines short period, not in terms of "a length of time, but a situation at a moment of time when equipment and stocks of inputs in existence and the available labour force provide for a potential supply of output that may be less or more fully utilized" (Robinson 1985, 157). But for long period, she argued that the analysis must be carried out in terms of " 'historical processes' based on a sequence of short period positions" (Garegnani 1983a, 75). For Robinson, short-period events affect the long run, and so the latter is not independent but rather path-dependent on the happenings in the short period. She extended her criticism of equilibrium analysis to Sraffa's price equations as well.

For Robinson and the Post Keynesians, as stated in Marshall's *principles*, the passage of time is what distinguishes the short run from the long run as a way to deal with complexities arising from the passage of time (see section 3.4.2). The short-run is "influenced by passing events and by causes whose action is fitful and short lived, than by those which work persistently" (Marshall 2013, 291), and the long run is supposed to correspond to Adam Smith's notion of natural prices. It is "the average value which economic forces would bring about if the general conditions of life were stationary for a run of time long enough to enable them all to work out their full effect" (ibid., 289). Marshall identifies the stationary state as a fictitious

state, defined by the absence of time or in which time is at rest, in this state the difference between short run and long run disappears.[24] Yet it is in this motionless state the natural determinants of value become explicit, where "cost of production governs value". However, such a state may never come to fruition as

> the unexpected may happen; and the existing tendencies may be modified before they have had time to accomplish what appears now to be their full and complete work. The fact that the general conditions of life are not is the source of many of the difficulties that are met with in applying economic doctrines to practical problems. (ibid., 289)

Thus, Post Keynesians applying the Marshallian methodology emphasise only the short period – the then and now, and conceives the long run as some average of a series of short runs in the future. Stationary state is identified synonymous with "static" long period equilibrium devoid of time and dynamics – an ideal fiction, characterised by full employment of resources and market clearing prices. Post Keynesians attribute this state to neoclassical equilibrium analysis and also to the long period method of the modern classical political economy, however it will be argued below that it is erroneous to attribute the characteristics of the stationary state to the classical long period method. Given the Post Keynesian rejection of long period as stationary state, one must recall that neoclassical economics also rejects the long period method as static and stationary (see the discussion in section 3.5) in favour of temporary or intertemporal short period equilibrium. Given this change in the neoclassical method, there is a sort of convergence between Post Keynesian and neoclassical economics position in that both share a fondness for short period method/frame of analysis, albeit having different theoretical structures. Moreover, identifying classical long period method synonymously with stationary state is a misinterpretation. Although both share the same characteristic of a uniform rate of profit, there is an important difference – stationary state implies the *always existence* of a stable uniform rate of profit on the capital stock, whereas for long period method, the uniformity of profit rates is *only a tendency* and may never be realised. The difference between

[24] For Marshall, if time is introduced, stationary state may be exhibited if all the variables under consideration grows at the same constant rate (Marshall 2013, 305–6).

the two is that, stationary state is 'idealization' and the long period method is about 'abstraction' (see section 5.4).

5.3 'Equilibrium' in Post Keynesian Methodology

From the discussion thus far of Post Keynesian economics regarding whether competitive process requires a notion of "equilibrium", we can identify two positions within Post Keynesians. Those that hold on to a short period partial equilibrium analysis in the spirit of Marshall and Keynes, and those that advocate doing away with the very concept of equilibrium as it connotates a static closed deterministic modelling system, a tool for mainstream economics. The latter position is held by Keynesian methodologists (see section 2.5.3) with impetus from Robinson's insistence on historical time. The common theme among Post Keynesians is the rejection of equilibrium as a deterministic long period stationary state and the insistence for historical time instead of logical time in economic theory. Concerning the first position, we had discussed it in section 4.7, mostly within the Kaleckian-Keynesian strand. Post Keynesians of all persuasions do realise the importance of some notions of "balance of forces" or "relative rest" akin to equilibrium in their theory at some level of abstraction from complex reality. According to Sardoni (2008,467), the world is fundamentally or substantially stable and "not subject to either chaotic, 'anarchic' dynamics or explosive, or implosive, tendencies." Although the "real economies are periodically subject to crises that can be very deep and violent, but they *do not show any significant tendency to permanent instability*" (emphasis added). Therefore, the study of equilibrium is necessary and important to study those features which lend the "tendency to stability". Equilibrium can be viewed as a "metaphorical representation metaphorical representation of the observed phenomenon". However, Post Keynesians are at pains to point out the difference between the traditional equilibrium model and a path-dependent equilibrium. According to Lang and Setterfield:

> "In this traditional equilibrium approach, the most important properties of economic systems are *homeostasis* and *time reversibility*. A system is said to be *homeostatic*, or self-maintaining, if the application of a temporary shock to the system does not change its equilibrium position(s). A homeostatic system returns to the status quo ex ante, the stable equilibrium, after being hit by a temporary shock. The"

> "*reversibility* property means that, in the aftermath of disturbances, the system will return its previous state by 'retracing its steps' until initial conditions are restored."(Lang and Setterfield 2007,199; epamhasis in original)

On the other hand, path-dependent equilibrium is defined as

> "the particular path followed by the system will shape the equilibrium reached, and a system's equilibrium (or equilibria) may change if or when other paths are followed. … In this approach, the time dimension is a *fundamental* dimension of the economic system, … [and] that history matters, in that the sense that the past the relevant variables of the model may help shape the path followed and hence any equilibrium reached." (ibid., 200).

Avi J. Cohen (1993) justifies Robinson's embrace of historical time and her rejection of the method of equilibrium (as mentioned earlier in section 5.2). However, this does not entail "theoretical nihilism", as her criticism is directed towards the traditional equilibrium model. Robinson still retains the concept of equilibrium as "useful for eliminating contradictions and pointing towards causal relations that will have to be taken into account in interpreting history" (Robinson 1980, 223). The traditional equilibrium model is closed and determinate, the outcome of which is supposed to predict reality with some correspondence and provide points of reference for actual outcomes. However, for Robinson, the study of equilibrium is only the first stage of theory. Beyond that, the model "must be embedded in a specific historical and institutional context … buttressed with factual information - the rules of the game, behavioural responses, institutional description, historical parameters" (Cohen 1993, 233). Similarly, for Kaldor (1972), the call for rejection of equilibrium was directed towards a particular type of equilibrium analysis– general equilibrium theory, Kaldor does not dispense with the use of equilibrium in economic theory, rather he advocates for an Allyn Young (1928) type of path-dependent equilibrium characterised by increasing returns – the principle of "circular and cumulative causation".

Post Keynesian methodological criticisms of mainstream/neoclassical economics are based on the rejection of the model of equilibrium analysis as it is based on the deductivism-

formalist approach.[25] Though there are differences in defining "systems" or "structures", all methodologies agree that social-economic reality must be viewed as an open system. Although Lawson rejects the model equilibrium featuring event regularity based on deductivism, he does recognise that interaction between agents and the social structure may bring about "demi-regularities" that lends some stability to an open system. He brings this out clearly in his distinction between the "theoretic" and the "ontic". Theoretic "denote the quality of being a feature of a model and the term *ontic* to denote the quality of being features of the world the economist presumes to illuminate" (Lawson 2005, 429; emphasis in original).

Regarding equilibrium analysis, theoretic equilibrium refers to those systems that are closed and deterministic, a "*particular representations or formalizations of the economy …* a sought-after property of theories or more typically models". While ontic equilibrium refers to "balance of order, … *an aspect of the economy they are attempting to represent,* … a property of society that the investigator is seeking to understand and explain" (ibid., 431; emphasis in original). For Lawson, Adam Smith and other classical economists including Marx's notion of natural prices (or prices of production) can be term as ontic, "concerned with explaining a particular state of affairs" (433) in the real world. For them, "the focus is on the deeper structures of capitalism and in particular social relations, including relations of production"(Lawson 2013, 962).

Similarly (Dow and Chick 2012) distinguishes mainstream theory as closed system ontology from that of an open systems approach for Post Keynesians. A System is defined as "a network, a structure with connections, within which agents act, mostly in ways which reproduce and reinforce the system, but sometimes in ways which lead the system to evolve." However, in any system, "the set of connections is incomplete. That is what differentiates one system from another and gives them a sense of both character and order" (Chick 2004, 5). Unlike in mainstream theory, where the systems are not only closed but also static and isolated, for Post Keynesians, the real-world systems are brought about by institutions, providing stability and are mutable evolving with time. However, "no system is perfectly open … [but] is characterised by some (partial, mutable) boundaries in order for it to be a system. … complete openness is incompatible with the system remaining recognisable as a system" (Dow and Chick

[25] See section 2.5.3 and Appendix A.2

2012). Therefore, systems have boundaries and subsystems. Boundaries are understood as the limiting of the systems that distinguishes one from the other. They are neither rigid nor isolating but are "semi-permeable and mutable".

On the other hand, subsystems exist within systems and are "defined by the connections which mark out an area as semi-separate or amenable to further closure by imposing additional conditions" (ibid., 185). Boundaries and subsystem enable the theorist to provide conditions for closures. Closures are important as it allows one to temporarily suspend real historical time. Thus, it enables us to study certain important aspects or features of the system, their connections and relations by keeping other aspects of reality "at the back of one's head" for the time being and not ignoring them. "Within an open theoretical system, there is scope for changing the assumptions, boundaries or ceteris paribus conditions to suit the theorist's immediate purpose" (186). These partial closures of an open theoretical system may give rise to event regularities, and such regularities are necessary to construct economic theory. Moreover, the closures are provisional, in that when systems change and evolve or the boundaries change, some event regularities may disappear or survive.

The argument advanced by Sheila Dow, Victoria Chick and others are that of applying partial analysis or closures to open systems. This is in concurrence with their "Babylonian mode of thought" methodology (see section 2.5.3). Their position seems similar or is compatible with the Kaleckian-Keynesian arguments for the use of short-period partial equilibrium analysis. As Dow and Chick argue that the use of "temporary and partial closures" makes the "analysis of a complex system tractable. … Indeed, we see great virtue in devices, such as ceteris paribus, designed to keep some aspects of reality at bay temporarily, thus allowing analysis to proceed. We have no objections even to complete closures so long as these are in place only temporarily; thus, models are shown with continuous boundaries, although these closures are provisional" (ibid., 192, 194).

5.4 The Long Period Method in Classical Economics

From the discussion in the previous section, it is clear that Post Keynesians of all persuasions do not reject the concept of equilibrium per se, but that of the neoclassical/mainstream model of equilibrium analysis which is closed and deterministic in its

outcomes. Post Keynesians acknowledge the contributions of Sraffa and the modern reconstruction of classical political economy for initiating and bringing out the logical flaws of neoclassical theory of value and distribution (the Cambridge capital controversies). But as discussed in previous sections, for most Post Keynesians, modern classical political economy with its "long period" method does not have much to contribute positively for an alternative approach to economic theory. In fact, most Post Keynesians consider the "long period" method as the same as that of the neoclassical's emphasis on "equilibrium and "stationary state". This has created misunderstandings and rift between modern classical political economists (Sraffians) and other Post Keynesians, which has been exasperated with the latter's emphasis on methodology (Lavoie 2011; King 2012). Although, there are differences with the dominant Post Keynesian strands, the present thesis sympathize with Mongiovi's(2003, 320) assertion that the two traditions does have differences but are not incompatible.

The criticism directed towards the modern classical political economy based on the long period method as a static equilibrium is unwarranted, misrepresented and misplaced. The Post Keynesian criticism of the "long period method" stems from telescoping anachronistically Marshall's definition of periods in terms of slices of time to the classical economists' notion of "normal values" or "positions". As discussed earlier in section 5.2, Post Keynesians endorse the Marshallian short period-partial equilibrium approach which should be embedded within a larger historical frame. An extract from Marshall is repeated here emphasising the role of time:

> "The element of time is a chief cause of those difficulties in economic investigations which make it necessary for man with his limited powers to go step by step; breaking up a complex question, studying one bit at a time, and at last combining his partial solutions into a more or less complete solution of the whole riddle. In breaking it up, he segregates those disturbing causes, whose wanderings happen to be inconvenient, for the time in a pound called *Cœteris Paribus.* The study of some group of tendencies is isolated by the assumption *other things being equal:* the existence of other tendencies is not denied, but their disturbing effect is neglected for a time. The more the issue is thus narrowed, the more exactly can it be handled: but also, the less closely does it correspond to real life. Each exact and"

> "firm handling of a narrow issue, however, helps towards treating broader issues." (Marshall [2013] 1920, 304; emphasis in original)

Robinson reaffirms that "for Marshall, the long run is a period of future time after some event has occurred"(Robinson 1980, 226). Interpreting the "long period method" through the Marshallian lens, allows Robinson and other Post Keynesians to view long period as a calendar time sometime in the future. Thus, in her debate with Garegnani she emphasises the importance of time and questions, "the conception of the long period, in particular of the normal rate of profit on capital, is not easy to grasp. Does he mean what the rate of profit will be in the future or what it has been in the past or does it float above historical time as a Platonic Idea? … The search for a theory of the normal rate of profit is proverbially like looking in a dark room for a black cat that probably is not there"(Robinson 1983, 71; 1980, 227). Because, long period is thought to be sometime in the future, and the only state where there is uniformity of profit rates and full employment of resources is in the stationary state. Hence, the claim that the long-period method of modern classical political economy is the same as that of the neoclassical stationary state that neglects uncertainty and historical processes.[26]

However, this retrospective characterisation of classical political economy is a misrepresentation. Classical economists never used the term "long period", rather "free competition" or "perfect liberty" is used as a method of abstraction, whereby the natural prices are an abstraction derived from the observable production process. The natural prices are extracted under the abstraction of a given social-economic institutions, production structure, technology, and social output in which free competition has played out to the fullest (long period method), such that the dominant technique of production prevails over the other techniques and there is uniformity of profit rates. The actual variables under consideration, as discussed earlier will always have a tendency towards the competitive variables, but will be frustrated by a multitude of factors, however, when in the givens of the system changes, a new normal will be defined towards which the actual variables will continually gravitate. The theoretical natural

[26] As discussed earlier in section 3.5, the pioneers of temporary and intertemporal equilibrium equated the "long period" with the stationary state to justify short period- general equilibrium as more realistic and to take into consideration price expectations.

prices are the natural or normal positions that explains the stability of the given system, the balance or order, or the ontic (in Lawson's words) in a dynamic world. The natural or normal positions is neither static nor stationary, it is a position towards which the actual variables competitively tend towards, and when the givens or the parameters change, the natural position will also change, and regulated by "the general circumstances of the society, their riches or poverty, their advancing, stationary, or declining condition; and partly by the particular nature of each employment" (Smith [1776] 1981, 126). The long period method or "centre of gravitation" characterising the workings of free competition (perfect liberty) is the "method of analysis" that brings forth the natural prices (normal position or normal values), given the parameters discussed earlier, such that:

(a) The natural prices (normal values) provide the minimum viability condition for production and reproduction of the system in consonance with the surplus approach sketched out in section 2.3.1.

(b) The normal position aids the analysis of the relation between prices and distribution and how changes in distribution or technology affects the structure of prices (a concern for classical economics, see section 5.5.2).

(c) Brings out the interdependent structure inherent within any social production system. Such analysis helps to understand the linkages between industries and sectors, nature of structural dynamics, and the effects of policy interventions.

Therefore, when Robinson enquires when in the long period will there be uniform profit rates, Garegnani (1983a, 76–77) respond that, "it is a pity that Joan Robinson's list of possible temporal location has left out the present: because it is in the 'present' that the 'normal' rate of profits has always been firmly located. It corresponds to the rate which is being realized *on an average* (as between firms and over time) by the entrepreneurs who use the dominant technique" (emphasis in original).

It is unfortunate that the natural or normal position of the classical economists has been refashioned and contorted as equilibrium in a stationary state with the advent of the marginalist revolution and later with Marshall as "long period equilibrium". Although the term "long period" has now entered the lexicon of economics, modern classical political economists

(Sraffians) are at pains to distinguish the Marshallian "long period" from that of the classical notion of "natural prices" interpreted as "normal position or values" or "abstraction method" or "long period method or position" (for want of a better term).[27] As Roncaglia clarifies:

> "It is then unclear why one should refer to a 'long-period', rather than simply to an 'abstraction method'. Reference to 'long-period' suggests a dichotomy with 'short-period' analysis. This latter is useful for Marshallian, and post-Keynes neoclassical theory in general, in order to avoid the pitfalls of long-period partial equilibria or of neoclassical capital theory. However, the dichotomy between short-period and long-period analysis is absent in classical theory-so that the 'post-Keynesian or neo-Schumpeterian criticism of the concept of long-period equilibrium' … simply does not apply to the classical approach. (The dichotomy between market and natural prices is not a dichotomy between short and long-period." (Roncaglia 1996, 404).

Similarly, Garegnani (1989) discerns that

> "these new, vaguer meanings of the expression 'long period' are perhaps what has misled some readers of Garegnani [1983b] into thinking that the idea of a 'long"-"period position', there referred to in order to cover both marginalist long-period equilibria and the analogous positions of the classical economists, ... In fact, what appears to be at stake in the conception of a 'long period position' is only an application of the general theoretical concept of *normal* levels of the variables to a general explanation of distribution and relative prices. … no expression like 'long"

[27] David Andrews (2015) also distinguishes between Marshall's normal prices as an outcome in the long run and Smith's natural prices, as a theoretical price, an outcome of abstract free competitive tendency. "The long run implies a sequential temporal structure with a period of adjustment preceding arrival at the final outcome. Natural price enables the single unified continuously self-sustaining process of ongoing production and supply, which may or may not continue for a long period of time."

"Marshall's normal prices are distinguished from market prices on the basis of time. … The natural prices of Smith's theory are defined by a theoretical condition or requirement: sufficiency to pay for continuing production and supply at going rates" (Andrews 2015, 276). Moreover, for Smith as discussed in section 3.2.2 footnote 8, the deviation of market price from natural price can persist for a long period of time. However, for Marshall "it is impossible that a deviation of market price from normal price could last for a long time because the effects of causes that persist over a long period of time are, on Marshall's theory, normal. If a market price lasts long enough, for Marshall, since the length of the relevant time period is the key factor, it becomes the normal price by definition, that which is to be expected in the long run" (ibid.).

> “period' was needed for such positions at the time (Marshall's distinction was only used for the 'particular equilibrium' of an individual industry), since it was taken as a fact that a general theory of price and distribution could only be formulated in those terms. The expression had to be used in Garegnani [1983b] because the theoretical development outlined there had tacitly abandoned that standpoint.”(Garegnani 1989, 362–63; emphasis in original)

Moreover, in classical political economy the forces of demand and supply do play a role only in price-quantity fluctuations, but the demand and supply does not determine the prices of produced commodities, rather they are determined by production conditions and production relations. However, in marginalist/neoclassical theory scarcity of resources are assumed, and demand and supply functions are derived from preference functions and production functions respectively such that the two scissors of demand and supply functions determines the equilibrium prices and quantities with optimal full employment of resources. In classical political economy, there is no mechanism that brings the system towards full employment of resources including labour. Therefore, Robinson and other Post Keynesians’ criticism of close deterministic equilibrium or stationary state in long period applies only to the neoclassical theory and not to the classical political economy approach.

Similarly, the Post Keynesian methodologists’ position that the equilibrium resulting from a closed and isolated system or structure through deductivism as discussed in section 5.3 does not apply to classical economists. The “normal position” method of classical economics is applicable to an open, dynamic system. While the former notion of equilibrium can be categorised as “idealization”, and the latter as “abstraction”. Nell (2004) succinctly distinguishes between the two as:

> “Abstraction is a process of focusing on particular aspects of some (concrete) phenomenon, with the aim of individuating or picking out particular features while ignoring others. Notably, it is not the case that the existence of the neglected features is denied; rather they are (momentarily) left out of focus and relegated to the periphery of our attention. Abstraction, then, is a matter of bracketing features of the phenomenon under investigation rather than of denying their existence”.

> "Idealization, in contrast, involves the ascription of features to an object that it does not in fact possess, that is, features that are false when predicated of it. Thus, theorists who use idealization invoke fictions, objects that exist only in the realm of ideas. Idealization generally comes in one of two forms. The first of these involves the use of ideal or limit types, that is 'enhanced' versions of entities or situations which possess features that are (in some sense) perfect, complete or pure. Examples would be perfect information, or perfect foresight."(Nell 2004, 82)

From the discussion above, it is clear that the notion of "equilibrium" in the classical-political economy (Sraffian) approach and other Post Keynesians are compatible and not antithesis to each other. However, the operationalisation of the concept differs as Keynesian-Kaleckian, the Keynesians methodologists and the Sraffian approaches have different concerns and studies different aspects of the economy. A complete synthesis is not realizable as was the agenda in the early stage of Post Keynesianism (see section 2.5.2). However, modern revival of classical political economy is not incompatible (or is more closely related to neoclassical methodology) as some Post Keynesians have argued, with the general Post Keynesian method and approach. This compatibility of the method of analysis, was recognised by both Robinson and Garegnani. Robinson with regard to the modern classical political economy (Sraffian) approach acknowledges that:

> "The 'system' of production in use in an economy at a moment of time, and the stocks of inputs required to implement it, are set out in terms of a physical input-output table. It does not represent a stationary state or an equilibrium position. It is simply the position that has been reached, 'today', as a result of accumulation of stocks and of technical knowledge over the past history." (Robinson 1985, 164).

Similarly, Garegnani clarifies that the term "long period method or position" can be replaced with "normal prices" or "normal position" to avoid confusion and to bring more clarity to the method of analysis of the modern classical political economy approach, as he writes in a correspondence with Martins.

> "As for the question of interpreting Sraffa in terms of 'long period analysis' (I now prefer to speak of 'normal prices' or 'normal position' to avoid the endless present confusions between 'long period' and 'stationarity'), …I believe however that the latter phrases take care essentially of quite a distinct question: Sraffa's early attempts to come to terms with his own unexpected results of a determination of prices with no (neoclassical) demand and supply functions—and later, may be, an attempt to present those results avoiding as much as possible the scandal of prices which can be determined without D&S [demand and supply]." (Martins 2013, 459)

5.5 Post Keynesian and Classical Theories of Value and Distribution

5.5.1 Post Keynesian Theories of Value and distribution

Post Keynesians usually distinguish between "theory of price" and "theory of pricing" (Eichner 1987, 338). The theory of price is about relative prices, the determination of the price of a commodity in terms of the price of another commodity. For the determination of relative price, a commodity is chosen as the *numeraire* (benchmark or the standard), and all the other commodity prices are measured in terms of the numeraire. The theory of pricing, on the other hand is about the pricing behaviour of the firms, how firms set their prices, the pricing strategies and how they respond to changing market conditions. Post Keynesians emphasise the theory of pricing rather than relative prices, as for them, pricing deals with realistic problems of firms, markets and consumers, whereas relative prices are abstract theoretical prices and are assumed to deal mostly with long-run equilibrium conditions. However, as we shall see below, neglecting relative prices has consequences for Post Keynesian theory.

There are many Post Keynesian pricing theories, all of which are based on a "cost-plus pricing" approach. Following Lavoie (2014, sec. 3.6) and Lee (1999), the three most popular pricing procedures followed are (a) mark-up pricing, (b) normal cost pricing, and (c) target rate of return pricing. The mark-up pricing procedure is determined by adding a mark-up over and above the direct variable cost (labour and material cost). The mark-up is such that it includes profit margins and overhead costs. $p = (ADC)(1 + m)$, where p is the unit price, ADC is average direct cost and m is the mark up. The normal cost pricing is developed from the "full cost" pricing pioneered by Hall and Hitch (1939). The normal cost is determined by adding a

mark-up m to the average total cost (ATC) based on a normal output level. The price is not computed on actual realised cost but by reference to normal or standard cost, brought about by normal (defined as desired or planned by the firm) degree of capacity utilisation. $p = (1 + m)NATC$, where NATC represents normal average total cost.[28] Finally, in the target rate of return pricing (also termed as administrative price doctrine), given the normal average total cost based on normal capacity utilisation, the firm will mark up the price in such a way that it generates a volume of profits in line with a specific target rate of return on the capital assets of the firm. $p = (1 + r)(NATC)$, t represents the targeted rate of return. Unlike the other pricing procedures, "the advantage of target-return pricing is that it provides an explanation of what the percentage net costing margin ought to be" (Lavoie 2014, 162).

The difference between the pricing procedures is because of "different cost accounting systems underlying them", and that among the three pricing procedures, "normal cost and target rate of return pricing procedures are the most prevalent" (Lee 1999, 205), while "markup pricing today is used mostly by small firms" (Lavoie 2016, 174). However, despite the fact that mark-up pricing has not been empirically relevant, Kaleckian-Keynesians (the dominant strand of post Keynesians) still rely on mark-up pricing to explain prices, distribution and growth. Hence, in the following discussion, we focus on Kalecki theory of pricing and distribution and its limitation for want of a well-grounded conception of competition.

Drawing from Kalecki (1971, chap. 5 and 6), we briefly present Kaleckian pricing and functional distribution theory. The prices of manufactured goods are cost determined, as the manufacturing sector is characterised by imperfect competition. Firms have reserve capacity, and therefore in the short run, an increase in demand will be met by increasing capacity utilisation, keeping prices stable. Hence, the average variable cost (direct labour and material cost) will be constant up to full capacity. On the other hand, the prices of raw materials, agriculture, and the primary sector are demand determined because of their inelastic supply. For

[28] According to Lee (1999, 204) , "normal cost pricing procedures consist of marking up average direct costs based on normal output to cover shop expenses which gives normal average factory costs, then marking up normal average factory costs to cover enterprise expenses which gives normal average total costs, and then marking up normal average total costs to set the price, with the mark up producing a desired margin for profit"

Kalecki, the manufacturing sector follows a mark-up pricing procedure, and so the unit price of the i^{th} firm is given by

$$p_i = mu + n\bar{p} \tag{5.1}$$

Where p_i is the unit mark-up price of the firm, u the constant unit prime (variable) cost,$\bar{p}$ the weighted average of the other firms in the industry, and$m > 1$ is the mark-up coefficient over and above the unit variable cost. The mark-up includes the profit margins and the overhead costs. $0 < n < 1$ is the "competitive-threat parameter [n] which determines the firm's price response to the average price of its competitors[$\bar{p}$]" (Shaikh 2016, 360). Kriesler (1987, 68) notes that "it is mathematically possible for *n* to be greater than one for any firm whose price is greater than the industry average price $\bar{p}$. However, economically this is unlikely as it implies that the firm under consideration is extremely influenced by the other firms – in which case it would be unlikely to charge so high a price." Thus, the *m* and *n* coefficients reflect the degree of monopoly given by $m/(1-n)$.[29] Taking the weighted average of the price, prime cost and the coefficients of the individual firms, Kalecki arrives at the industry's price equation.[30] The analysis can be extended to other sectors of the economy – the consumption goods sector, investment goods sector and primary sector. The mark-up pricing analysis provides the stepping stone for the analysis of functional income distribution and macro dynamics. In carrying out this analysis, Kalecki abstracts from input-output considerations and intermediate goods and assumes that the industries are vertically integrated.

For the function income distribution at the macro level, from the assumption of vertical integration, the ratio of price to unit direct cost is equal to the ratio of aggregate proceeds to aggregate direct cost denoted by $k = (A/W + M)$, k denotes the degree of monopoly at the aggregate level, *A* is aggregate proceeds or sales, *W* is the total wage bill, and *M* is the aggregate material cost. Given that Π denote aggregate profits and O the aggregate overhead costs, we have

[29] According to Kalecki (1990, 49–51), the determinants of the degree of monopoly are the degree of concentration within the industry, non-price competition (sales and advertising), "changes in the level of overheads [cost]in relation to prime costs", and the power and influence of trade unions.

[30] The weights are output of each firm in the aggregate output of the industry.

$$A = W + M + O + \Pi$$

$$\frac{A}{(W+M)}(W+M) = W + M + O + \Pi$$

$$k(W+M) = W + M + O + \Pi$$

$$(W+M)(k-1) = O + \Pi$$

The value-added of the industry is given by $(W + O + \Pi)$, the share of wage out of the total value added is defined as

$$w = \frac{W}{W+O+\Pi} = \frac{W}{W+(W+M)(k-1)} = \frac{1}{1+(k-1)(1+\frac{M}{W})}$$

Denoting the ratio of aggregate material cost M to the wage bill W by $j = (M/W)$, the wage share is given by

$$w = \frac{1}{1+(k-1)(1+j)} \qquad (5.2)$$

Then, the profit share $\pi = (1 - w)$ is defined as $1 - \frac{1}{1+(k-1)(1+j)}$

$$\pi = \frac{(k-1)(1+j)}{1+(k-1)(1+j)} \qquad (5.3)$$

Therefore, "broadly speaking, the degree of monopoly, the ratio of prices of raw materials to unit wage costs and industrial composition are the determinants of the relative share of wages in the gross income of the private sector"(Kalecki 1971, 64). Changes in demand can only have an indirect effect on income distribution through changes in the price of the raw materials or through changes in "the composition of output, affecting the weights of single firms within an industry and the weights of single industries or sectors in the economy"(Hein 2014, 188). Kalecki's mark-up pricing and functional income distribution briefly discussed above is the dominant Post Keynesian pricing and distribution theory, which emphasises the short run and imperfect competition. For Kalecki and Post Keynesians, the mark-up prices are not market-clearing prices, and as firms sets their price, the prices can remain stable even in the long run unless the conditions of industry and the degree of monopoly changes. The prices are such that it enables firms to reproduce and grow.

Limitation of Post Keynesian Theory of pricing and Distribution:

Other heterodox economists have criticised the theory on several grounds. First, Post Keynesians generally accept that Kalecki initially used neoclassical/marginalist tools in his pricing equation, such as Lerner's index of monopoly power, marginal revenue and marginal cost, the elasticity of demand and profit maximising firms in short period equilibrium. However, in his later writings between 1954 and 1971, Kalecki abandoned the marginalists tools and developed a non-neoclassical pricing theory. This is disputed by Basile and Salvadori (1984) and more emphatically by John Carson (1996), who argues that although Kalecki was not uncritical of marginalist pricing theory, Kalecki never abandoned marginalism. In his pricing theory, he worked out in detail "only the marginalist first approximation … it dictated the functional form of the pricing equation, with the subsequent approximations having only a quantitative effect(by, for example, shifting a function up or down)" (Carson 1996, 665).[31]

Second, the Kaleckian mark-up pricing theory has been subjected to critical cross-examination by Ian Steedman in his famed "Questions for Kaleckians" (1992). Some of the critical points are (i) Steedman questions the Kaleckians for not taking into consideration input-output relations (commodity interdependence) and intermediate goods. (ii) undue importance to unit direct costs on price, but with input-output relations, prices will not be cost determined but will be determined by prices of other commodities. (iii) because of interdependence, a product price mark-up is not independent but will depend on many other mark-ups and their prices, and therefore prices and mark-ups may not move in the same direction. (iv) the use of hypothetical vertically integrated industries and sectors that are "merely differently weighted combinations of the real industries (or processes). … why do they not consistently set it out in explicitly dynamic form(with a clear statement of the time period involved)?" (ibid., 150). The main argument of Steedman is Kaleckians' unapologetic use of partial equilibrium analysis for an interdependent and dynamic system and the use of vertically integrated industries as an inappropriate assumption. Given an "open Leontief system" as representing the

[31] Carson (1996, 665) continues "It could reasonably be said that, in these subsequent approximations, Kalecki departed from the price-theoretic orthodoxy of his day by making pragmatic accommodations to empirical realities, without ever subjecting the relevant empirical realities to formal theoretical analysis. In this he does not appear to have been very different from a great many policy-oriented economists who would regard themselves as essentially orthodox economists."

interdependence of the n industries with $A = [a_{ij}]$ as the square input coefficient matrix, I the identity matrix, X, the column vector of gross output and Y, the column vector of final demand (value-added or national income). Then, the solution is $(1 - A)X = Y$., Post Keynesian pricing and distribution deals only with the final demand vector, which is aggregated with the mark-up pricing and distributed between wages and profits depending on the determinants of the "degree of monopoly". The intermediate sector represented by the technology matrix $(I - A)$ collapses with the assumption of vertical integration and partial equilibrium analysis. Kaleckians responded to the criticism in various ways; Sawyer (1992) argued that the concept of vertical integration is a "bridge" between microeconomics and macroeconomics, not intended for empirical validity but for theoretical simplification. On the other hand, Steindl (1993, 121) justifies the use of partial equilibrium analysis such that "Kalecki wanted his concepts to be applicable ('operational') and he was willing to buy this advantage at the cost of drastic simplification."

Third, Kaleckian mark-up pricing has been criticised on the ground that in the modern economy dominated by mega-corporations, the pricing procedure is no longer used except by small firms (Lee 1999). However, post Keynesian theory still relies on the mark-up pricing procedure. Moreover, "there are still a number of post-Keynesians who rely on Marshallian microeconomic foundations" (Lavoie 2016, 183). Lee (1999, 222n6) also criticised the Post Keynesian over-reliance on the concept of vertically integrated industries, which assumes away intermediate goods which "generally constitutes over 40 percent of all economic activity in capitalist economies". Hence, in his book, Lee attempts to construct a price model synthesising the three pricing procedures discussed earlier in conjunction with a circular production schema with interdependence among the industries.[32]

Finally, an important foundational limitation of the post Keynesian pricing and distribution theory is the lack of clarity in its concept of competition. Post Keynesians, with

[32] However, most Post Keynesians based on methodological (critical realism) argument still rely on the mark-up pricing. According to Downward (2000, 222), "The paper also argues that other contributions that have traditionally been cited as central to post-Keynesian pricing theory, for example work by Eichner, Asimakopulos and Cowling and Waterson, as well as the neo Ricardian analysis of prices, shares the emphasis of main- stream deductivist theory or closed-systems modelling. Despite the widespread interest in the latter by post-Keynesians, therefore, the adoption of a critical-realist philosophy implies that they cannot provide the constructive basis of an alternative account of pricing."

their assumption of imperfect competition (oligopoly or monopolistic), merges the concept of competition with that of a market structure. This has neoclassical overtones as competition is defined in terms of the number of participants in the market, and as this number increases, competition approximates to perfect competition. For classical economics, the concept of competition is not defined by the number of buyers and sellers in the market, it only influences the intensity of competition (see section 5.4). Rather, it provides the method of analysis (normal position) describing the tendencies of the "object of analysis". However, as Post Keynesian competition has no independent conception outside of the particular market structure, the whole of the mark-up profit margin is treated as a result of monopoly powers of the firms. And so, as the number of firms increases, the mark-up profit margin can be logically reduced to zero.

Moreover, Post Keynesians' assertion of competition being dynamic within imperfectly competitive markets seems to present only the *strategic* aspect of competition among firms justified by its short period analysis and for its realism. However, monopolistic or other non-competitive behaviour can only be defined with reference to a benchmark or anchor of competition, and so defining mark-ups as non-competitive independently of competitive rates of return is unrealistic. As Aspromourgos rightly asserts, "the returns on capital in non-competitive industries are best conceived of as the sum of a competitive required rate of return plus margins, the latter determined by a complex of economically relevant factors, ... *The competitive returns remain an 'anchor' for non-competitive target rates of return, in some degree or other*; the non-competitive mark-ups are partly determined by the competitive required rates of return" (2013, 19; emphasis added) Thus, despite its claims, the Kaleckian price and distribution are rooted in neoclassical grounds with no well-grounded concept of competition.

5.5.2 Classical/Sraffian Theory of Value and Distribution

In classical political economy the theory of value and distribution is contained in Smith's analysis of the tendency of market prices to gravitate toward natural prices continually.[33] The classical theory of price and distribution came into sharp focus with David Ricardo, for whom "to determine the laws which regulate this distribution, is the principal"

[33] For a discussion on pre-Smithian theories of value and distribution see Thomas (2015) and (Aspromourgos 1996), and for a discussion of Smith's theory of price and distribution see (Aspromourgos 2009).

problem in Political Economy"(Ricardo [1817] 2005, 55). For Classical economists' the modern economy is characterised by the social division of labour in that exchange pre-supposes specialisation in production. And so, the economy is understood as a complex web of interdependence, in which, given the natural resources, commodities are produced by means of commodities with direct labour (see section 2.2.1, Figure 2.1). With each production cycle, the economy produces a surplus after deducting the necessary inputs and the wage bill for the labour. For classical economists, the real wage rate is determined by the labour market conditions, the bargaining position of workers, and the pace of economic growth. The natural wage rate is a theoretical wage rate that reflects the long-run tendencies of the real wage. Subsistence wage is the minimum wage below which real wage cannot persistently fall. Subsistence wage should not be considered a physiological minimum; rather, it is historically determined by culture, social standards, habits and customs.[34] Since institutional and historical factors determine real wage rates, Ricardo takes the real wage as given at the subsistence level for his distribution analysis.

Given the size of the surplus produced, it needs to be distributed in proportion to the capital advanced. Competition among the capital brings about a tendency towards a uniform rate of profit. Profits are generated in the production sphere but are realised in the exchange sphere. The rate of profit is expressed as the ratio of total profits to capital stock advanced $r = (\Pi/K)$ and as the surplus and the capital stock are composed of heterogeneous commodities, both the numerator and the denominator needs to be expressed in terms of a homogeneous magnitude. Thus, to solve the problem of distribution, one needs to solve for prices as well. The prices that classical economists were concerned with are not market prices but rather natural prices (or prices of production), market prices are affected by a multiplicity of accidental and temporary forces, therefore a theory of price and distribution must be erected on the basis of natural prices, which are long period relative prices established through the workings of free competition (see section 3.2.2). The natural prices establish the reproducibility conditions of the economy. Therefore, in an interdependent production and exchange system, the natural prices must be such that it covers the material inputs, wages for labour and a profit on capital.

[34] For a detailed discussion of classical theory of wages and factors determining real wage and how classical theory is different from wage fund theory and modern neoclassical theory see Stirati (1994).

However, prices are not “cost determined” as in later post Keynesian pricing, as “commodities are at the same time products and means of production, the price of any one commodity cannot be determined independently of the others, nor the complex of relative prices independently of the distribution of income between profits and wages” (Roncaglia 2009, 43). Ricardo adopted the labour theory of value to solve the problem of distribution (between wages and profits), through which the prices of the commodities can be expressed in terms of direct and indirect labour employed. Now since all commodities (both products and the means of production) are expressed in terms of labour time spent in production, he could determine the rate of profit as both the surplus and the capital stock are measured in labour time. In determining the relative prices and distribution, Ricardo took as given the real wage rate, technology, and the size of the social output, which determines the relative prices and the rate of profit.

Though the labour theory of value resolved the problem of distribution, Ricardo was well aware of its limitations with regard to relative prices. Choosing the price of any commodity as the numeraire to express the price of other commodities (both expressed in direct and indirect labour time)“violate the condition of a uniform rate of profits in the different sectors of the economy for three reasons: different durability of productive processes; changing ratio between fixed and circulating capital; and different durability of fixed capital in the different sectors” (Roncaglia 2005, 191),these factors obscure the inverse relation between the wage share and the profits. This led Ricardo to search for an invariant measure of value, a commodity whose value will remain invariant to changes in distribution and technology, i.e., a standard commodity with which the prices of all other commodities can be expressed.

Sraffa (1960) provided the solution to the classical theory of value and distribution without recourse to the labour theory of value, but rather through simultaneous determination of the relative prices and one distribution variable (either the wage rate or the rate of profit) while taking technology, the social output and one of the distributive variables as exogenously given. We briefly review Sraffa’s reconstruction of the classical theory of prices and distribution and the role of the standard commodity. Assuming that there are *n* single good industries producing n commodities annually, then the Sraffa price and distribution equation is given as:

$$(A_{11}p_1 + A_{21}p_2 + \cdots + A_{n1}p_n)(1+r) + l_1 w = X_1 p_1$$

$$(A_{12}p_1 + A_{22}p_2 + \cdots + A_{n2}p_n)(1+r) + l_2 w = X_2 p_2$$

.....

.....

.....

$$(A_{1n}p_1 + A_{2n}p_2 + \cdots + A_{nn}p_n)(1+r) + l_n w = X_n p_n$$

In matrix form:

$$\boldsymbol{pA}(1+r) + \boldsymbol{l}w = \boldsymbol{pX} \qquad (5.4)$$

$\boldsymbol{A} = [A_{ij}]$ is a square matrix of order *n* of given quantities, that gives the quantity of commodity i annually employed by industry *j*, $\boldsymbol{p}$ is the row vector of *n* prices, *r*(scalar) the rate of profit, $\boldsymbol{l}$ is the row vector of labour inputs, w (scalar) is the wage rate, and $\boldsymbol{X}$ is the diagonal matrix of the gross output of the *n* industries. In the system, we have *n* equations, $(n+2)$ unknowns (*n* prices and two distributive variables), and the system is underdetermined. We take one commodity as the numeraire and take either the wage rate or the rate of profit as exogenously given, then the system becomes determinate.[35] Sraffa distinguishes between "basics" – those commodities that enter directly or indirectly into the production of all other commodities and "non-basics" or luxury commodities that are not part of the necessities either as means of production or as consumption goods. Given the different proportions of capital and labour employed in each industry, Sraffa analyses the changes in relative prices due to changes in the distribution variable. Sraffa constructs the "standard commodity" to resolve the Ricardian search for an "invariant measure" of value. Using basic commodities, Sraffa derives the standard system from the actual system, the standard system is constructed with the attribute such that the product and the means of production are made up of the same commodities and in the same proportion. Thus, the standard commodity is a "composite commodity" (the standard system). If this standard commodity is adopted as the numeraire in which wages are measured, and if there is a change in distribution (either *w* or *r*) that brings about changes in relative prices,

[35] See Pasinetti (1977, chap. V) for a detailed mathematical treatment of the Sraffa system. From Sraffa's (1960, 33) suggestion that the rate of profit can be determined from outside the system through monetary policy, Sraffians have also analysed prices and distribution by assuming that the rate of profit (exogeneous variable) is determined by interest rates, thus bringing in discussion of money and inflation. For details on this literature see Aspromourgos (2004).

even then, a linear inverse proportional relation is established between the wage rate and the rate of profit in the real system, $r = R(1 - w)$, where R is the standard ratio or the maximum rate of profit. Thus, the standard commodity "give transparency to a system and render visible what was hidden, but they cannot alter its mathematical properties"(Sraffa 1960, 23). However, the standard commodity is invariant only to changes in distribution, but when techniques of production change, the standard system also undergoes a change.

Roncaglia (1991; 2009) identifies three "Sraffians schools" that seek to interpret Sraffa's reconstruction of classical political economy –"the Ricardian reconstruction" of Pasinetti, the "Marxian reconstruction" of Garegnani, and the "Smithian reconstruction" of Sylos Labini, which Roncaglia himself favours. The "Ricardian" programme is attributed to Pasinetti's (1981) structural dynamics model wherein a synthesis is attempted between Keynes's principle of effective demand and Sraffa's price and distribution structure. The objective is "to study the consequences of structural change of technology and of final demand on output, value and employment. ... and the conditions that have to be satisfied in order to accomplish the potential of the system concerning growth, employment and the satisfaction of final wants" (Bellino 2016, 26). The structural model is in dynamic equilibrium with full employment, the model is designed to be a normative ideal, which is termed as the "natural" system independent of social behaviour, history and institutions, this is the foundational analysis aim at discovering basic relations and "first principles" that are fundamental to the system. The actual society with all its complex institutions and historical circumstances is the second stage of analyses on how the "objects of analysis" are actually determined, with the natural system as its ideal. Taking inspiration from classical economists' investigation of natural prices and market prices, Pasinetti terms this two-stage approach as a *separation theorem.*

> "We must make it possible to disengage those investigations that concern the foundational bases of economic relations – to be deducted at a strictly essential level of basic economic analysis – from those investigations that must be carried out at the level of the actual economic institutions, which at any time any economic"

"system is landed with, or has chosen to adopt, or is trying to achieve."(Pasinetti 2007, 275)[36]

The second line of enquiry is Garegnani's reconstruction of classical political economy through Sraffa and Marx. Garegnani identifies the *core* of classical political economy as the relation between relative prices and distribution. As discussed in section 2.3.3, there is a logical separation of analysis between variables determined within the core and those that are determined outside the core. Social output, technology and real wages are determined outside the core, and they in turn determines the relative prices and the rate of profit within the core. It is recognized that there can be "interrelations and reverse influences" between the variables as well as other outside factors. Therefore, "the multiplicity of these influences and their variability according to circumstances was in fact understood to make it impossible to reconduct them to *necessary* quantitative relations like those, studied in the 'core'"(Garegnani 1984, 297; emphasis in original). Roncaglia (1990, 145–46) have criticised the notion of the "analytical core" as being superior and "logically prior" to other analysis.[37] However, there is no such priority of analysis, the parameters in the core must be considered as "intermediate data" given for a specific problem, as the "output levels, or the forces determining accumulation and technical progress, … [are] determined by plural and complex forces, of different intensity and even directions according to different historical contexts and the different prevailing formal and informal institutions" (Trezzini and Palumbo 2016, 506). Garegnani also uses the idea of "gravitation" of market prices towards natural prices through the persistent force of free

[36] For Pasinetti the main difference between the "natural" system and the actual system are institutions, and so the study of institutions is of outmost importance. The role of policy should be to design, develop or evolve the right institutions to achieve the ideal normative system. "The conceptual scheme of a 'natural' economic system might well be considered-not only as an abstract, though fundamental, conceptual scheme possessing a series of normative properties-but also as something more concrete, namely, in fact, as an economic system actually achievable in reality, on the strong hypothesis, however, that we have been able to put into actual effect the 'perfect' institutions that are able to bring it about"(Pasinetti 2001, 388–89)

[37] Garegnani(1990, 151) in his reply to Roncaglia quotes "it should be noted that the distinction between the part of the theory to be found in that core and the part outside it, has to do with a difference only in the nature of the relationships studied. It has therefore little to do with the comparative interest or importance which one wished to attach to those two kinds of relationships, as should be evident from the fact that questions as central as distribution, aggregate demand, accumulation or technical change fall largely outside the core."

competition, which he termed as the “long period method”. As discussed in section 5.4, most Post Keynesians have interpreted it as static and deterministic equilibrium theory.

Roncaglia attributes the third line of enquiry to Sylos-Labini(1962; 1993). Drawing mainly from Smith’s analysis of the division of labour and technological change in the process of growth, Labini analysis the effects of market forms on pricing, investment and growth. From Sraffa’s analysis of prices with uniform profit rates, an oligopoly market form is introduced, with “technological discontinuities” erecting barriers to entry and constraining free competition and thus creating differential profit rates. Sylos-Labini’s analysis of market structure is based on the classical concept of competition as free mobility of resources.[38] Barriers or obstacles to entry give rise to oligopoly, with differentiated rates of profits. Labini’s oligopoly theory is embedded within a general Sraffian production structure, in which the uniform rate of profit is the benchmark with free competition. Thus, unlike Post Keynesian analysis of imperfect market structures that rely on partial short period method and assumption of vertically integrated industries, Classical (Sraffian) theory of value and distribution can provide a much richer and fuller analysis of market forms.

Roncaglia interprets Sraffa’s price system as a “photograph” or “snapshot” of a complex system in motion.

> “The determination of prices was studied at a given moment of time, given the prevailing technology. But the technology could only be considered given for a given instant of time as it is subject to ever-continuous evolution over time. ... In other words, the classical economists' analysis of prices examined the situation of a given economic system at a given moment of time, much like a photograph of the system at an instant in time. In this way all the economic variables which were not the object of analysis could be considered as given. Theoretical investigation could concentrate attention on the 'virtual' movement of specific variables and on the relations between these variables as if they were being 'isolated in vacuum'. In the”

[38] “Sylos Labini’s ([1956] 1962) and Bain’s (1956) theories of oligopoly are based on ‘barriers to entry’. The two authors reached analytically similar results independently. However, the role of barriers due to technological discontinuities (‘concentrated oligopoly’) and the link between this view of oligopoly and the classical notion of competition are stressed only by Sylos Labini” (Roncaglia 2009, 122n14)

> "case of *Production of Commodities by Means of Cornrnodities* the choice of variables to be analysed has fallen on the relations that exist between prices of production and the distributive variables, the wage rate and the rate of profits."(Roncaglia 1978, 21)

The focus is on value and distribution in terms of the given parameters, and the determination of output, technology and other factors are to be studied separately. However, given social output should not be taken as actual observed output at any given instance because "they incorporate the influence of temporary, occasional or unforeseen circumstances, … 'Theoretical outputs' are those which would prevail in the absence of such circumstances. This does not mean considering theoretical outputs as 'equilibrium outputs', interpreted either as 'chosen' positions or as positions 'of rest' … we can assume that sectoral output levels correspond to a 'normal' degree of utilisation of existing productive capacity" (Roncaglia 1995, 114). Similarly, given technology must not be interpreted as actually observed production processes, as different techniques can be used at any given time. The given technology must be interpreted as the "dominant technology (Roncaglia 2009, 52–54; Garegnani 1989, 358).

Ajit Sinha's new interpretation of Sraffa's price system:

Other than the three Sraffian research projects that Roncaglia has identified, one can also add a fourth line of enquiry based on Ajit Sinha's (2010; 2016) recent reinterpretation of classical economics and Sraffa. In the present thesis, the focus is on Sinha's reinterpretation and his criticism of the notion of "centre of gravitation" as it relates to the present study. Moreover, in his criticism of Garegnani's interpretation, Sinha does not generally distinguish the various Sraffians as Roncaglia does. According to Sinha, Sraffa's prices are actual empirical prices, and so are the inputs and outputs, the system is not in equilibrium. For Sinha, prices are derived as a solution "on the basis of observed input-output data of an interconnected system of production. and by simply arranging them, the rate of profits of the system (which must be uniform) can be determined without knowledge of the prices, if the wage rate is given from outside the system. In this context, prices have only one role in the system, and that is to consistently account for the given distribution of the net output in terms of wages and the rate of profits" (Sinha 2016, Xiii). The prices do not have any coordinative mechanism, that would bring the system to

equilibrium, and so "no arrow of *causation* can be drawn", that it is there is no causal theory of price determination. The only role of prices is to "consistently account for the given distribution of the net output in terms of wages and the rate of profits". With regard to the uniform rate of profit in the Sraffa system, Sinha argues that such a condition "is a logical necessity, or a mathematical property, of his equation system once wages are taken to be given from outside" (ibid.).

Sinha argues that the uniform rate of profit is only a mathematical property of the system and not the result of competitive tendencies. For Sinha, Sraffa's discovery of the "standard commodity" or the standard system provides the analytical tool to justify the uniform rate of profit condition. Sinha (2016, 201–3) argues that since the standard system is derived from the actual system and thus equivalent, given the relation $r = R(1 - w)$as discussed earlier, "if we put w = 0, then the 'Standard ratio' given by the physical ratio of the total output to the aggregate means of production of the Standard system gives us the average rate of profits of the actual system". The average rate of profit is a

> "physical property of the actual system and is completely independent of prices or the condition of a uniform rate of profits across industries. 'Even if' prices were such that the industrial rates of profit were not equal, the average rate of profit would not be disturbed. … It is not only the maximum rate of profits of the Standard system that can be derived from the physical proportion independently of prices but it is also possible to derive the average rate of profits for any level of positive wages, as long as we measure the 'given' wages in terms of the Standard commodity." (Sinha 2016, 202)

Sinha's reinterpretation of Sraffa is completely different from the first three lines of enquiry and has come under heavy criticism(see Aspromourgos 2012; Fratini 2011; Roncaglia 2017; Levrero 2019). According to Sinha, the methodological basis for such an interpretation is the distinction Sraffa makes (in his unpublished papers) between "geometrical description" and "mechanical causation". A geometrical description, as Sinha interprets, is not timeless, nor statical or ideal stationary state, but rather "a *description* of what exists. … it represents a situation at one instant of time, that is to say something indistinguishable from the real state of"

"things in such a short period of time that no visible movement takes place. Its object is, as it were, the photograph of a market place" (2016, xii, 64; emphasis in original). On the other hand, mechanical causation is when some forces cause things to change over time, and the resulting outcomes are uncertain. With this distinction between geometrical and mechanical, Sinha argues that Sraffa's relative prices are geometrical, and their determination at an instant of time is a non-causal problem.[39] With this reinterpretation, Sinha criticizes Garegnani and Sraffians' interpretation of Sraffa's prices as theoretical natural prices – equilibrium prices brought about by "gravitation" of market prices towards natural prices.

However as discussed in section 5.4, just like Robinson and other Post Keynesians, Sinha attributes a Marshallian and a neoclassical conception of equilibrium to Sraffians (modern classical political economy).[40] The use of "centre of gravitation" or "long period method" has been interpreted in terms of "mechanical causation". Rather as discussed in the aforementioned section, Garegnani and Robinson's arguments are repeated here for clarity. Garegnani had clarified that the gravitation or the long period method is a "theoretical "concept of normal levels of the variables to a general explanation of distribution and relative prices" … "no expression like 'long period' was needed for such positions at the time" … "since it was taken as a fact that a general theory of price and distribution could only be formulated in those terms"(Garegnani 1989, 362).The term "long period" or gravitation was used to distinguish it from temporary and intertemporal equilibrium models. Similarly, Robinson also accepts that "the 'system' of production in use in an economy at a moment of time, ... It does not represent a stationary state or an equilibrium position. It is simply the position that has been reached, 'today', as a result of accumulation of stocks and of technical knowledge over the past history" (Robinson 1985, 164). Thus, Sinha is right in arguing that Sraffa follows a geometrical

[39] Sinha interpretation of Sraffa's system as non-causal theory, actual prices meant for accounting only the functional distribution of income. The purpose for such an interpretation seems to be about disentangling Sraffa's prices from the dominant narrative of it as being long period natural prices, thus bringing it in line with the Post Keynesian pricing principles. As Sinha suggests "a Sraffian price theory can be fitted into a Keynesian quantity adjustment mechanism without any need for an unnecessary assumption of fixed prices. This has brought us to the threshold of marrying Sraffa with Keynes—not an easy proposition given the role of psychology in Keynes's theory, but a good time to draw down the curtain on the current story" (Sinha 2016, 230).

[40]Martins(2019, 522) in his critique of Sinha work similarly concludes that Sinha "interprets the classical notion of gravitation in terms of the neoclassical notion of equilibrium. … that classical political economy is often interpreted anachronistically in terms of neoclassical equilibrium analysis".

approach, focusing on an instant of time, a snapshot, or an "a photograph of the system at an instant in time" (according to Roncaglia).[41] However, one might ask, geometrical approach to what end or for what purpose. For Sraffa, given the social output, technology and one distributive variable, the theoretical natural prices are abstracted through the method of "long period" or "gravitation" under the assumption of free competition. As Martins (2019, 515) points out that "in Sraffa's conception, mathematics is employed only to provide an exact description of the core conditions of reproduction of the economy at a given moment in time, rather than changes through time as human activity unfolds". The purpose of such a theoretical exercise of drawing out the natural prices is discussed in section5.4, page 130. Thus, the geometrical approach is firmly rooted in historical time,[42] and therefore needed, to make sense of the dynamic and complex system.

Much like the Post Keynesians and the methodologists, classical political economy also advocates an open system with temporary closures. As Aspromourgos (2004, 181) notes that the Classical/Sraffian theory does not have any "intellectual claims to comprehensiveness … Rather than offering a comprehensive alternative to orthodoxy, it posits a narrower set of solutions to certain fundamental problems in the history of economic theory—most notably, the relationship between distribution and 'equilibrium' (or more appropriately, 'normal') prices in production systems subject to competition and choice among methods of production. … This openness of the Sraffian project to a variety of possible theories, across a range of economic phenomena". Openness with regard to the determination of income distribution, accumulation, output level, and technological progress gives an important role for institutions, social-political

[41] Arena and Blankenburg (2013, 87) has a similar interpretation of the geometric approach and the snapshot, "the analogy of the 'snapshot' can be understood, not as simply replicating this notion of 'identity,' but perhaps more broadly as informed by this gradual clarification of problems arising from different concepts of causality in economics: In this sense, the 'snapshot' of an 'event' is of a logical nature in that it does exclude all change". With this, they extend Sraffa's prices to real historical time.

[42] According to Martins (2019, 515), in order for Sraffa's geometrical theory to be applicable to reality, "a possibility consists in finding an analogue of an instantaneous photograph that persists through time. A possibility in this regard is to look at a normal position, which depends upon human conventions that persist. However, the word 'normal,' in this context, can only mean 'conventional,' that is, the outcome of conventional human activity, rather than an equilibrium which would be itself explained through mathematical analysis. … So, the notion of gravitation around a normal position, if used at all, can then only mean a vague description aimed at capturing the fact that the economy is not always in the position outlined in the geometrical theory. … Gravitation does not take place in the logical time of mathematical models, which the classical authors did not even use, but rather in historical time in which multiple factors often preclude any possibility of exact measurement"

factors and history. Hence, classical-Keynesians (Sraffians) advocate a two-step approach in the application of economic theory – Garegnani's (1984) analysis of the core, Pasinetti's (2007) separation theorem or the "layers of reality" analysis of Heinrich Bortis (1997).

Chapter 6
Summary and Conclusion

It is clear from the preceding discussions that those advocating competition as a dynamic process, classical economists, Marx and Austrians, also perceive society as a complex organic and evolving system and advocate a narrow role for deterministic theorising. On the other hand, neoclassical/mainstream theory aims for comprehensiveness and determinism through the methodology of choice, the theory of demand and supply based on scarcity, preferences, technology, and the principle of substitution with outcomes determined by equilibrium. Competition is conceptualised as an equilibrium state defined in terms of the number of participants in the market. Some of the early marginalist/neoclassical economists, including Marshall, conceptualised competition as a process. However, given the static deterministic neoclassical framework, competition became conflated with market structure – perfect competition.

Through their emphasis on historical time, short-period partial analysis and methodology (critical realism, Babylonian mode of thought and non-ergodicity), Post Keynesians also advocate for an open system approach. However, the concept of competition is fuzzy and ill-defined, and so the concept of equilibrium as a position of rest or balance, of partial or temporary closure, has neoclassical overtones. Competition and equilibrium are defined by the number of participants in the market, and by extension, if the number of agents increases, then competition approximates to perfect competition. For Post Keynesians, the frame of analysis is the Marshallian period analysis, and for competition and markets, Post Keynesians still depend on neoclassical conceptualisations. Therefore, given that Post Keynesians purport to have a very different methodology to neoclassical/mainstream economics grounded in realism and open systems, there is a need to develop the concept of competition independent of market structures consistent with open systems dynamics.

An important implication of competition as a dynamic process is recognising the necessity of a two-stage method of theorising. As discussed in sections 3.2.2 and 5.4, the classical notion of market prices gravitating towards natural prices should not be interpreted as

equilibrium determination as in neoclassical theory or Marshallian period analysis. The long period method is a method of abstraction with the assumption of free competition. The Classical/Sraffians recognize the economy as an open system and hence as mentioned in sections 2.3.3 and 5.5.2, adopts a two-stage analysis. The first step is about establishing the basic structure (the core or the natural system) of the economy and developing "first principles". The second stage discusses the institutional, socio-political and other influences on accumulation, activity levels, technology and income distribution. This approach is similar to the Post Keynesian two-stage approach to analysing an open system. Competition and equilibrium (although not well conceptualized) play an important for partial and temporary closures to extract the basic features and regularities of the system. And in the second stage, assumptions are relaxed in steps in order not to muddy the analysis of an open organic system. Thus, as asserted in section 5.4, the two approaches are not incompatible at a foundational level, although synthesis of the mainstream kind (old and new neoclassical synthesis) is not possible, as Post Keynesians and classical political economy (Sraffians) deal with different analytical areas.[1]Given that mainstream economics is fast diversifying in its areas of research and asserting its differences from the "old" characterization of neoclassical economics, focusing on complexity theory, supported by empirics and advanced mathematics (Colander 2000; Colander, Holt, and Rosser 2004), compatibility of the various heterodox traditions are important, not to provide a grand-all comprehensive alternative theoretical system to the neoclassical/mainstream economics. But to acknowledge that society is complex and dynamic and therefore needs different approaches at various levels and areas of analysis, whether at the level of methodology or at the level of substantive theory, or looking at a particular economic process.

[1] There are a number of Post Keynesian economists working towards synthesis/compatibility between Sraffian and Keynesian approaches see Pasinetti (1981; 2007), Kregel (1983), Roncaglia (2009; 2020), Lavoie (2011; 2006), and Arena and Blankenburg (2013). Most have argued that "there is only one remaining obstacle to the achievement of a synthesis between the Sraffian approach, including the Garegnani dominant Sraffian strand" and that obstacle is the notion that long period are centre of gravity for market prices towards natural prices, through some persistent dominant force.

Finally, the main points of arguments presented in this thesis are summarised below:

1. At the conceptual level, there are two different conceptions of competition – competition as a dynamic process present in classical political economy and Austrian economics. And competition is a static state embodied in the perfect and imperfect competition models.

2. There was a recognition of competition as a process with most of the early marginalists, including MarshalI however, with the adoption of the static neoclassical theoretical structure, competition had to be contained within the straitjacket of that static theory (see section 3.4).

3. The first imperfect competition revolution pioneered by Robinson and Kaldor was not only to provide an alternative concept of competition but also an alternative basis for the theory of value and distribution. However, with indeterminacy and lack of stability in the imperfect competition models, there was a lack of predictability, it was subverted by perfect competition as it returned as the benchmark workhorse model exalted for its determinism and power of prediction, despite its unrealistic assumptions. The revival of imperfect competition in the late 1970s cannot be termed as a revolution, as the benchmark model is still perfect competition, and imperfect competition is introduced (in new Keynesian economics) to explain price stickiness, rigidities and other deviations from competitive equilibrium. Whether perfect or imperfect, competition in neoclassical/mainstream economics is synonymous with market forms (see sections 4.3 to4.6)

4. Post Keynesians' frame of analysis is the Marshallian short period (given in terms of historical time or given productive capacity), partial equilibrium analysis and competition is characterised as imperfect competition. Post Keynesian reject the closed deterministic equilibrium models as reflected in neoclassical/mainstream theory and rather accepts conceptions of path-dependent equilibrium as partial or temporary closure in the first stage of theorising for an open and evolving system with uncertainty. For Post Keynesians, such equilibrium analysis must be embedded in a broader analysis where institutions, social behaviour, and history play an important role (see section 5.2 and 5.3).

5. Post Keynesian heavy reliance on short period and partial equilibrium analysis are self-evident in pricing and distribution theories. Without a well-defined concept of competition, the mark-up pricing is used to characterise imperfect competition, this has neoclassical overtones

as competition is defined in terms of the number of participants in the market, and as the number increases, competition approximates to perfect competition. The whole of the mark-up profit margin is treated as a result of monopoly powers of the firms. And so, as the number of firms increases, the mark-up profit margin can be logically reduced to zero. Post Keynesians' assertion of competition being dynamic within imperfectly competitive markets seems to present *only the strategic aspect* of competition among firms justified by its short period analysis and its realism. However, monopolistic or other non-competitive behaviour can only be defined with reference to a benchmark or anchor of competition, and so defining mark-ups as non-competitive independently of competitive rates of return is implausible. There is a need to define competition independent of market forms and integrate input-output relation in the price and distribution theory. See section 5.5.1 for other limitations of the Post Keynesian pricing theory.

6. Unlike most Post Keynesians, the classical/Sraffian long period method should not be interpreted as the deterministic equilibrium model of neoclassical theory, nor should it be interpreted in terms of the Marshallian period analysis of slicing real-time in which long period is defined in terms of a stationary state. The long period method or "gravitation" is the method of abstraction that expresses the competitive tendencies towards a uniform rate of profit. The natural prices (or normal values) are theoretical positions under the assumption of free competition and given production conditions, although they may never be realised in reality. When production conditions change (output level, technology or distribution among the social classes), the natural prices will also change (see sections 3.2.2, 3.6 and 5.4)

7. The theoretical natural prices are important as it (a) provides the minimum viability conditions of reproducibility of the system in consonance with the surplus approach, (b) aid the analysis of the relation between prices and distribution and how changes in distribution or technology affect the structure of prices, and (c) reveals the interdependent structure inherent within any social production system, linkages between industries and sectors, structural dynamics, and the effects of policy interventions. The classical/Sraffian is amenable to the study of non-competitive market structures (see section 5.5.2) and that Ajit Sinha's new interpretation

of Sraffa's prices – that there is no causal theory of price is incompatible with the method and theoretical structure of classical political economy.

8. Both Post Keynesians and Classical-Keynesian (Sraffian) acknowledge the economy as an open system, thus emphasising the importance of institutions and history. Both the strands recognise a two-stage approach to analysing economic processes. A Complete synthesis is not possible as both the strands deal with different issues. However, even with the "horses for courses" approach, one still needs compatibility of "vision" of what economics ought to be, its concepts and its categories. Post Keynesian and classical political economy has the potential to offer much in the reconstruction of an alternative economics paradigm. The present study sympathizes with the position that, "rather than striving for a *synthesis* between the post-Keynesian and Sraffian traditions (or indeed between any two non-mainstream frameworks), it might be more appropriate simply to aim for *reconciliation*—for recognition that the frameworks are compatible and complementary" (Mongiovi 2013, 208–9; emphasis in original).

The present thesis has been developed within a certain scope of study, and the arguments presented here certainly open up further avenues of research. First, with the conception of competition as a dynamic process, all economists insist on the importance of institutions. Therefore, there is a further need to investigate the nature and type of institutions and their role in providing stability to modern capitalism. Second, the present thesis focuses only on the conception of competition and how it is used in the Post Keynesian/classical theories of value and distribution. However, there is also a need to study how different concepts of competition relate to different growth models. Finally, in terms of policy and empirics, there is a need to investigate how the different conceptions of competition relate to competition laws and policy, how it relates to strategic competition among firms and the normative aspects of a competitive economy

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Appendix A.2
'Neoclassical' Economics or 'Mainstream' Economics'?

We have used the term "marginalists", "neoclassical", "mainstream", or "orthodoxy" interchangeably. However, some scholars do make a distinction between the terms, especially between neoclassical and mainstream economics. Modern economics today is generally characterised as mainstream economics, and some scholars from both sides of the divide – those that are critical of the mainstream (heterodox economists) and those that identify themselves with the mainstream have called for abandoning the term "neoclassical economics" as it does not serve any useful purpose within the discipline (Lawson 2013; Colander 2000). As discussed in section 2.2, the term "neoclassical" was coined by Thorstein Veblen in 1900 to characterised Marshallian marginalism, who sought a theoretical continuity with positive change with classical economics. Later "Hicks and Stigler, in the 1930s and 1940s, the term was extended to embrace marginalism in general. Neither of them offered any substantial notion of a continuity between the classics and marginalism" (Aspromourgos 1986, 266). However, today neoclassical is seen as a small subset of the more complex mainstream economics. Neoclassical is seen as "orthodox", with

> strict adherence to the holy trinity—rationality, selfishness, and equilibrium … a static representation of a dynamic, constantly changing profession … In our view, neoclassical economics is an analysis that focuses on the optimising behaviour of fully rational and well-informed individuals in a static context and the equilibria that result from that optimisation. It is particularly associated with the marginalist revolution and its aftermath. Leon Walras and Alfred Marshall can be viewed as its early and great developers, with John Hicks's *Value and Capital* (1939) and Paul Samuelson's *Foundations of Economic Analysis* (1947) as its culmination … The neoclassical orthodoxy tests the results of that model by using conventional econometric techniques that are based upon a foundation of classical statistics. Perhaps the most important characteristic of the neoclassical orthodoxy is that

axiomatic deduction is the preferred methodological approach. (Colander, Holt, and Rosser 2004, 485, 490–91)

According to Colander, economics has continually changed and progressed (the "cumulative view") since the marginalist revolution of the 1870s. However, many heterodox economists and critics still identify modern mainstream economics with neoclassical economics and use it as a "slur", "to them bad economics and neoclassical economics are synonymous terms" (Colander 2000, 130). However, modern mainstream has moved much beyond neoclassicism, and therefore, the term no longer serves its purpose and therefore must be abandoned or let it die.[1]

Colander, Holt, and Rosser (2004) define modern mainstream economics sociologically as "a complex system of evolving ideas", which is diverse and in which "many new ideas are being tried out".[2] Mainstream economics no longer strictly adhere to attributesor characteristics which were considered fundamental for neoclassical – resource allocation, utilitarianism, marginal effects, rationality, methodological individualism and general equilibrium (Colander 2000, 135–36). The frontier research of mainstream economics is "classical-evolutionary-behavioral game theory, evolutionary-behavioural experimental economics, neuroeconomics and agent-based complexity economics" (Lee 2012, 343). For Colander and others, modern mainstream economics is fragmented, and diverse and so, is not defined by adherence to any theoretical content or assumptions, rather to embrace its broad content, mainstream is defined by an approach or method,"*the modelling approach to*

[1] To Colander, the transition from neoclassical to modern economics was a gradual evolution rather than revolutionary, "I'm not sure when we should say neoclassical economics died. The most logical cut-off would be somewhere between 1935 and 2000. The date cannot be pinpointed because its death was gradual—a slow transition rather than a sudden epiphany" (Colander 2000, 133).

[2] Sociologically mainstream economics is defined as those "ideas that are held by those individuals who are dominant in the leading academic institutions, organizations, and journals at any given time, … the ideas that the elite in the profession finds acceptable, where by 'elite' we mean the leading economists in the top graduate schools. It is not a term describing a historically determined school, but is instead a term describing the beliefs that are seen by the top schools and institutions in the profession as intellectually sound and worth working on. Because of this, mainstream economics usually represents a broader and more eclectic approach to economics than is characterized as the recent orthodoxy of the profession" (Colander, Holt, and Rosser 2004, 490).

The changes taking place in modern economics is not the Kuhnian sudden paradigm shift but rather ideas that "lead to cumulative evolutionary changes that ultimately will be recognized as a revolutionary change" (ibid., 488).

problems is the central element of modern economics" (Colander 2000, 137; emphasis in original).[3] Colander proposes to call modern mainstream economics "New Millennium Economics" (ibid. 141).

As discussed above, Tony Lawson criticises mainstream economics on methodological grounds – modern mainstream economics relies heavily on mathematical modelling. It is "a form of mathematical deductivism" and "presuppose regularities at the level of events. Whether the latter is *a priori* hypothesised or *a posterior* 'detected', the successful application of economist's mathematical tools require event regularities or correlations. Systems, where such event regularities occur, can be called *closed*" (Lawson 2013, 953). However, social reality is not as envisioned by mainstream economics, but rather it is causal, processual and historical.[4]

> Phenomenon of human interaction, is recognised as being (not at all atomistic in the sense just noted but rather) highly transient, being reproduced and/or transformed through practice; social reality is in process, essentially a process of cumulative causation. … Furthermore, social reality is found to be composed of emergent phenomena that (far from being isolatable) are actually constituted in relation (that is, are internally related) to other things, and ultimately to everything else … Constitutive social relations in short are a fundamental feature of social reality. So, social reality consists of emergent phenomena, constituting highly internally related causal processes. (ibid., 954–55)

[3] "modelling remains the central core of the mainstream approach, but the nature of the models and the assumptions underlying them are much more open, and trans disciplinary. … It is much more willing to accept that the formal part of economics has limited applicability, at least as currently developed. It is also far more willing to question economics' special status of economics over the other fields of inquiry and to integrate the methods of other disciplines into their economic analysis" (ibid., 496–97).

[4] Lawson's characterisation of mainstream economics as mathematical deductivuism and hence his call for rejection of mathematical formalism in heterodox economics for an open system approach has attracted criticism from other heterodox and Post Keynesian economists. "What economics needs is not to abandon mathematical methods, but to catch up with the last half-century of progress in mathematics and computing that has made it possible to model non-atomistic, emergent, complex systems" (Keen 2016, 252).

Mainstream economics uses tools that are inappropriate for understanding the complex social reality, and therefore the models are unrealistic and have experienced "repeated explanatory failings."

Lawson argues that the usage of the term "neoclassical economics" hinders effective criticism of mainstream economics. The source of the real problem in mainstream lies at the "level of methodology and social ontology" and not at the level of substantive theory, tools or policy formulations. Lawson suggests that Veblen used the term "neoclassical" for those Marshallian economics who recognised the complex, processual and historical nature of social reality, "but nevertheless simultaneously treating it using "taxonomic and specifically deductivist methods that presuppose that social reality is anything but" … "the core feature of neoclassical economics is adherence not to any particular substantive features but to deductivism itself in a situation where the general open-processual nature of social reality is widely recognised at some level" (ibid., 971, 976). And because the term "neoclassical" is defined in terms of an intrinsic inconsistency between "(ontological) theory and (methodological) practice", Lawson shares the sentiment with Colander, that the term must be abandoned as economics has moved away from the Marshallian legacy – the tension between open social reality and theory, towards a pure deductivist approach.[5] For Lawson, this must be so as "to facilitate more appropriate and telling criticism, than hitherto in evidence, of the content of modern economics" (981).

However, political economy (Marxian and Classical) critique still consider mainstream economics synonymous with neoclassical economics. This is because the so-called "frontier of economics" are just deviations and modifications of the central tenents of neoclassical economics. For Fine (2009), although mathematical deductivism is an important feature of mainstream economics, it is not its defining character. For Arnsperger and Varoufakis (2006), though neoclassical may show sophistication of techniques or theory, there are three crucial axioms that underpin neoclassical economics and which cannot be shed. The first axiom is methodological individualism – modern neoclassical economics have embedded in their models' imperfect information, irrationality or bounded rationality, however "the

[5] Besides Colander and Lawson, Aspromourgos (1986) also calls for the abandonment of the term "neoclassical" because the term does not connotate any positive continuity with classical economics but rather a different system of theory

method is still unbendingly of the analytic-synthetic type: the socio-economic phenomenon under scrutiny is to be analysed by focusing on the individuals whose actions" brought it about"(Arnsperger and Varoufakis 2006, 7). The second axiom is that of methodological instrumentalism – individual behaviour is always preference-satisfaction driven. Whether the preference is modelled to be exogenous or endogenous or with the advent of game theory, "preferences could not be linked just with outcomes: they depended on the structure and history of the interaction as well. … *homo economicus* is still exclusively motivated by a fierce means-ends instrumentalism" (5; emphasis in original). Finally,methodological equilibration – given the assumptions of individual behaviour and constraints, neoclassical theoretical exercise "*presume* that behaviour hovers around some analytically-discovered equilibrium and then ask questions on the likelihood that, once at that equilibrium, the 'system' has a propensity to stick around or drift away (what is known as 'stability analysis')" (ibid). Thus, no matter how neoclassical economics metamorphosis, the three "meta-axioms" state above form the basis of all neoclassical economics. Similarly, for Fine (2009; 2016), neoclassical economics is well defined and evolving.

> It is the technical apparatus or architecture established by the mainstream from the marginalist revolution onwards. Most fundamental is the use of utility and production functions, with accompanying assumptions to allow the theory to proceed regardless of any other considerations – methodology, realism, other theory, empirical evidence and mathematics – to the contrary. … Enduring commitment to this technical apparatus explains the persistence but not the necessity of equilibrium, efficiency, laissez-faire ideology, the optimising individual and so on. To a large extent, even those approaches on the edge within the mainstream take this technical apparatus at least as point of departure, adding other forms of behaviour or modifying technical assumptions or, because institutions, history, path dependence, aggregation now matter, glorifying previous inconveniences as the way forward to add wrinkle or complexity" (Fine 2009, 2–3).

According to Fine, the technical apparatus focussed on "equilibrium, efficiency, laissez-faire ideology, the optimising individual and so on" as the core of neoclassical. These were

developed to have universal application, giving rise to economic imperialism. However, the technical core is not cast in stone. It can be suspended or modified to bring in other considerations such as imperfections, increasing returns, "institutions, history, path dependence, aggregation, … glorifying previous inconveniences as the way forward to add wrinkle or complexity" (Fine 2016, 187), and almost always clothed with a heavy reliance on advanced mathematical techniques. As the technical apparatus and core can be suspended and modified to bring in variety and complexity, Colander et al. has called for the "death of neoclassical economics". On the other side of the methodological extreme, Lawson also calls for abandoning neoclassical as he reduces modern mainstream economics to "mathematical deductivism" and neoclassical to tension between social otology and the use of mathematics.

The present study contends that modern mainstream is at its core neoclassical, with subsequent ad-hoc modification of its assumptions and core tenets to generate diverse models and policy prescriptions. This can be clearly deduced when one considers the core theory of value, distribution and growth. For a discussion of value and income distribution, mainstream/neoclassical economics relies on the perfect competition model with supply and demand functions, with imperfect competition as deviations from the benchmark. Similarly, for the endogenous or new growth theories, the traditional Solow-Swan model based on aggregate production function is modified to bring in a production function for technology/knowledge or human capital, introducing increasing returns, market imperfections, and endogenous growth. Therefore, neoclassical economics's theoretical and technical core (discussed in section 2.2) has more or less remained the same. However, the core assumptions have been suspended, modified, or added on to generate various complex models using advanced mathematics, which has been called modern mainstream economics. Its practitioners (or sometimes its critics) is eager to shed the neoclassical label, as it has been called out multiple times for its lack of logical rigour and explanatory powers. However, every time there is a crisis in economics, the response is to redraw neoclassical economics into a Chimera. Given the preceding discussion, we continue to use the term neoclassical, marginalism and mainstream interchangeably.

Appendix B.2
Classical Economics and Say's Law

The classical economists had no substantive theory of the determination of the output level. For them, "saving is spending", a decision to save is the same as a decision to invest. The classical economists offered no mechanism as to how investment and savings adjust to each other; rather, they relied on Say's Law. Although the popular law is expressed in the catchphrase "supply creates its own demand", but rather Jean Baptiste Say wrote that it "is production which opens a demand for products"(Say 1850, 133). Ricardo adopted Say's law and generalised it to the whole economy. Murray Milgate (1982) contends that Ricardo used Say's law in two ways. First, Ricardo invokes Say's law to critique Adam Smith's notion that competition will bring about a fall in the rate of profit. According to Smith, accumulation will result in an overabundance of capital, and that some stocks will fail to find productive employment, thereby lowering the rate of profit. Ricardo criticised Smith by asserting that the rate of profit will only fall when there is a rise in the wage rate. As Ricardo notes:

> "M. Say has, however, most satisfactorily shown that there is no amount of capital, which may not be employed in a country, because demand is only limited by production. No man produces, but with a view to consume or sell, and he never sells but with an intention to purchase some other commodity, which may be immediately useful to him, or which may contribute to future production. By producing, then, he necessarily becomes either the consumer of his own goods," "or the purchaser, and consumer of the goods of some other person."(Ricardo [1817] 2005,1:242)

Second, Ricardo's use of Say's Law was in his debate with Malthus regarding the possibility of general overproduction. According to Ricardo, overproduction in particular spheres is possible but denied that a simultaneous overproduction of all the commodities is not a possibility. For Ricardo, any increase in aggregate income equivalent to the increase in

aggregate output (money value remaining the same) will increase demand for that output. In a letter to Malthus, Ricardo writes, “It appears to me that one great cause of our difference of opinion is that you always have in mind the immediate and temporary effects of particular change – whereas I … fix my whole attention on the permanent state of things which will result from them” (ibid. 7:120). The difference between them is that one focuses on the short period, where overproduction is possible but not in the long period. However, for both Ricardo and Malthus, there is no explanation of how the output level is determined.

Classical economists were critics of the mercantilist idea that wealth can be increased by increasing money stock. They showed that a society’s wealth could be increased only through production, i.e., increasing the size of the surplus, therefore the classical approach to money must be understood within the context of the classical theory of prices and distribution. In the long period, the quantity of money required for circulation was determined in the real sector by the value of the commodities. Marx advanced the understanding of the role of money, the circuit of capital being M-C-M’, money is not only a medium of exchange but also the medium that separates the act of purchase and that of sale, both of which requires space and time. Capitalist purchases labour and other commodities and use them to produce commodities. The finished commodities are brought to the market. The act of sale or realisation of the surplus takes time. Therefore, there is a possibility of a temporary mismatch between the purchase and sale (in the short period), which is reflected in the savings-investment processes. According to Milgate (1982, 55), this creates the possibility of crisis (in the short period), but a permanent crisis does not exist. Milgate argues that though crisis is inherent in capitalism for Marx, it is not a long-period theory of output. Rather “the possibility of crises merely parallels his insistence on the necessary deviation of market prices from prices of production”. In the long period, savings and investment are equal. The classical economists' position of savings is investment must entail the proposition of full employment. However, the level of employment depends on the quantity of available capital. Hence, this condition alone is not sufficient to guarantee full employment at that stock of capital. Moreover, classical economists also acknowledge that technology or the introduction of machinery might displace labour.

The structure of classical economic theory is based on the method of long-period position, which is brought about by the process of competition. The focus was on production, distribution and valuation of the surplus. For that, they had a sequenced approach and a logical separation of the value and distribution theory from that of output determination. This separation makes the theory an open system that permits the integration of history, social and political forces, and institutions into economic analysis.

Appendix C.3
Austrian Competitive Market Process: Coordinative Equilibrium or Disequilibrium

C.3.1 Austrian Economics

The beginning of Austrian Economics is traced to Carl Mengers' seminal publication *Principles of Economics* ([1871] 2007). Menger's ideas were popularised and extended further by Böhm-Bawerk, Friedrich von Wieser and others in the late 1800s, which firmly established the Austrian tradition in economics. Carl Menger was highly critical of the classical labour theory of value, which seeks to explain value through objective factors, and he also criticised the German historical school for its predominantly historical approach. Alongside Leon Walras and Stanley Jevons, Carl Menger is generally recognised as part of the "marginalist revolution". This is because there were many common elements within them, such as subjective value theory in lieu of the labour theory of value, utility analysis, and the concept of marginal changes. Most scholars, therefore, thought that the neoclassical school and the Austrian school have the same theoretical and methodological foundation and that there were no real differences between them. Fredrick Von Mises, a leading Austrian, acknowledge this

> "Within modern subjectivist economics it has become customary to distinguish several schools. We usually speak of the Austrian and the Anglo-American Schools and the School of Lausanne…. that these three schools of thought differ only in their mode of expressing the same fundamental idea and that they are""divided more by their terminology and by peculiarities of presentation than by the substance of their teachings."(Mises [1933] 2003, 228)

However, by the late 1930s and 1940s, when the Austrians engaged with socialist economics in the "socialist calculation debate", it brought out the sharp differences the Austrians had with neoclassical economics. Austrians, since Carl Menger has always

emphasised a subjectivist approach to economics. This is the "fundamental tenant that distinguishes Austrians from neoclassicism is their belief in subjectivism. It is from subjectivism that so many unique Austrian insights flow" (Horwitz 1994, 17).[1] This brings us to the concept of methodological individualism, "according to which a proper explanation of a social regularity or phenomenon is one that is grounded in individual motivation and behaviour. In other words, according to this methodology, individual human beings are the basic units from which we must build up in order to understand the functioning of society, economy and polity" (Basu 2018, 8715). Austrians envision the entire economic process as emanating from purposeful human action rather than being determined by objective external conditions. According to Israel Kirzner, "what emerges in real-world economies is the expression of human preferences as exercised against a background of given, passive resource constraints and endowments" (Kirzner 2000, 42). Hence, all explanations of social or economic phenomena must begin from an examination of the subjective perception of humans, their purposeful, conscious actions and plans.[2] Whereas neoclassical economics concerns itself with maximising individuals and equilibrium analysis, Austrians deal with purposive behaviour and process analysis. Purposive human action is always future oriented. Citing Fritz Machlup, Kirzner (2018, 587) lists six central ideas that would define the Austrian approach (a). methodological individualism (purposive human action), (b). methodological subjectivism, (c). marginalism (d). utility analysis, (e). opportunity costs, and (f). time structure of consumption and production. The above listed ideas are almost similar to neoclassical economics though emphasis may differ. However, during and after the socialist calculation debate, based on the works of Friedrich Hayek and Von Mises, Austrian economics has developed additional insights, which were earlier implicit within, thus

[1]Both Neoclassical and Austrian share endowed scarce resources, subjectivism and methodological individualism as common foundation for their economic system. However, there are important differences how the two schools view and use these concepts.

[2]Ludwig von Mises defined human action as "purposeful behavior. … Action is will put into operation and transformed into an agency, is aiming at ends and goals, is the ego's meaningful response to stimuli and to the conditions of its environment, is a person's conscious adjustment to the state of the universe that determines his life" (Mises [1949] 1998, 11). There are three prerequisite conditions of human action, first a person must not be satisfied with the current state of affairs, an 'uneasiness' must be there to act and bring change. Second, he/she must have desire to be in a better state, and third, he/she must have the expectation action "has the power to remove to remove or at least to alleviates the felt uneasiness"(ibid.13-14).

separating the Austrian approach from mainstream neoclassical economics. Mises stressed the role of entrepreneurial activity in an open-ended world of radical uncertainty, and Hayek emphasised the role of knowledge and discovery. These subjectivist insights led them to characterised market coordination as a dynamic process rather than an end state. Therefore, according to Kirzner, two more ideas must be added to Machlup's list, and they are (a). market as a process, and (b). radical uncertainty. From the above discussions, it is clear that Austrians rejects the static approach to competition in which there is no scope for change and where all individuals' plans are fully satisfied. Rather they conceptualise competition as a dynamic approach, a problem of coordination between individuals seeking to better themselves in an uncertain decentralised economy. In the next section, we explore further the Austrian approach to competition as a dynamic process.

C.3.2 Competitive Market Process: Coordinative Equilibrium or Disequilibrium

From his seminal work *Competition and Entrepreneurship* (1973) and subsequent contributions, Israel Kirzner has synthesised Mises and Hayek's ideas about the market process. Based on those foundations, Kirzner has developed further how "alert" entrepreneurs bring about a tendency of coordination and social order in a dynamic environment. For Hayek, as information is dispersed, the market process equilibrates as individuals discover knowledge and plans of others through market interactions. On the other hand, Mises stressed the importance of entrepreneurs' action under uncertainty as they seek opportunities for pure profit bringing coordination in the market. Kirzner extends the analysis by introducing the 'alertness' of the entrepreneur. According to Kirzner, there is disequilibrium because "market participants are unaware of the real opportunities for beneficial exchange which are available to them in the market" (Kirzner 1973, 69). Alert entrepreneurs notice or discover such price discrepancies and take advantage to make a pure profit. Unexploited profit exists because there is "sheer(unknown) ignorance in the market". None can even estimate the chance of finding such opportunities using a probability distribution. Profit arises not because of systematic search, involving a production cost for searching the missing information.[3] Rather, it is

[3] For Kirzner, "What distinguishes discovery (relevant to hitherto unknown profit opportunities) from successful search (relevant to the deliberate production of information which one knew one had lacked) is that the former

> "Without knowing what to look for, without deploying any deliberate search technique, the entrepreneur is at all times scanning the horizon, as it were, ready to make discoveries. Each such discovery will be accompanied by a sense of surprise (at one's earlier unaccountable ignorance). An entrepreneurial attitude is one which is always ready to be surprised, always ready to take the steps needed to profit by such surprises." (Kirzner 1997, 72)

Thus, for Kirzner, profit always comes as a surprise that was hitherto unknown because of genuine ignorance. This quality of the successful entrepreneur is not because of good luck but rather to the innate ability, good judgement or intuition to gauge profit opportunities.[4] In the Entrepreneurial process of knowledge discovery through their alertness in an uncertain environment, the market participants become better informed. Initial entrepreneurial errors are eliminated or corrected as alert entrepreneurs respond to the profit opportunities created by these errors. As there is freedom of entry to the market, entrepreneurs compete with other entrepreneurs in being alert and grasping those profits. This dynamic competitive process tends to enhance mutual awareness. Here, Kirzner is careful to mention that the competitive market process "cannot guarantee rapid (or slow) convergence to a state of equilibrium. However, it does at each moment guarantee profit-incentives tending to nudge the market in what, from the perspective of that moment, must be recognised as the equilibrative direction" (ibid., 70).

It is apparent that Kirzner's entrepreneurial knowledge discovery process that brings the market into some equilibrating tendencies is in direct contradiction to Schumpeter's idea of the disequilibrating entrepreneur. According to Schumpeter:

> "The function of entrepreneurs is to reform or revolutionise the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way,

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(unlike the latter) involves that surprise which accompanies the realization that one had overlooked""something in fact readily available. ("It was under my very nose!") This feature of discovery characterizes the entrepreneurial process" (Kirzner 1997, 72). In the neoclassical model, the boldness and imagination of the entrepreneur is not required because they know what they are ignorant about.

[4] For Mises or kirzner, entrepreneur 'alertness' cannot be learnt nor taught.

> by opening up a new source of supply of materials or a new outlet for products, by reorganising an industry and so on."(Schumpeter [1942] 2003, 132)

In short, the action of the entrepreneur far from being equilibrative is described as "creative destruction". Scholars have debated how the two notions contrast each other. Kirzner (2000, chap. 13) clarified that though the two notions of entrepreneurs are in part contrasting, both can be used to understand the market process from two different perspectives. To Kirzner, his initial conception of the entrepreneur in his 1973 book was conceptualised to focus on the essential feature of alertness and discovery. This was done abstracting to "a single-period world without production and without the uncertainty" (ibid. 246). However, as we extend the analysis to a multi-period case with radical uncertainty, the entrepreneurial alertness requires the "qualities of boldness, innovativeness and creativity" (247), the Schumpeterian entrepreneurial characteristics. Kirzner agrees that though entrepreneurs can bring about "creative destruction" but within that innovative disruption, there is also the seed of a coordinative quality. Kirzner gives the example of how horse drawn carriages were replaced by motor cars, which were cheaper, convenient and time saving. The introduction of automobiles is seen as a good example of creative destruction, which greatly innovated transportation. According to Kirzner, though on the surface, the horse drawn transportation

> "For all its placid, normal-profitability over many decades, was an industry in grave disequilibrium before the automobile actually appeared … the investments made in physical and human capital were mal investments. … opportunities, as yet unnoticed, existed for far superior motorised transportation to be provided at prices that would have been highly attractive to many consumers. Production was, in this sense, being conducted inefficiently; capital and labor were being misallocated."(ibid. 250–51)

The automobile entrepreneurs disrupted and displaced the market; it clearly showed the disequilibrium situation in the transportation industry, as it reveals how resources were misallocated. Alert entrepreneurs saw opportunities for profit by better reallocation of resources, bringing a higher degree of coordination in the market. Therefore, for Kirzner, Schumpeter brings out the "psychological profile typical of the real world entrepreneur",

bringing about creative destruction. On the other hand, Kirzner portrays the entrepreneur as alert to profit opportunities bringing an equilibrating tendency to the market. To Kirzner, both the views are not so different but only in emphasis. Schumpeter gives an outside view of "what constitutes the essence of capitalism (viz its being characterised by continual technological change driven by innovative, creative entrepreneurs)". Whereas Kirzner emphasise "the inside workings of the capitalist system (its ability to offer pure profit incentives that can evoke entrepreneurial perception of available opportunities" (254)

Ludwig Lachmann takes the opposite stance to Kirzner's equilibrating market process. Lachmann (1976, 1986) stress the *kaleidic* nature of the economy.[5] Competitive market does not systematically move towards coordination through the action of the alert entrepreneurs. Lachmann extends the Menger-Hayek-Mises subjectivism through G L S Shackle's works emphasising radical subjectivism and radical uncertainty. Lachmann draws from Hayek that no one has complete knowledge; rather, it is dispersed. Individuals plan and formulate their actions based on their own subjective interpretation of the information they possess, and as they interact with others in the market, they acquire more knowledge. "The stream of knowledge produces ever new disequilibrium situations, and entrepreneurs continually manage to find new price-cost differences to exploit When one is eliminated by strenuous competition, the stream of knowledge throws up another. Profit is a permanent income from ever-changing sources." (Lachmann 1976b, 128). In acquiring knowledge, the Misesian "human action" works through time that has consequences in the unknown future. For Lachmann, speculation and expectations are inherent in all human action.

Lachmann extends the Menger-Hayek-Mises subjectivist tradition by introducing expectations. For individuals, knowledge is acquired through past experience and based on this, individuals act and make choices oriented towards the future –unknown and uncertain, and how others will act and react. Nevertheless, individuals do make speculative decisions with some expectations about how the future will pan out. Lachmann emphasises the role of

[5]In economics the term was first used by G L S Shackle, Kaleidic denotes the unstable changes in the form and structure of an economy because of uncertainty. The economy "can change as swiftly, as completely, and on as slight a provocation as the loose, ephemeral mosaic of the kaleidoscope. A twist of the hand, a piece of " 'news', can shatter one picture and replace it with a different one" (Shackle 1965, 48). Ludwig Lachmann and others working in the subjectivist tradition popularised its use.

time and the formation of expectation in explaining economic processes, because expectations are subjective interpretations of future events, they can neither be formalised nor assign a probability. To Lachmann (1945), individuals do not have a particular expectation about the future, but as he acts in an environment of uncertainty, they usually form a "practical range" of possibilities. Expectations will be modified when the variable under consideration (say prices) falls outside of this range; otherwise, expectations will remain inelastic(unchanged). The subjective nature of knowledge will also mean that there will be divergence in interpreting the current market situation and in the formation of expectation internals. "Divergent expectations are nothing but the individual images, rather blurred, in which new knowledge is reflected, before its actual arrival, in a thousand different mirrors of various shapes" (Lachmann 1976a, 59).

The formation of expectation intervals and divergences has serious implications for the coordinative convergence of the competitive market process. According to Lachmann (1977, 190), "the market process is kept in permanent motion, and equilibrating forces are being checked, by the occurrence of unexpected change and the inconsistency of human plans." This is because fundamental uncertainty is present in all economic processes. More importantly, "what, however, will, in reality, frustrate the equilibrating forces is the divergence of expectations inevitable in an uncertain world, and its corollary, the inconsistency of plans" (ibid.). For Lachmann, the subjective formation of divergent expectations is endogenous in the market interaction will prevent any hope for complete mutual coordination.[6] Competition may help in the diffusion of knowledge, but entrepreneurial action generates endogenous and diverse expectations that prevent the market from any equilibrating tendencies.

The differences between Israel Kirzner and Ludwig Lachmann led to an theoretical debate within the Austrian school on whether the competitive market process shows some equilibration tendencies., the debate continues between the two traditions. Some

[6]According to Lachmann, equilibrium may be established for individual markets, "but we can never be sure that the spill-over effects which an equilibrating adjustment in one market has on other markets will always be in an equilibrating direction. They may well go in the other direction. Equilibrium in one market may be upset when the repercussions of the equilibrating adjustments in other markets reach it" (Lachmann 1977, 190–91).

have argued that Lachmann's radical subjectivism leads to theoretical nihilism.[7] Critics have argued that such an approach goes against the foundation of Austrian economics as the approach emerged as an opposition to the German historical school, theorising on and advocating the coordinative powers of the market.

On the other hand, Kirzner's equilibrating market process theory has been criticised as being neoclassical in character, as the economy always have a tendency towards equilibrium. Over the years, Kirzner (1992, 1997) has defended and clarified his position as the "middle view" between the static equilibrium neoclassical theory and the radical subjectivism approach to market theory. Kirzner acknowledges that entrepreneurial error does happen, but there is learning and revision of expectations; thereby, the market process over time aligns the "underlying realities" (exogenous system variables) with that of the "induced realities" (endogenous variables). However, for Lachmann, once divergence of expectations is recognised. Then even the underlying systemic realities (such as consumer preferences and resources) will change fast enough that no objective anchor will exist to bring any sort of convergence to the market process.

Mario Rizzo and Gerald O'Driscoll, in their book *The Economics of Time and Ignorance* (1996), attempt to pave a sort of conciliatory path between dynamic equilibrium and radical subjectivism. They were very critical of the "equilibrium-always" approach of Kirzner. But rather have a different construct of equilibrium as "some concept of equilibrium is an indispensable ingredient in all economic explanations" because it can be used as "a mental laboratory in which various causes can be isolated from one another and their effects fully traced" (ibid., 85). They emphasise dynamic subjectivism, taking into consideration real time as opposed to logical time. Taking a cue from Hayek, they aim to reconcile real time and equilibrium in a dynamic framework. Rizzo and O Driscoll introduce the concept of "pattern coordination" as an alternative substitute for equilibrium. Making use of Hayek's distinction

[7]Lachmann (1986) and others denies the charge of theoretical nihilism. Rather it's a suggestion to move away from high levels of abstraction in developing a general theory of the market process. Markets differ in many ways, and so the theorist must discuss 'ideal types of market" by deciding on the most suitable level of abstraction, elaborating the array of market forces. "Our main conclusions are, in the first place, that different markets, characterised by the encounter of different classes of agents with different interests and functions, will give rise to market process of different kinds. In the light of this insight all statements suggesting that *the market* will produce this or that result must be regarded with some suspicion. It is better to speak of *markets* than of *the market*" (124; emphasis in original)

between typical and unique features of events, they define pattern coordination as "the plans of individuals are in a pattern of equilibrium if they are coordinated with respect to their typical features, even if their unique aspects fail to mesh" (ibid). Typical features or types of an event that are stable and repeatable, "in the sense that they are not that they are not affected by the mere passage of time" (76). Thus, typical features can be known with certainty or probabilistically. On the other hand, unique features of an event are those aspects which are non-repeatable, and are "specific time-dependent variants of a stable pattern" (78). Any anticipation about unique aspects of an event proves to be futile as the act of anticipation itself affects the event. In other words, unique features are endogenous changes because of uncertainty.[8]

The work of Rizzo and Driscoll was severely criticised by Charles Baird (1987) in his review of the book. Baird reviewed that the book does not convey Austrian concepts faithfully and consistently, that the authors are unable "to settle their own position on the question of the possibility of equilibrium or even the tendency to coordination" (ibid. 206). Baird concludes that the book has nothing new to offer to the Austrian debate about equilibrium. The concept of pattern coordination that Rizzo and O'Driscoll introduce is quite similar (if not the same) to Hayek's "Patten prediction". For the authors are inconsistent with their claim, they first recognise that the two are similar. However, later when pattern coordination is introduced, Hayek's equilibrium concept is identified with exact coordination, which is static in nature, devoid of time and uncertainty. More importantly, there is a clear separation between the two in their definition of typical and unique features as they are not affected by the "mere passage of time"; the typical features are seen as the equilibrating force. Therefore, it can be said that time has no place in equilibrium. On the other hand, the unique features caused by uncertainty and real time are seen as disequilibrating. Those in the market process equilibrating traditions like Kirzner also does not deny that endogenous changes cause disruption of coordination. The authors do not explore the possible interrelationship and feedbacks between typical and unique features. The reason for this could be that such analysis will lead us back to nihilistic conclusions (which Rizzo and O'Driscoll wish to avoid). Giving

[8] To Rizzo and O Driscoll, pattern coordination is superior to neoclassical stochastic equilibrium because in the latter, the typical features are embedded in some probability. Moreover, neoclassical completely ignores the unique features that brings endogenous changes (Rizzo and O'Driscoll 1996, 88).

up on the concept of equilibrium will prevent the theorist from drawing general principles about the market society.

C.3.3 Institutions and Market Process

The debate within the Austrian approach regarding the nature of competition and equilibrium remains open. Some have taken to exploring institutions as a possible determining factor in explaining the market process. Lachman (1971) has suggested that in a *kaleidic* (radical uncertainty) society, institutions underlying the market process provide a "point of orientation" for human action, preventing nihilistic conclusions. According to Lachmann,

> "An institution provides means of orientation to a large number of actors. It enables them to co-ordinate their actions by means of orientation to a common signpost … They enable each of us to rely on the actions of thousands of anonymous others about whose individual purposes and plans we can know nothing. They are nodal points of society, co-ordinating the actions of millions whom they relieve of the need to acquire and digest detailed knowledge about others and form detailed expectations about their future action."(Lachmann 1971, 49–50)

Thus, institutions reduce indeterminism and volatility and provide a sort of reference point for individuals to interact in an uncertain world. Institutions emerge either as design products of legislation or "social will" or as innovations when "successful plans gradually crystallise into institutions" through imitation by the masses, creating or adding new points of orientation. If such is the importance of institutions, then exploring the nature of institutions for efficiency and order must take precedence. Hence, Lachman (ibid., 13) mainly focuses on the contrast "between the necessarily durable nature of the institutional order as a whole and the requisite flexibility of the individual institution". Stability is required so that individuals can make decisions no matter the nature of uncertainty and expectations.

On the other hand, institutions must also be flexible enough to adapt to unexpected changes in a kaleidic society. However, Lachmann did not provide any clear, explicit analysis

between his ideas of institutions and that of his market process. In recent times, all modern Austrians greatly acknowledge the importance of institutions for understanding the market process (Gloria-Palermo 1999), .and such analyses are still explorative in form. Institutional economics can greatly enrich the Austrian approach. Despite having methodological differences, there are a lot of commonalities between the two. Other Austrians have moved into exploring themes in evolutionary theory taking inspiration from the works of Carl Menger, Schumpeter and Hayek (see Birner and van Zijp 1994, Boettke, Horwitz, and Prychitko 1994, and Witt and Beek 2015). Menger had an organic view of social institutions, Schumpeter though he rejected the idea of natural selection as "social Darwinism", yet he discussed about capitalist development through creative destruction. Hayek, through his notion of group selection, views market society through an evolutionary lens. Austrians reject equilibrium as an end state and all mechanical explanations of the economy. Hence according to them, recourse to evolutionary theory would better explain the Austrian notions of change in an open-ended framework. Yet, on the other hand, evolution being an organising principle, can prevent nihilism and have a systematic explanation of social institutions and the market process. Evolutionary approaches to Austrian economics are recent developments, and a detailed understanding is well beyond the scope of the present thesis.

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Gautam Mathur's Sraffa – Neumann System: A Framework for Development

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Throughout the work of Gautam Mathur there is a unique blend of theoretical insights for development strategies and the pursuit of ideals of economic justice, freedom and egalitarian society. He uses a Sraffa-Neumann system structure to disaggregate the economy into sub-systems as a tool of analysis for choice of techniques, allocation of labour and resources and time transition path towards steady growth based on a sound foundation of capital theory. The paper appraises his unique approach to study processes of structural transformation, and the relevance of such a strategy in an era of jobless growth, high inequality, low productivity and inefficient production structures across sectors. Mathur envisioned that an underdeveloped economy can be structurally transformed into a Robinsonian "golden age" through active state policy interventions.

I Introduction

The seminal publication of Piero Sraffa's *Production of Commodities by Means of Commodities* (PCMC) in 1960 gave a foundational critique of the dominant neoclassical theory of value and distribution. It revived interest in classical economics and the surplus approach. Based on the classical approach, Sraffa laid out a consistent theory of value and distribution. For economists (mostly Cambridge educated) disenchanted with neoclassical economics and the re-appropriation of Keynes' economics by the former, PCMC provided a foundation upon which to build an alternative analysis of growth, output, employment and development. Gautam Mathur was one of the few Indian economists who was inspired by the works of Cambridge economists.[1] Mathur published *Planning for Steady Growth* (1965),[2] his seminal work on development planning. In the book, and in subsequent writings, he puts forward a development framework based on a synthesis of Sraffa and Neumann systems along with post-Keynesian growth analysis. The present paper is an appraisal of Mathur's unique approach to development. Section II discusses the limitations of growth models and how it can be amended with regard to developing economies to study the objective of steady state growth. Section III introduces Mathur's Sraffa-Neumann model, its assumptions and the concept of a subeconomy. Section IV proceeds with the construction of a process matrices production function that enables the planner to

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choose the technique for a targeted golden age growth. After identifying the long-term objective of steady growth, Section V discusses strategies for the path of development. Section VI espouses how Mathur modifies and classifies the concept of basic and non-basic goods. Section VII concludes the paper by discussing policy prescription based on the model and legacy of Mathur's theoretical framework for development.

II Growth Models and Developing Economies

Neoclassical growth models lay stress on refraining from present consumption so that savings can be translated into investment for capital accumulation. In these models savings rate along with a "well-behaved" aggregate production function and continuous substitution between capital and labour ensure that the economy is always at full employment steady state. Whereas, in the Keynesian growth models, investment is seen as the prime mover of growth whether in under equilibrium or full employment equilibrium situations. However, all these models pertain to well-developed capitalist system of maintaining steady growth and are highly aggregative in nature (aggregate rate of saving, aggregate capital-output ratio, etc.). Though the Keynesian models' focus on investment is well taken, the macro-dynamics analysis has focused on the maintenance of a steady growth rate with full employment. The causation in the system is unclear as the natural growth rate becomes the determining variable. As Mathur points out, the study of steady state positions "becomes too restrictive when one looks at the problems of an economy actually undergoing growth" (Mathur 1965: 4). He takes the instance of Harrod's second identity of growth in which the natural rate of growth is given by the growth of employment and growth of technology $= g_n + g_t$. The rate of growth becomes a datum based on two exogenously given parameters. In the steady growth rate, the savings propensity of the capitalist class determines the rate of profit as in the Cambridge growth equation $g/s_c = r$. And given r, and the technology, the wage rate is determined (Subramaniam and Panth 1996: 138).

The causation of growth in underdeveloped countries differs from advanced countries, and the policy conclusion would be different as well. Underdeveloped economies are generally far away from steady state growth, characterised "with a vast population in relation to capital goods in the advanced sector, and a low subsistence wage rate, [and therefore] the bond between rate of growth of population and the rate of growth is severed" (Mathur 1979b: 979). According to Mathur, in a developing economy the chain of causation runs in the reverse direction $s_c r \rightrightarrows g$. The propensity to save of the capitalist class (and thus investment) depends on their consumption propensity. On the other hand, the wage rate and technology, determines the rate of profit. Thus, the thriftiness condition of the capitalist class and rate of profit determines the rate of growth of the economy till it reaches steady growth in which the rate of growth is determined by the natural growth rate of labour force and technology. Hence, for

an analysis of development, "the real wage, the technology, and the propensity to consume, of entrepreneurs are the governing variables, while the rate of profit, degree of mechanization and share of wages in income are dormant variables along with the rate of growth, output-capital ratio, and rate of savings as residuary variables" (Mathur 1979b: 979).

III Sraffa-Neumann Model for Development

For an underdeveloped economy, the objective of development is to achieve the golden age, i.e., a steady growth at full employment with the highest possible consumption per man. As such, the Keynesian macro-dynamics analysis must be amended for a developing economy. As steady growth models take only aggregated variables, it is important to introduce some disaggregation of the economy in order to discover the bottlenecks that hold back growth. Moreover, there are heterogenous inputs and outputs. Mathur introduces this disaggregation through Von Neumann system of dynamic processes, and synthesizes it with Sraffa system of analysing value and distribution. The choice of technique is an issue on the path of development, and when the problem of aggregating heterogenous goods arises then it brings the problem of value and distribution which is associated with capital theory. By combining Sraffa and Neuman Systems along with post-Keynesian growth analysis, he forges a powerful framework for analysing development issues. He termed it as the "Self-Reproducing Durable capital Goods model' or simply Sraffa-Neumann mode.[3]

The following are the broad assumptions of Sraffa-Neumann model.

1. Every commodity is produced through a linear process in which labour along with material inputs produces a commodity. The set of all processes each producing a separate commodity gives the technological structure of the economy. The processes are interdependent upon one another in which commodities with the help of labour produce other commodities. The production process is circular.
2. All goods are categorized as either basic or non-basic. Basic goods are those which enter as inputs into the production of every other commodity directly or indirectly. Non-basic, on the other hand, are those goods which are not used as inputs but depend on other processes for production. They are termed as dependent processes. Unlike the strict Neumann model, there are also no 'free goods' having zero price. All goods having positive output have positive prices. There is no by-product or joint production.
3. Labour and other natural resources are not scarce. It's assumed that for a developing economy, there is a large reserve of labour that can be gainfully employed on the path of development.
4. Inputs consist of working capital and fixed capital. Wages constitute the working capital. Equipment or machines represent the durable capital. The capital stock depreciates over time. According to Mathur, "Depreciation is not, in general a physical concept. But a value one" (Mathur 1965: 49).

Given that the production period is one year, each machine, no matter the age, after the end of production in each process, appears as one year older on the output side.

5. Real wages are always paid in advance of production in terms of consumption necessaries. Wages constitutes only consumption necessaries. Composition of the wage is given in rigid proportions of the consumption goods. Therefore, it is equivalent to assuming a composite consumption good. All sub-economies will have the composite consumption good. Therefore, consumption forms the only general basic goods and is hence used as a numeraire through which all other goods are valued. Generally, for simplicity and comparative statics most of the general analysis is carried out using the classical savings assumption, i.e., works do not save but consume all their wages and capitalist class (or the state as the planner) does not consume but saves all profit for reinvestment, $s_w = 0$ and $s_c = 1$. However, Mathur also analyses the implications of assuming $s_w > 0$ and $s_c < 1$ on the growth rate of the economy.

Sub-economy

The set of all the processes producing all the goods constitutes technology of the economy. Within the given technology, a set of processes which is self-sufficient and self-contained is called a sub-economy with the ability to have steady state growth. Multiple sub-economies can be identified with a combination of processes that are self-sufficient in themselves. In the model, we study basic linear sub-economies, which have the capacity to produce the composite consumption and investment goods that helps to produce. In the simplest case, we have the single consumption good and the single investment good, as shown below in the process table:

Table 1: A Simple Linear Sub-economy

	Consumption			Consumption	
Labour	Good	Equipment		Good	Equipment
1	1	1	→	b_0	1
1	1	1	→	0	$b_1 + 1$

Labour is shown in the margins showing the scale of a unit production for each good. It does not directly enter as input, but is represented through the consumption good which is paid as wage. In the output side of the process, the stock of durable equipment appears as one year older. In this single-equipment case, b_0 and b_1 are the outputs of consumption and investment good respectively. If the given sub-economy is to grow at a steady rate, then we should determine the level of process intensities of both the sectors. This is akin to determining the distribution of labour in both the sectors so that the two processes grow at a

uniform, steady growth. If $\mu_0 \; and \; \mu_1$ are the process intensities or distribution of labour, then we have a set of simultaneous equations as:

$(\mu_0 + \mu_1)\alpha \leq \; \mu_0 b_0$

$(\mu_0 + \mu_1)\alpha \leq \; \mu_1(b_1 + 1\,)$

And

$(\mu_0 + \mu_1) = 1$

Where $\alpha = (1 + g)$, is the coefficient of growth. Then, solving for steady growth we have

$$\alpha = \frac{b_0(b_1+1)}{b_0+b_1} \qquad \ldots(1)$$

$$g = \; \alpha - 1 = \frac{b_0(b_1 + 1)}{b_0 + b_1} - 1 = \; \frac{b_1(b_0 - 1)}{b_0 + b_1}$$

$$\mu_0 = \frac{b_1 + 1}{b_0 + b_1} \; and \; \mu_1 = \frac{b_0 - 1}{b_0 + b_1}$$

The process intensity ratio is given as $\frac{\mu_0}{\mu_2} = \frac{(b_1+1)}{(b_0-1)}$ …(2)

The above two equations (1) and (2) solve the real quantities of the Sub-economy. Similarly, the value system determining the prices and the uniform rate of profit (or the rate of surplus) is the dual of the above system. Given wages as a numeraire the prices and rate of profit can be solved as

$(1 + p)\alpha \geq b_0 + P$

$(1 + p)\alpha \geq 0 + P(b_1 + 1)$

$$p = \; \frac{b_0}{b_1} \qquad \ldots(3)$$

The coefficient of growth in (1) becomes the rate of profit $\alpha = 1 + r$

This single equipment case can be generalized to *n +1* processes producing *n* investment goods and composite consumption good. In effect, there are two sectors, the consumption sector and investment sector. The Table below shows the output produced by unit equipment per man. The *n* department investment good sector produces a hierarchy of capital equipment. The highest order

investment good is I_n, the Heavy-Equipment sector which produces itself along with the help of labour. However, the next lower order good and other lower order goods in the chain cannot produce themselves and must rely on the next higher order goods and labour to produce their output. The output is then transferred to the next lower order as input.

Table 2: $n + 1$ Processes of Unit Equipment Per Man

G	I_1	I_2	I_3	⋯	I_n		G	I_1	I_2	I_3	⋯	I_n
w	1	0	0	⋯	0	→	b_0	1	0	0	⋯	0
w	0	1	0	⋯	0	→	0	b_1	1	0	⋯	0
w	0	0	1	⋯	0	→	0	0	b_2	1	⋯	0
⋮	⋮	⋮	⋮	⋮	⋮	→	⋮	⋮	⋮	⋮	⋮	⋮
w	0	0	0	0	1	→	0	0	0	0	0	$b_n + 1$

Time Structure of Production

Output of the highest order investment good is b_n. if we knew the process intensity of each good (through the same procedure as in the simple sub-economy case) and have solved for steady growth g. Then out of b_n output, g proportion of machines will be ploughed back into that process itself. The remaining $(b_n - g)$ equipment of I_n, will be delivered out to the next lower order investment good sector (I_{n-1}) as input. This sector (I_{n-1}), produces $b_{n-1}((b_n - g)$ of output. As the I_{n-1} processes do not use its own output as input, it delivers out its entire output $b_{n-1}((b_n - g)$ to the next lower investment good as input. This chain continues till the lowest order investment good sector I_1 the output of which is $b_1 \dots b_{n-2}b_{n-1}(b_n - g)$. This output of the lowest order investment good is then delivered out to the consumption sector as equipment input for producing the composite consumption good. With the given amount of equipment and labour as input, the consumption good sector produces an output of $b_0b_1 \dots b_{n-2}b_{n-1}(b_n - g)$. This is the amount of output created by one unit of highest order equipment at the end of n+1 years.[4]

Employment

If the unit operation of j^{th} department produces b_j output and if μ_j men are employed in that department, then the total output will be $\mu_j b_j$. All these machines will be used up in the next lower order department (j –1) and one machine operated by one man will create additional employment there equal to $\mu_j b_j$. Now in this department *(j–1)* this year, the employment is μ_{j-1}, and so the next year's additional employment must be rate of growth times the employment this year i.e. $\mu_{j-1}g$. Thus,

$$\mu_j b_j = \mu_{j-1} g$$

$$\mu_j = \mu_{j-1} \frac{g}{b_j} \quad \ldots(4)$$

Thus, Employment this year in a j^{th} order department is a fraction of the employment this year in the next lower order department.

Price of Equipment or Capital Intensity

Let the price of an investment good of the j^{th} order be p_j. The price of the composite consumption good is unity as it is the numeraire. The price of the capital good used in the consumption sector is given by p_1. Surplus of the consumption good sector is given by $(b_0 - w\gamma)$ where γ is the coefficient of profit, $\gamma = 1 + r$ The price p_1 "should equal the capitalized value of the surplus per man at the equilibrium rate of interest [or the rate of profit]" (Mathur 1965: 60). Thus,

$$p_1 = ((b_0 - w\gamma))/r \qquad \text{where } r = \gamma - 1 = g \quad \ldots(5)$$

From eq. (5), we know the price or the capital intensity p_1 of the lowest order machine used in the consumption sector. We can derive the price of all the other investment goods since lower order good uses the output of the next higher order good. The price of the next higher order machine is p_2 and as the gross output is b_1 units of the lowest order machine, the value of gross product in terms of the consumption good as numeraire is b_1 times the price of I_1which is $b_1 p_1$

$p_2 = (b_1 p_1 - w\gamma)/r$. In the same way, we can derive the price of all the higher order investment goods as $p_j = \left(b_{j-1} p_{j-1} - w\gamma\right)/r$ and the price of the highest order investment good I_n will be $p_n = (b_{n-1} p_{n-1} - w\gamma)/r$. The price of I_n in terms of the consumption good as numeraire is $p_n = (b_n p_n - w\gamma)/r$

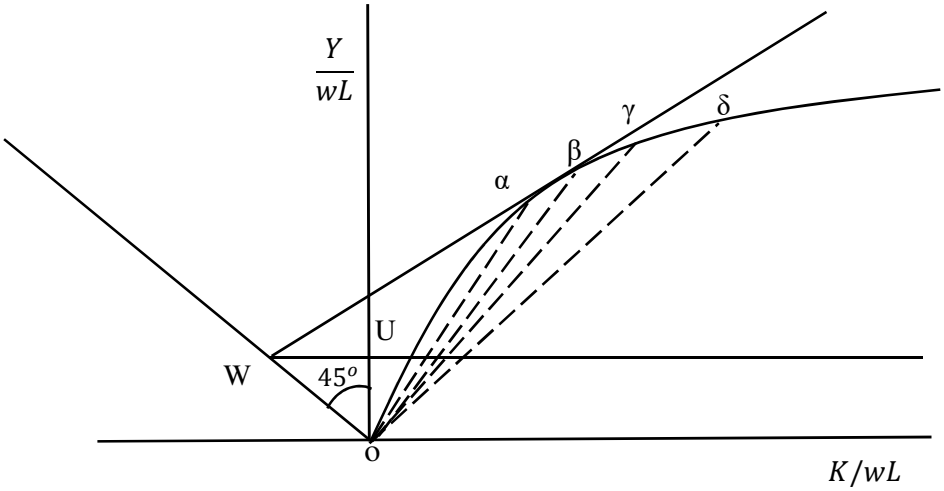
A special price can be derived from the equilibrium prices of capital goods call the capital goods per wage unit. "A wage unit is a unit of human labour which is defined as that fraction (or multiple) of a man which earns a unit wage. The wage per man being w. Thus, capital in wage units is the ratio of value of capital per man (in terms of consumption goods) to the real wage per man hour. This then represents the price of a capital good measured in terms of man hours as numeraire" (Mathur 1965: 62) and is termed as capital in labour time. This is the same concept as that of Robinson, but using the process matrix and not through aggregates. In the present study, as the labour units is represented by wage units in the processes, we have P_j/w.

IV Process Matrix Production Function

The Process matrix production function is an ex ante ordering of all the eligible techniques at a given wage rate from which a planner or the state can choose the most dominating technique as a long-term objective of steady growth. It is ex ante for it informs the planner for choosing and recognizing the technique with the highest rate of growth for a given wage rate or technology. As discussed earlier, a sub-economy is a structure of production capable of existing as a separate unit. Several sub-economies can be organized for a given technology, each producing the composite consumption good with the help of a hierarchy of investment goods. In constructing the production function, we assume the wage rate is given. This is done to facilitate comparison among the sub-economies and the rate of profit is the determined variable.[5] Each sub-economy is solved for steady growth, prices and distribution of labour. A sub-economy then represents a technique for producing a set of goods. A technique, therefore, is not an individual process producing a good but a set of processes in which goods produce one another. All the eligible techniques with their own steady growth[6] are depicted in a two-dimensional scatter diagram in which the x axis measures the output of consumption per wage unit and y axis represents capital per labour time. For a standard production function, wage is taken to be unity, then it "is equivalent to relating the physical output of the composite consumption good per man to fixed capital in labour time per man" (Mathur 1965: 140). All the eligible techniques depicted in the scatter diagram are not equally suitable. Only those techniques which are on the outer envelope or the convex hull will be considered suitable. Whether a technique is inferior or superior is judged by two attributes, i.e., output per man and output per capital. As Mathur explains, "Take two sub-economies X and Y. If sub-economy X has output per man and output per fixed capital lower than in Y, then X is inferior to Y. It is also inferior if one of the attributes is less than in the other sub-economy" (Mathur 165: 142).

All the eligible sub-economies on the convex hull are mutually non-superior as the value of capital per man and output per man rise, but in a decreasing proportion. Thus, forms the curvature of the production function as shown in the Figure below.

Figure 1: Process Matrices Production Function



As the production function represents the technical knowledge existing at any given time and so must have a limit on the level of output per capita that can be achieved with larger capital per labour. This is the summit point (or the bliss point) of the production function. Given the wage rate, the value of the degree and order of mechanization increases from left to right[7] as the marginal product of investing in high capital-intensity techniques declines. In the Figure above, α, β, γ, and δ represent some of the mutually non-superior techniques on the production function. Rays from the origin to the techniques measure output-capital ratios. OU represents unit wage and WU is drawn at 45^o to the left quadrant and point W is referred to as the "wage point". The tangent drawn from W, touches the production function at its summit, at which point the sub-economy β gives the highest maximum rate of growth. This technique will be the dominating technique that the planner can choose as the long-term objective for steady growth. For the given wage rate, the dominating sub-economy is the only point of interest in the production function. However, when the wage rate or technology changes, the whole procedure of deriving and ordering the eligible sub-economies must again be undertaken.

Changes in Wage Rate and Thriftiness Conditions

With given technology, once we allow for changes in the wage rate, the resultant rate of profit will also be different. This takes us to the realm of analysis of the effects of distribution on the relative prices of capital and consumption goods, i.e., Wicksell effect.[8] The type of Wicksell effect and changes in the output-capital (Y/L) ratio of any technique depend on Wicksell Structure of that technique. The different wage and profit rates affect the price of capital goods and as a result the output-capital ratios. If the structure of production of the sub-

economy is such that the productivity of all orders of equipment is the same for all the processes, then the price of equipment will remain the same as the wage or profit rates change, and termed as neutral Wicksell structure. If the productivity of equipment increases as we move from the lowest to highest order processes, prices of equipment increase as the wage rate increases, and so it has a positive Wicksell structure. Lastly, if the productivity of equipment decreases as we move from the lowest to the highest order process, the price of equipment will decrease as the wage rate increases, and the technique or sub-economy is described as having a reverse Wicksell structure. Hence depending upon the latter, the position of a technique gets affected on the production function as the degree of mechanization changes. Thus, with wage rate changes, we get different production functions and dominating techniques. The curve connecting these dominating techniques is the production locus. As Mathur points out, "A Wage-Production Locus depicts the set of dominating techniques which we get when wages differ among different production functions, the array of technology being the same" (Mathur 1965: 155). The ingenuity of Mathur's process matrices production function analysis allows to discuss development planning, permitting planners to choose and organize.

Changes in Technology

Technological change is studied through shifts in production function at a given wage rate. But before the study of technological shifts, we must consider how technical differences are registered within a sub-economy. Mathur defines technical differences as "any difference in the types of equipment or differences in the manufacture of any given equipment or consumption good which leads to any of the engineering input or output entries in the process matrices of two economies being different" (Mathur 1965: 255). Technical differences are defined purely in terms of engineering differences. If there are two sub-economies (standard and observed) with the same n number of departments in the investment sector, giving outputs of b_j and $\eta_j b_j$ $(where\ 1 \leq j \leq n)$ respectively, and in the composite consumption sector we have outputs b_0 and ρb_0 respectively. If $\rho > 1$ and all $\eta_j = 1$. Then there is neutral technical difference between the two economies. This requires that the observed sub-economy must have a higher output per man in the consumption sector, but the same output per man in the investment sector of both sub-economies. However, if $\rho = 1$ and one or all $\eta_j > 1$, then there is capital saving technical change in the observed sub-economy. Again, if $\rho = 1$ and one or all $\eta_j < 1$, then there is labour saving technical change in the observed sub-economy.

Again, if $\rho > 1$ and $\eta_j \geq 1$, it is capital saving. If $\rho > 1$ and $\eta_j \leq 1$, then it is labour saving technical change. The constant ρ is termed as the progress factor as it measures the degree of technical advance of the observed sub-economy. The constant η is termed as the bias factor. The analysis of technical difference has

been done assuming constant wage rate, but a neutral technical difference increases output of consumption good per man which is equivalent to wage rate being reduced, thus increasing output per man with the same technology. This equivalence between neutral technical progress and the effect of wage change, given the same technology on output per man helps in superimposing wage changes on technical differences in observed sub-economies and further the analysis of technical change.

Mathur proceeds the analysis of technological changes through shifts in the production function at the same wage rate. The following assumptions are made. First, the techniques lie in the same order as they go to a higher or lower capital intensity. Second, there is the same technical bias among each pair of corresponding techniques. For instance, if there is labour saving technical progress, then all the pairs of techniques (both on the new and old production functions) are related to each other by labour saving technical progress. Finally, the degree of technical progress and the type of technological bias are the same for all corresponding pairs of techniques. Thus, the analysis of technical progress is confined to only those productions functions having a relationship of regular, harmonious and proportionate character. At a constant wage rate, if we have a number of production spectra each having a dominating technique, as one moves higher along the spectrum of dominating techniques one realizes higher rates of profit. The curve joining these dominating techniques gives us the technical progress production locus.[9] "It shows the different techniques which would be adopted as dominating ones, each confronted with its relevant spectrum of technique and a constant wage rate" (Mathur 1965: 287). Moreover, the type of Wicksell structure of the dominating techniques would inform us in what cases the output-capital would rise, fall or remain constant as technological progress happens. The technical progress production locus is traced out for different levels of wage rate. However, each of the locus is traced out on the premise of an expected rate of technical progress. If technical progress is continuous or uncertain, then the planner has to choose the objective of steady growth with some expected technology which might prevail once the economy has successfully transitioned to the objective. However, for an underdeveloped country in its path to steady growth, the shifting of production spectra must not be too much of a concern for technological progress in basic heavy industries does not change so quickly, and a strategy aiming at investment in basic industry is a requirement for development.

The neoclassical production function is built on the assumption of malleability, homogeneity and divisibility of capital. Though it seeks to represent techniques with different factor price ratios, however because of the assumption of homogenous capital, it does not really represent choice of techniques, rather "the movement along the function can, at best represent varying intensities of use of some unspecified, homogeneous substance called "capital"" (Subramaniam and Panth 1996: 162). Mathur's construction of the process matrix production function recognizes the heterogeneity and indivisibility of capital. Each

technique is a miniature economy solved for steady growth. Since each technique consists of a set of processes, it can address problems concerning how the structure of production and changes in distribution affect the valuation of capital and consumption goods. Moreover, unlike the neoclassical situation, the process matrices production function is an ex ante apparatus and does not profess to represent all possible production choices and conditions. It's a tool for the planners to organize and choose from all the possibilities, the technique giving the highest possible growth, given the parameters of technology, wage rate and the thriftiness conditions.

V Strategies of Development

Once the appropriate technique that gives the maximum steady growth, this rate of growth becomes the objective of long-term development. The next step is to formulate a strategy so that an undeveloped country at the least time can have transition to that golden age.[10] The objective is to shift the economy from an initial situation of wage rate near subsistence, which is using an inferior technique to a more mechanised technique with full employment where the wage rate is determined by the golden age growth rate. Mathur elaborates three strategies for the path to the golden age, termed as Strategy Dam, Strategy Tractor and Strategy Corn.

In the first strategy of Strategy Dam, emphasis is laid on investment in the heavy industries. Heavy equipment is only for increasing itself. The surplus output produced in this sector is ploughed back as reinvestment to its own sector. There is no leakage to other sectors of the economy "till enough investment has been done to satisfy the golden age requirements at full employment". In the meantime, the consumption goods requirements for the entire economy are met by using labour intensive techniques which does not require heavy equipment as an input. After enough heavy equipment has been produced for the golden age, does the economy starts producing lower order machines using the heavy equipment as input? These lower order machines are finally used to produce consumption goods, till all types of goods are in proportions suitable for golden age with full employment.

The second Strategy is of Strategy Tractor. In this heavy equipment is used as inputs both to produce itself and lower order equipment that produces consumption good. As the surplus output of heavy equipment sector is not restricted to itself like in the first strategy, its growth rate is not as high as before. Moreover, the consumption good is also produced by lower order equipment, although the wage rate is low. Since the wage rate is low, the surplus output per man is high and the rate of accumulation is greater than the golden age rate of growth. In this this strategy, all the goods grow in a balanced fashion through the transition path from the initial period to the golden age. Once the economy approaches golden age, the wage rate rises and the rate of accumulation settles down at the rate appropriate to the golden age.

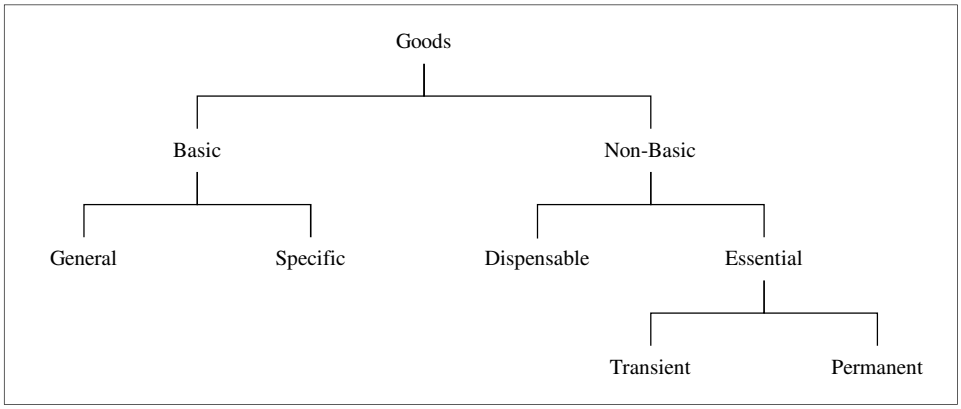
The third strategy is called Strategy Corn. Initial emphasis is placed on the growth of consumption goods sector. The production of heavy equipment is postponed to a later period. The initial focus is on the production of consumption goods. The rationale for this strategy is that a consumption good being a basic wage good is a necessary input in the production of heavy equipment and other lower order equipment. So, in the first phase of the strategy, a consumption good is produced at the maximum growth rate by using labour intensive techniques employing all the labour force at the initial given wage rate. After overcoming the consumption good bottleneck, in the next phase heavy equipment and other lower order equipment are made The whole economy moves to a more mechanised technique and the wage rate also increases as the economy approaches the golden age growth.

The three strategies differ from each other in three aspects. First, on the emphasis is placed on the goods which grow fast in the main phase. Second, on the sequence in which different operations are performed, and finally on the amount of time required to reach the golden age. Whatever be the differences, in all the three strategies, the economy in its transition path to the targeted golden age experiences a "bastard platinum age" – a growth phase in which the rate of growth of output is higher than the growth rate of labour force but accompanied by non-employment. As the per capita income, wage rate and capital per man increase, the growth rate shows declines to match the growth rate of labour force (the natural growth rate), and full employment is ultimately achieved as the economy enters the golden age. All the variables grow at the balanced rate as determined by the golden age steady growth rate. For an underdeveloped country with large unemployment and low productivity looking to achieve golden age, in general it is difficult to suggest any strategy as the best one. Mathur suggests that a combination of the three strategies listed above might be followed. In the first phase, as in Strategy Dam, emphasis should be given to produce heavy equipment as they require long gestation period. In the meantime, as suggested by Strategy Corn, the growth rate of employment must be increased by increasing maximising growth rate of the consumption good using labour intensive techniques. This is done as the expansion of heavy equipment requires increasing amount of consumption good as input, and use of labour intensive techniques in the consumption sector will provide employment to the bulk of the labour force. In this phase, no lower order equipment is produced. Only when employment is about to reach full employment, does one start producing lower order capital equipment as in the Strategy Tractor so as to avoid a rise of wage rate near full employment. This goes on until the highest order or heavy equipment has expanded enough for the golden age full employment. After which all goods are produced at the golden age growth rate. At the golden age, the wage rate also rises appropriate to the golden age growth rate, giving the highest possible consumption per man. This optimum strategy gives what Mathur again borrowing a phrase from Robinson calls it "galloping platinum age".[11]

VI Distinction of Basic and Non-Basic Goods

Mathur's analysis of strategizing development consistent with capital theoretic concerns is based on a model in which Neumann system of steady growth is super imposed upon Sraffian standard system (Mathur 1979a). According to Mathur, "The Sraffa standard system does not allow a choice of technique, the number of process being equal to the number of goods. For purpose of examination of growth problems, the Sraffa system must be considerably extended and modified" (Mathur 1963b: 1039). Each technique or sub-economy in the process matrices production function has different capital intensities at a given wage rate. Hence, goods which are basic to one sub-economy may not be basic with reference to the whole technology. Then, the only good common to all sub-economies is the composite consumption good as "one is sure of finding only these goods as common inputs to all process, and this also because of the assumption of the rigid and uniform consumption pattern of all workers" (Mathur 1963b: 1040). So they are used as a *numeraire* for valuing all the non-basic goods. Mathur (see 1963b) classifies all types goods as basic and non-basic as shown in the Figure below.

Figure 2: Classification of goods into Basics and Non-basics



As the technology consists of a series of sub-economies, a good can be basic only to a specific sub-economy and may be non-basic in other sub-economies. Only the consumption good which is common to all sub-economies qualifies as a general basic good. Corresponding to the two types of basic goods, there are also two types of non-basic goods. Those luxury goods which are unproductive and for conspicuous consumption are non-basic. But some non-basic goods might also be essential even though they depend on the basic system for their production. Essential non-basic goods can be further classified according to the time horizon as transient or permanent. For Mathur, investment into heavy and basic industries and "projects of long gestation period are treated as non-basic

activities for the reason that they do not give a return to the rest of the economy immediately, and for the purpose of supply of basic goods they do not contribute to the pool but only consume out of it" (Mathur 1963b: 1040). They are, therefore, treated as transient non-basic goods. On the other hand, defence is a permanent non-basic good. Krishna Bharadwaj (see 1963a and 1963b) in her replies to Mathur (1963a and 1963b) makes a strong objection to the rationale of defining only the wage good as the only general basic good in the economy. As she writes, "… one gets an impression that "basic goods" are more or less equivalent to consumption necessaries… The definition of basic goods would embrace a much wider range of goods" (Bharadwaj 1963a: 471). Again, she says, "That general consumption necessaries would appear as "general basic goods", I do not doubt. However, that they would be the only ones appears to me too extreme a proposition" (Bharadwaj 1963b: 1041). However, Mathur's system consists of sub-economies organized as techniques each having a unique growth rate, for a given wage rate. There is no single standard system but rather intra standard system. Hence, for an analysis of growth, Mathur's classification of basic and non-basic goods seems to be justified.

VII Conclusion

Though in his model, Mathur assumes a fully planned economy where the state plans the objective as well as the strategy. However, this assumption can be dropped as the model is "an extension of post-Keynesian macrodynamics and dynamic process-analysis, as evolved for private-enterprise situations and no use is made of any theories developed in socialist countries" (Mathur 1965: 10). In his later writings (see Mathur 1967, 1989a, 1994 and Satyanarayan & Raghuram 1999), Mathur elaborates further on Sraffa-Neumann system as well as made policy prescriptions for development with equity and social justice. A policy of non-inflationary growth must be pursued. Inflation is caused due to unbalanced allocation of investment expenditure which can be remedied through deficit financing and allocative taxation, a form of miss-expenditure taxation. Equity and social justice can be achieved by following a strategy of development that generates employment through shifting of investment from luxuries to heavy equipment and consumption necessaries. For an undeveloped country, investment in consumption goods that require large capital-intensive techniques generates only a low level of employment and increases the general price level. This type of investment strategy creates a small privileged class enjoying high standard of living, while drawing away valuable resources from heavy industries and consumption necessaries that can raise the standard of living of everyone. Mathur's approach to development is ever more relevant for a developing economy like India which is experiencing jobless growth because of misdirected investment strategy.

A review of Mathur's *Planning for Steady Growth* reads, "But for the implications, as seen by this writer, of Mr. Sraffa's monumental book, Dr.

Mathur's work would have been the next big step in the theory of growth from Joan Robinson's 'Accumulation'. There are many Cambridge's even at one Cambridge" (Bramananda 1967: 106). In setting out Sraffa-Neuman model, Sraffa's standard system underwent certain modification as regard to basic and non-basic goods. But as discussed in the previous section, this seems justified as standard systems have to adapt to a growing economy. Many scholars also view Mathur's model just as an elaboration of Joan Robinson's *Accumulation of Capital* in terms of process analysis. Though the inspiration is unmistakable, Sraffa-Neumann model is much more than that. The model is certainly innovative in its character. It is the ingenuity of Mathur that brings together theoretical approaches set for different purposes (Sraffa, Neumann and Robinson) together, and apply it to a completely different field – development economics.

Endnotes

1. Particularly the works of Keynes, Sraffa and Joan Robinson
2. The book is the published form of his doctoral dissertation under Joan Robinson at Cambridge University.
3. Ian Steedman (2012) points out that Adolph Lowe's three sector model in *The Path of Economic Growth* (1976) is a special case of Mathur's model.
4. The time structure of production is a self-reproducing durable capital technology. To produce each commodity, it takes one year. The higher the order of the highest-order investment good, the larger the time-structure of production. However, "there is no priori presumption that in the nature of technology that the capital intensity would be higher larger the time-structure of production". (Mathur 1965:57)
5. We can derive the same conclusion, if the rate of profit is given and the wage rate is the determined variable.
6. The rate of accumulation, the rate of profit, the rate of surplus and the rate of interest are all equal because of the assumption of steady growth, free competition, no consumption out of the surplus and no sharing of the surplus by the workers.
7. The degree of mechanization is the value of capital per labour, whereas the order of mechanization is a physical concept. Given unit wage, the order and degree of mechanization are the same. However, a change in the wage rate may affect the degree of mechanization through prices.
8. Named after Knut Wicksell, Wicksell effect is how the valuation of capital stock gets affected through changes in distribution such as the wage rate and the rate of profit.
9. For production functions that exhibit regular, harmonious and proportionate relationships, the dominating technique or the summit point of each production function serves to represent the spectra.
10. The golden age aimed at depends on three determinants – technology, thriftiness condition and the rate of accumulation. However, to simplify the analysis, we assume that technology is given and does not change. Workers do not save: s_w =0 and the state playing the role of the entreprenerd class in a planned economy does not consume but saves all to reinvest $s_c = 1$. With these assumptions, the golden age is that technique that gives the highest rate of accumulation for a given wage rate (Mathur 1965: 192).
11. A galloping platinum age is one in which the sector with the higher growth rate such as the heavy equipment sector attains dominance over time as the economy moves to a higher capital intensity, and the average growth rate of the economy also accelerates as it approaches the golden age (Mathur 1989b: 420).

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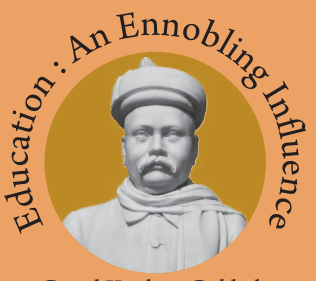

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