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Demand and Structural and Technological Change
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After Keynes and Sraffa, heterodox political economy has taken several different lines of development. Some, especially American Post Keynesians such as Davidson and Minsky and their followers, have elaborated Keynes's emphasis on the role of money and finance and the uncertainty of investor expectations and its implications for aggregate effective demand and the determination of aggregate employment. The relative inattention of the American Post Keynesians to issues of structural and technological change and the implications of the theory of value and distribution for the theory of output and employment in the economy as a whole reflects *The General Theory*, where Keynes ignored technology and perhaps himself never 'fully escaped' the marginalist approach to value and distribution.

Other heterodox economists have focused on one or the other of Sraffa's 'negative' and 'positive' contributions. The former regards the critique of the neoclassical (or marginalist) theory of value and distribution, the latter the revival of Classical and Marxian approaches to the same topic. Both of these projects have been the focus of Neo-Ricardian (or Sraffian) political economists. For the most part, Sraffians have paid relatively little attention to money and uncertainty on the one hand, and technical change on the other, while considerable focus has been paid to effective demand, in particular the attempt to reconcile the principle with Sraffian price theory and extend its application to the long run. A third line of development in addition to the American Post Keynesians and the Sraffians has been that heterodox political economy that has concerned itself primarily with structural and technological change. Some of this work in fact preceded *The General Theory*, for example the work of the Kiel School, of which Leontief was a participant, as well as that of Schumpeter. Just as the Post Keynesians have paid little

attention to technology and the Sraffians have paid little attention to uncertainty, effective demand and money are pushed to the background in much of the work on structural change.

Of course, these are broad-brush claims, and there are exceptions in each case. But even with the exceptions considered, the conclusion is still largely valid: little work has been done that considers at once money, effective demand, and structural and technological change, while thoroughly rejecting the neoclassical theory of value and distribution and replacing it with a logically consistent revived Classical/Marxian approach. If we then add to this Schumpeterian-inspired evolutionary concerns, alternative conceptions of rationality and emphasis on learning, consideration of uneven development and the open economy, and a commitment to social justice in the sphere of economic policy, we will have put forward a tall, tall order, indeed.

One name would rise to the fore were such an order placed, however: Luigi Pasinetti. For over four decades, Luigi Pasinetti has made seminal contributions in virtually every important debate and discussion concerning economic theory and policy, resulting in a framework that does in fact consider value and distribution, money and effective demand, and structural and technological change in a dynamic, evolutionary context. In this way, Pasinetti has elaborated and synthesized the work and spirit of his teachers and mentors: Kahn, Kaldor, Robinson, Sraffa, Goodwin, and Leontief. In doing so, Pasinetti has done more than accomplish a great intellectual achievement. While this he has certainly accomplished, Pasinetti first and foremost has developed a framework for understanding the economic society in which we actually live, one which is characterized by ongoing structural and technical change, deficiencies in aggregate effective demand, and persistent unemployment. Such understanding is necessary if

policies are to be devised that can eliminate unemployment, reduce poverty, and generate the economic security necessary for a more prosperous society.

Considerable attention has been paid lately to Pasinetti's contributions. *Festschriften* and symposia, entries in dictionaries and encyclopedias, and articles by students and colleagues analyzing and developing his contributions may be added to the Professor's own writings to form a body of work summarizing Pasinetti's theories and analyses, and it is not the purpose of the present paper to duplicate those efforts. This paper instead focuses on the importance of the goal of full employment in Pasinetti's political economy, and the prime point of Pasinetti's approach to eliminating unemployment: full employment policies must consider both effective demand and structural and technological change. After defining full employment and considering full employment as a societal goal, the paper turns to the methodology of full employment analysis. The two broad categories of unemployment at the heart of Pasinetti's analysis are identified, and a full employment policy that can address both the effective demand concern and the structural change concern is proposed.

DEFINING FULL EMPLOYMENT

The term 'full employment' has come to mean different things to different people, and it should therefore not be taken for granted that it is clear what the term means. The first issue concerns the resources referred to by the term. Does the term refer to full employment of all resources, or only the full employment of labor? While there is obviously *some* relation between the employment of labor and the employment of other resources, full employment will be used here to refer only to labor. Full employment of plant and equipment as well as labor will be referred to as 'full capacity utilization' or 'full employment of resources.' As we will see, it is

important to maintain a distinction between the two. First, while Pasinetti often includes both full employment of labor and full capacity utilization as part of his analytical framework and set of policy goals, the two are determined by different (though related) processes. Second, while it will be suggested that full employment of labor may be brought about through economic policy, it is less clear that full (as opposed to high levels of) capacity utilization is an attainable goal (in a capitalist system). Third, we will also see that for a number of reasons, it is not clear that full (again, as distinct from high levels of) capacity utilization, is desirable, even if it were possible. It may be that some degree of reserve capacity (which can translate into excess capacity at the industry and economy-wide levels) may perform an important function in a capitalist economy that might be retained even while eliminating unemployment of labor.

The second definitional issue regards the level of employment referred to by the term “full employment.” Contrary to the intuitive, common-sense meaning of the term, most economists and policy makers do not equate “full employment” with “zero unemployment.” Looked at through the lens of concepts such as the “natural rate of unemployment” and the “non-accelerating inflation rate of unemployment” (NAIRU), “full employment” has come to indicate that level of employment that is associated with price stability, *even if that means millions of individuals ready and willing to work are unemployed*. Such a usage obviously places fighting inflation above combating unemployment in the list of macroeconomic priorities. However, even in many cases where full employment is considered a higher priority than fighting inflation, a trade-off between unemployment and inflation is taken as given. Such an assumption is not made here.

Full employment for Pasinetti refers to zero involuntary unemployment. He therefore rejects any notion of a “natural” rate that includes unemployment:

If we were to talk at all of a ‘natural’ level of employment, this could not but be the level of full employment. In the present context, a natural rate of unemployment would make no sense; or, if we like, it couldn’t but be equal to zero.” (Pasinetti, 1993, p. 24)

Thus full employment means that no one who is ready and willing to work for an appropriate wage is without a job. This also means zero involuntary part-time employment. Involuntary part time workers, counted in conventional measures of employment statistics as fully employed, are those who want to be working full-time but can only find part-time employment. There might be included in this definition some very small amount of frictional unemployment, but only *voluntary* frictional unemployment (some individuals may choose to forego employment in order to devote full time to job search). Thus we are concerned with true full employment of labor, where every person ready and willing to work full-time has full-time employment, and those ready and willing to work part-time have as many hours of part-time employment as they desire.

WHY FULL EMPLOYMENT?

Throughout his writings, Pasinetti speaks of “a permanent, and challenging, task of pursuing the macro-economic goal of adequate global effective demand and full employment” (1993, p. 59). “The aim,” Pasinetti writes, “is clear: achieving the full utilization of available labour, i.e. full employment” (1993, p. 128).

a magnitude of national relevance [is] the physical quantity of labour that is available in the whole economic system. And it is clearly a matter of general concern that it should entirely be employed—i.e., that there should be full employment. (1993, p. 23)

Pasinetti often points to this emphasis on the goal of full employment as one of the most important contributions of Keynes, a point to which we will have occasion to return:

But full employment is too important for an economic system as a whole. Keynes was therefore right in advocating, at the institutional level, the inclusion of full employment into the objectives of overall economic policy, in the sense that the community as a whole takes charge of it as a goal to be pursued with whatever measures of economic policy

may be appropriate, whenever the spontaneous forces of interaction between employers and workers fail to bring it about. (1993, p. 132)

While it will be our position that Pasinetti does not—*contra* some authors (see, e.g., Shapiro, 1984-85)—*assume* full employment, what might be said is that he does assume full employment as a *goal*. This is because, with some exceptions, Pasinetti has not dedicated much space to justifying his placing of full employment as a—perhaps *the*--goal. One of the exceptions was in a 1984-85 issue of the *Journal of Post Keynesian Economics*, the title of which, “The Difficulty, and Yet the Necessity, of Aiming at Full Employment” serves as a good summary of Pasinetti’s position. In that article, Pasinetti states that:

It is the desirability of the full employment path, and the misery and social injustice of unemployment, that makes it a necessity for industrial societies to put the full employment path among the basic aims of economic policy. (1984-85, p. 248)

There was a time when it could be assumed that full employment was an agreed-upon goal of national governments, central banks, and supranational organizations, and Pasinetti often used this as an additional partial justification for his own taking of full employment as a goal of economic policy. In 1974, he could write that:

full employment is the situation that matters, and that, indeed, now-a-days forms one of the agreed goals of any economic system. (1974, pp. 119-20)

Halevi (1998, pp. 185-86) has pointed out that “twenty years later, there is enough evidence to doubt the contemporary validity” of the latter part of that statement, but the fact that the goal of full employment has been abandoned by central banks, national governments, and international organizations, has not stopped Pasinetti from maintaining it as a most important target, and the arguments for full employment remain as strong, or even stronger, than ever. It might do us well to briefly review these arguments.

The first argument for full employment is that the economic and social costs of unemployment—direct and indirect—are staggering. Unemployment causes permanent losses in

potential output of goods and services; economic, social, psychological and other problems resulting in crime, ill health (physical and mental), divorce, suicide, etc.; deterioration of labor skills and productivity; and more. The argument that full employment is key to social stability may also be included here. Quite simply, a compelling argument can be made that the benefits of full employment outweigh the costs of its achievement, and that unemployment, rather than inflation, ought to be viewed as 'Public Enemy Number One'.

The second argument for full employment is based on the idea that, just as there are human, political, and civil rights that may be considered "inalienable," so too are there economic and social "rights," of which the right to employment is one of the most important. This view was expressed by Franklin Delano Roosevelt in his 1944 State of the Union Address, and may also be found in a number of UN documents, including the "Universal Declaration of Human Rights." Similar proclamations can be found in many other countries as well. If individuals are ready, willing, and able to work and have no employment opportunities, it is government's responsibility to guarantee employment. Therefore, even if it was argued or could be shown that the costs of eliminating unemployment were greater than the monetary benefits, government would still be responsible for guaranteeing full employment.

The third argument is that the promotion and maintenance of full employment is required in many countries by law. In the U.S., this is due to legislation such as the Employment Act of 1946 and the Full Employment and Balanced Growth Act of 1978 (Humphrey-Hawkins bill). The former corresponds roughly to the 1944 British White Paper on Employment Policy. Similar legislation exists in many other industrialized nations as well. Thus, even if it was

argued that the costs are prohibitive and that employment is not an "inalienable" right, it may be argued that under current law many governments are obligated to guarantee full employment.

The fourth argument is that full employment is an ethical imperative in a capitalist economy. In a society in which unemployment is systemic, public inaction constitutes social assignment of workers and their families to poverty and/or various forms of assistance. Therefore, even if the costs are prohibitive, employment is not considered an inalienable right, and current legislation is not interpreted as legally requiring government to take action to promote and maintain full employment, it would nevertheless be wrong for government not to do so.

Doubtless there are many other arguments, and these categories overlap and should be treated as provisional. Clearly, however, the arguments for full employment--both individually, and taken together--are compelling. The crucial point is that unemployment is endemic to capitalism. Of course, even if unemployment were not inherent in capitalism, the arguments for government policies to promote full employment would still be strong, but the existence of involuntary unemployment provides a strong justification for the priority of full employment initiatives.

Full Employment is the foremost goal in Pasinetti's Political Economy. But this goal is not merely a policy *conclusion* of Pasinetti's analytical work, it plays a role in that analytical work itself. This is part of what might be called Pasinetti's 'full employment methodology,' to which we shall now turn.

THE METHOD OF FULL EMPLOYMENT ANALYSIS

There is a methodological issue that should be addressed, and that concerns the place of “full employment” in economic models or economic theory. Here we must distinguish between: 1) full employment as assumption; 2) full employment as logical or theoretical tendency; and 3) full employment as postulated goal. Models that *assume* full employment are certainly of little value in analyzing unemployment, if they are of any value at all. To assume full employment is, as Keynes remarked, “to assume our difficulties away” (1936, p. 34).

Traditional Neoclassical theory puts forward a theory of how, under certain conditions, a market economy will tend to full employment of resources. The price mechanism--perfectly flexible wages, prices, and interest rates--constitutes the self-adjusting mechanism that endows the system with an inherent tendency to full employment of all resources. This is not, strictly speaking, *assuming* the state of full employment, though the conditions under which the self-adjusting mechanism smoothly operates are being assumed. The assumption that all markets are perfectly competitive includes even more than perfectly flexible prices. A trailer-load of assumptions are hauled in behind the cab of ‘perfect competition’: assumptions regarding the knowledge and response-time of economic agents, factor mobility, factor substitutability and divisibility, factor homogeneity, the number and size of firms, and so on. Nevertheless, there *is* a *theory*--however unrealistic--of how full employment is supposed to be established.

Faced with persistent unemployment, then, there are two possible responses: 1) the theory is wrong; or 2) there are market imperfections and rigidities that prevent the smooth workings of the self-adjusting mechanism. Which view is taken has serious implications for economic and public policy. If the theory is wrong, we can work on formulating alternative theories of

employment determination. Such was the approach of Keynes (and the Post Keynesians), who demonstrated that even with flexible wages the economy has a tendency to a state of persistent unemployment due to insufficient aggregate demand. State intervention is thus necessary to promote full employment and economic growth.

Such is also the conclusion of Pasinetti. According to Pasinetti,

the traditional economic analysis...depicting a market for labour, with an overall demand function and an overall supply function for labour, where a flexible wage rate is supposed to act as a price that clears the market and thus always ensures full employment, or rather ensures the absence of voluntary unemployment, does not seem to make sense. To put it in other words, the market-price mechanism, if applied to the labour market, cannot ensure the clearing of such market. It cannot ensure full employment, simply because a labour market does not satisfy the basic conditions of a traditionally intended market, in which there is a market determined price that settles at a point where a downward sloping demand curve crosses an upward sloping supply curve, thus equating demand and supply. A market determined wage simply cannot do that. (1993, pp. 131-32)

The conclusion is clear: neoclassical theory is flawed, and the conclusions it reaches are therefore not justified. In addition, it is not just the neoclassical theory that is flawed; its policy conclusions are not justified elsewhere. Within Pasinetti's own, alternative framework, as we shall see, unfettered markets do not result in an inherent tendency to full employment. Thus, again invoking the name of Keynes, Pasinetti provides the following response to the question, "Can the free market institutional system do the job?"

This is the question Keynes explicitly posited to us. And he gave us his answer...[in his scheme the system is] not necessarily one of full employment... [and his] scheme also suggests what ought to be done to improve the market results, if not actually achieve full employment. It was a very simple scheme, valid within restrictive conditions (that were, however, relevant for the capitalist economies of the 1930s). It is astonishing how slow we have been—and still are—to learn the lesson that Keynes's simple scheme teaches us. (1997a, p. 103)

We should note, however, that Pasinetti's rejection of neoclassical theory and its policy conclusions, and his conclusion that free markets do not guarantee full employment,

or even a tendency to full employment, do not mean that Pasinetti sees no role for markets or the price mechanism at all. Rather, since “the market-price mechanism, when applied to the actual determination of the economic variables, cannot work equally well for all of them,” the lesson is that “it cannot be applied uncritically; it cannot be thought of as the only institutional mechanism to be used for a satisfactory determination of all economic variables” (1993, p. 145). Thus, while “we cannot expect the market-price mechanism to solve for us the macro-economic problems of... ensuring full employment” it may be useful for other purposes, in particular, for Pasinetti, “it leads the actual commodity prices toward the corresponding costs of production, and induces the producers to look for ever better technical methods” and “it may be judiciously used to promote an efficient mobility of labour among the production sectors” (1993, p. 146). We shall have occasion to return to this last point. For now what is important is that Pasinetti rejects the neoclassical theory and its conclusions, and also does not find support for those conclusions using his alternative analysis, yet he does see some role for markets and the price mechanism elsewhere.

Of course, as noted above, within neoclassical theory there is another explanation for unemployment, with important implications. If it is concluded that unemployment is due to “imperfections” then the policy implications are that the State should try to eliminate these rigidities--often attributed to government intervention such as regulation or minimum wage laws, or the existence of unions--and promote the conditions for the smooth workings of the price mechanism. Promoters of the neoclassical synthesis (‘Bastard Keynesians’) were successful for some time in balancing acceptance of neoclassical micro theory with a ‘pragmatic’ approach to public policy (‘fine-tuning’ with ‘Keynesian’ fiscal and monetary policy), but their policy stance did not follow from their underlying theoretical model, and they eventually lost their position of

influence within the discipline to supply-siders, monetarists, and adherents of rational expectations and ‘new classical’ approaches. Pasinetti, a sharp critic of the neoclassical synthesis, has also rejected this view (see, e.g., 1974).

Already it appears that we have slipped in the assumption that full employment is an economic goal. Mainstream methodology is not comfortable with such proclamations at the level of *analysis*, however, for it blurs the distinction between ‘positive’ and ‘normative’ economics. The third method of full employment analysis listed above, however, takes full employment as a postulated goal as the *analytical* point of departure. In such an “instrumental” approach (Lowe, 1965), the purpose of economic theory is to ‘work backward’ from the stipulated end-state (e.g., full employment, price stability, economic growth, more equitable distribution of income) to discover the suitable paths--including policies--by which the goal(s) may be achieved (Forstater, 1999a). Such an approach is at once strange and familiar. Strange, because it is so at odds with the traditional approach of beginning with data and then employing the deductive method to explain or predict outcomes, whatever they might be. Familiar, because it has an intuitive, common-sense appeal to it that in fact that is how economic policy is or should be conducted.

This approach is that of both Pasinetti and Lowe. While Lowe made the method the subject of several books and articles (e.g., 1965; 1987) in Pasinetti, while its application is present throughout his work (1981, 1993 and *passim*), actual discussion of the method is more infrequent. In the aforementioned article from the *Journal of Post Keynesian Economics*, Pasinetti responded to Shapiro’s claim that his model assumes full employment: “But in fact I do not make any such assumption. I simply state the conditions that full employment *would*

require” (1984-85, p. 247). As Lowe, quoting J. S. Mill in another context, pointed out, such a model, while “insufficient for prediction” is “most valuable for guidance” (1965, p. 243).

Pasinetti asked the question: “if the full employment path is never to be reached, why then should we keep it as our reference point?” (1984-85, p. 248). The answer, he suggests, and as we are emphasizing here, regards methodological issues. His answer also again invokes the name of John Maynard Keynes:

It is the really crucial merit of Keynes to have set out to demonstrate that, at any given point of time, the market forces are inadequate to perform the same task [of ensuring an inherent tendency toward]... the position of full employment, and I hope to have shown the difficulties that the structural dynamics of technology and demand interpose to the same task through time. But it is equally a great merit of Keynes to have singled out the full employment position, and by implication the full employment path through time, as the natural point of reference for economic policy. The failure of market forces to reach efficient positions does not justify our failure to pursue them by other means. (1984-85, p. 248)¹

Another way of posing the problem has been put forward by Halevi:

Reference to the difference between potential and actual output in aggregate terms can be useful to identify the degree of unused capacity. However, it becomes worthless for the purpose of discussing the condition of accumulation...once the system has been brought to operate at full capacity by means of short-run “Keynesian” policies. (1983, p. 347)

In other words, as we will see below, it is necessary to separate out the question of how full employment is *attained* from the question of how it might be *maintained* in the face of on-going structural and technological change.

¹ Lowe likewise interpreted Keynes in this regard: “By postulating a state of full employment as the overriding *macro-goal*, Keynes has taken th[e] decisive step, thereby giving to his analytical findings quite a novel meaning. All the obstacles to the attainment of the postulated goal...can now be turned into so many reasons for active interference with the autonomous course of events” (1965, p. 243). Lowe and Pasinetti also share another view with regard to Keynes’s methodology: it certain respects, it has some important features in common with the method of

While structural and technological change has also to do with the attainment of full employment, even if we have eliminated unemployment, problems still remain. And those problems can never be addressed by reference to the actual state of capitalist economic systems, since they all exhibit unemployment and excess capacity. We therefore need to address the problem by investigating the operational tendencies of full employment systems. To do this, we do not assume the economy is *at* full employment, nor that it exhibits an inherent tendency to full employment, nor that full employment is necessarily an actual goal of present governments. We investigate what are the conditions that must be met if full employment is to be attained and maintained, given the operational tendencies of capitalism at and below full employment and full capacity. Such a framework can then guide us in our attempts to formulate and implement effective practical policies.

Lowe referred to this methodological approach of discovering the necessary conditions that must be met to attain a given economic goal or goals as “instrumentalism,” a term also referred to by Pasinetti. Like Lowe, Pasinetti insisted on the distinction between such a goal or goals and the tools and policies for their attainment. The tools and policies are:

means, and not ends in themselves. Once their instrumental role is properly understood and recognised, it becomes much easier also to operate on them in as detached a way as is possible; to treat them as instruments susceptible to being continually improved and changed, in relation to their suitability (or unsuitability) to ensure tendencies, or near-tendencies, towards agreed ends. (1981, p. 155)²

Students and colleagues of Pasinetti promoting and elaborating his approach have explicitly referred to Lowe’s instrumental method as well. Scazzieri, for example, has argued that “the

Classical Political Economy, as against neoclassical economics (see Lowe, 1954 [1987]; Pasinetti, 1974).

² This distinction between means and ends has also a point of contact with Abba Lerner’s “functional finance.” I have elsewhere (Forstater, 1998a) shown the similarities between the method of functional finance and Lowe’s instrumentalism.

task of dynamic theory is not to suggest a realistic interpretation of actual processes” (1996, p. 183). Instead, it

shifts economic theory away from the theoretical reconstruction of actual processes and turns it into an experiment in instrumental inference, which is, using Adolph Lowe’s words, an attempt ‘to discover the particular set of causes that are suitable for the realization of some postulated effect’” (Scazzieri, 1996, pp. 183-84; see also, Baranzini and Scazzieri, 1990)³

In addition to their common methodology, the works of Pasinetti and Lowe, while differing in some important ways, also share a common focus on *structural and technological change*. This focus is different, though complementary (and related), to the Post Keynesian focus on aggregate balance, i.e., the aggregate demand-constrained nature of capitalism. These two concerns--the effective demand concern and the structural dynamics concern--correspond to two different questions (or sets of questions) and two different theories of unemployment as the

³ As mentioned in passing, one of Pasinetti’s teachers who influenced him in important respects, Wassily Leontief, was for a time a member of the Kiel School. There Lowe served as the Director of one of the first institutes for the study of business cycles and Leontief was working on his dissertation (from another university however). Kiel also served as the other location—in addition to Cambridge—where the reproduction models in the Quesnay-Marx tradition were being revived. It is also worth noting that the Kiel School sought the explanation of cycles in technological and structural change, and believed that cycles were rooted in the same forces that determined secular economic development. Thus, while Pasinetti appears to have worked out his theories and methodology quite independently from Lowe, one can in no way say that the commonalities are purely ‘accidental’ either.

normal outcome of unfettered market activity. It is to these questions and theories to which we must now turn.

ATTAINING AND MAINTAINING FULL EMPLOYMENT

The two analytically separable but related questions concerning unemployment may be posed as follows:

1) If there is unemployment in the economy, is there a self-adjusting mechanism inherent in the market system that will tend to push the economy back to the full employment level of output? If not, why not, and what policies follow from the analysis? If so, what is the nature of that mechanism?

2) Under what conditions can full employment and full capacity utilization be *maintained* in the face of ongoing structural and technological change, such as labor- or capital-displacing technical change, changes in the supply of labor or natural resources, or changes in the composition of final demand? Are these conditions likely to be met by the market system? If not, what types of policies might be implemented that can satisfy the conditions?

As we have seen, and as is well-known, neoclassical theory answers ‘yes’ to the first question, and the mechanism that assures the tendency to full employment is the price mechanism, under the condition of perfectly flexible prices (including factor prices) and perfectly competitive markets. Keynes and the Post Keynesians answer ‘no’ to the same question, based on an alternative theory of the savings-investment relationship that refutes Say’s Law, and the analysis of capitalism as a monetary production system. Thus, for Keynes, *involuntary unemployment is normal*, with full employment to be expected “only by accident or design”(1936: 28). ‘Design’ refers first and foremost to demand management policies conducted by the State.

Pasinetti applauds Keynes's contributions. But Pasinetti also warns that to stop with *The General Theory* would be unwise:

We cannot expect from Keynesian theories and policies what they cannot give. We have gained from them the avoidance of large-scale unemployment and this has been a notable achievement. But the resumption of growth is another matter. The economic system still has to solve the much deeper problems... the structural problems of learning the appropriate ways to expand. (1981, p. 238).

In particular, we need to address the issues that follow from the second question, as well as the first.

As to the second set of questions concerning the maintenance of full employment, in the neoclassical view, the same features that provide the system with the tendency to full employment, also endow the system with an amazing degree of flexibility. Prices (including factor prices) are fully flexible, and prices correctly convey information that economic agents with full knowledge instantaneously respond to in pre-determined ways. Factors of production are perfectly mobile, perfectly divisible, perfectly substitutable, homogeneous. The principle of substitution likewise dominates the analysis of consumer behavior. There is no historical time, uncertainty, or money. Thus, not only is there an inherent tendency to full employment and full capacity utilization, but the system in such a state instantaneously and easily adjusts to changes in technology, the supplies of labor and natural resources, and the composition of final demand. The production system, even at full employment of all resources, is fully flexible. As Basu has remarked, "in standard neoclassical models, flexibility is unimportant because it is total"(1995, p. 64). At the same time, the primary source of rigidity in the standard view is government intervention.

Analyses of structural dynamics that reject most or all of the neoclassical assumptions are based on a very different vision of the economic system that is more compatible with the Post Keynesian view, and is reflected in their conclusions. Key to these analyses is that economic processes take place in historical time. There are no instantaneous adjustments:

Instantaneous adjustments are not always possible, particularly in those cases in which it is necessary for each product to use 'specialized' productive resources (such as machinery of a specific type, or workers of a particular skill). (Pasinetti and Scazzieri, 1987, p. 528)

Capital goods are highly specific and in no way necessarily shiftable between different lines of production. Means of production are not highly divisible or substitutable, if at all. There is a significant amount of uncertainty regarding the future, and the past is unchangeable.

Modern economies are interindustry systems, with complex sectoral interdependencies such as are described in input-output analyses. Even analyses that are not as disaggregated as input-output models highlight the sectoral interdependence and interindustry linkages and their implications (see, e.g., the three sector models in Lowe, 1976). There are thus timelags, distortions, bottlenecks, and rigidities that reflect the physical and technical nature of the system.

There are two general approaches to the formal analysis of structural change, the ‘vertically-integrated’ approach and the ‘horizontally-integrated’ approach. The former is represented by Pasinetti (1981; 1993), the latter by Lowe (1976). Both of these approaches are non-neoclassical, despite the fact that they analyze systems operating at full employment and full capacity utilization. They do not assume full employment, or an inherent tendency to full employment. Rather, they take full employment as a stipulated goal and then analyze the conditions under which an economy operating at full employment and full capacity utilization might maintain that state in the face of ongoing structural and technological change.

Pasinetti’s framework recognizes that the economy is a multi-sectoral industrial system with ongoing technical change, and ongoing changes in final demand. Growth is not proportional—it is highly disproportional and disruptive. This means that the second question—the conditions that have to be met for an economy to maintain full employment and full capacity utilization through time—have to be addressed.

The conditions that must be met for such a modern industrial economy to maintain full employment—even if it could be attained—are neatly reduced by Pasinetti into two conditions: an effective demand condition and a structural change or capital accumulation condition. These two concerns—the effective demand concern and the structural change concern—correspond to two types of unemployment: technological unemployment or Marxian unemployment and Keynesian unemployment.

We will not reproduce these analyses here; there is a sizable literature on each of these approaches, as well as a number of excellent surveys comparing and contrasting the strengths and weaknesses of vertical and horizontal approaches (see, e.g., the papers in Baranzini and Scazzieri, 1990; Halevi, 1994). In fact, the two approaches may be seen as highly *complementary*. For present purposes, what is important is that both approaches highlight how difficult it would be for a full employment/full capacity system to *maintain* itself, even if it could be *attained*.

The conclusion is clear: the structural dynamics of employment mean that left to their own devices, capitalist economies will not run at full employment and full capacity: “This means that it becomes the specific task of institutions—that is, of the way society organises itself” to ensure full employment (1997a, p. 102):

A confirmation thereby emerges of the necessity of setting up some major coordinating institutions, at the level of the economic system as a whole—a necessity that emerges in the field of fiscal policy and in the field of monetary policy. (1993, p. 146)

Pasinetti does not propose completely doing away with markets, however. The task, as Keynes pointed out, is finding those spheres where markets are appropriate, and those where public institutions are required, and the way the two relate:

In fact, one of the great challenges for economists in the near future appears precisely that of finding ways to reconcile and render complementary the automatic stimuli coming from the competitive market-price mechanism with the necessary requirements for overall policies concerning the economic system as a whole. (1993, p. 146)

A full employment policy must thus address both involuntary unemployment of the Keynesian variety, that is, unemployment due to the inherent demand constrained tendency of capitalist economies, and ‘technological unemployment,’ here used as something of a catch-all phrase for unemployment due to structural and technological change. Of course, these types of unemployment are related, as technological change can affect the level and not only the composition of aggregate demand. For example, labor-displacing technical change may result in income redistribution between sectors of the population with different saving propensities, which can set off—or exacerbate—an effective demand crisis. In addition, focus on technological and structural change highlights not only issues related to *unemployment*, but issues related to the operation of an economy *at full employment*, when aggregate balance is no longer an issue, but sectoral balance very much is. These issues—sectoral proportionalities and imbalances—are key to the bottlenecks and rigidities that are associated with higher employment and capacity utilization rates. System flexibility is fundamentally an issue of economic and technological structure. Until a full employment plan can demonstrate the possibility of a flexible and stable full employment, the central banks, national governments, and supranational organizations of the world will continue to fulfill Kalecki’s (1943) vision of politically-enforced unemployment and excess capacity.

REAL LIFE FLEXIBILITY: UNEMPLOYMENT AND EXCESS CAPACITY

Standard neoclassical theory puts forward an idealized economy where methods of production and factor supplies instantly respond to demand that changes when relative

prices change. Structural analysis highlights the impediments to rapid adjustment, the structural disequilibria, the disproportionalities, and the physical-technical consistency conditions for system viability (reproduction) that especially confront an economy brought to full employment by, e.g., Keynesian demand management. In neoclassical theory there is a trade-off between flexibility and reality; in structural analysis there is a trade-off between flexibility and full employment of resources. The only way to have flexibility in reality seems to be with unemployment and excess capacity. Thus the primary 'real life' factor endowing the system with flexibility seems to confirm the 'Central Bank' view. Capitalist systems gain flexibility by sacrificing full employment. As Scazzieri, with reference to the Pasinetti model, has pointed out: "Short run difficulties (unemployment, spare productive capacity, the stagnation of once important industries) have to be considered as the necessary conditions for long-run expansion" (Scazzieri, 1983, p. 73).

Lowe referred to this as the paradox of capacity utilization: "recurrent, long-lasting stretches of underutilization" while a "periodic drag on output and income" and thus welfare generally, "from the viewpoint of growth" has had the "paradoxical effect" of providing the "large, pool of idle resources that greatly facilitated the system's adjustment to changes in aggregate demand and technology," i.e., "frictions and bottlenecks that impede inter-sectoral shifts of resources" were avoided: "Thus growth became a by-product of the cycle and hardly distinguishable from the latter's phase of recovery" (1976, p. 8).

But demand management policies, where successful, by reducing “the degree of underutilization of resources and the duration of their idleness,” can amount to a “reverse paradox” in which “the greater the success of this policy of stabilization, the smaller the flexibility of the system, and the greater the difficulties of achieving a smooth expansion path” (Lowe, 1976, p. 9).

Aggregate demand management, which refers to the attempt to push the private sector to full employment and full capacity, will create a system that is fraught with rigidities. Bottlenecks in key industries, such as the machine-tools industries, can cause economy-wide disruptions and prevent smooth expansion. Viscous system structure can result in sluggish growth and inflation. The system requires flexibility.

It is not clear what policies would ensure full capacity utilization. Given the desire for flexibility at the plant or firm level, the system would likely still reproduce some excess capacity even absent Central Bank enforcement policies (the system would not tend to full capacity utilization just because Central Banks suddenly stopped promoting slack). It is not even clear that, despite the potentially negative consequences, true full capacity utilization would even be desirable.

Full employment of labor, however, is both possible and desirable. The problem has been how to maintain the system flexibility and stability that unemployment helps to ensure, without the social and economic costs of unemployment. Lowe (1988), from the

perspective of structural analysis, supported what he called “planned domestic colonization,” which is better known as government as employer of last resort (Wray, 1998) or the buffer stock employment model (Mitchell, 1998), and we will simply call Public Service Employment. Such a policy approach is consistent with Pasinetti’s commitment to true full employment, his analytical concerns with both effective demand and structural and technological change, and his instrumental approach to economic policy.

FLEXIBLE FULL EMPLOYMENT: THE PUBLIC SERVICE EMPLOYMENT APPROACH

The Public Service Employment approach acknowledges the unlikelihood of attaining or maintaining full employment through indirect means such as stimulating private sector demand, while identifying a number of clear advantages to public employment programs:

Unlike private investors, public investors are not hampered by uncertainties about future demand, because they themselves determine the purpose that investment and its final output is to serve, for instance the items that make up the infrastructure. (Lowe, 1988, p. 107)

In public works there is a degree of variability and flexibility not possible in the private sector, where competitive pressures legislate methods of production, the composition of output and the types of capital equipment and natural resources utilized, and where private decisions governed by narrow economic motives may not be consistent with what is best for society as a whole (Forstater, 1999b).

Some of the major obstacles to full employment are rooted in the technological conditions of production. Employing workers available as a result of labor-displacing technical change or increases in labor supply depends on the prior construction of real capital. But the public sector has the ability to vary the labor intensity of productive activity in ways that the private sector cannot. The public sector may choose a more labor intensive method of production that would be 'inefficient' for a private firm, but which is quite reasonable from the perspective of social well-being. The public sector may also vary public employment between different tasks, for the purpose of altering overall capital-labor ratios or easing the utilization of certain types of capital equipment or increasing the utilization of yet other types. The spectrum of choices open include activities which approach the level of "*pure services* in the fields of health, education, and general welfare" as well as activities that do not use or make more limited use of precious natural resources and that do not pollute (Lowe, 1988, p. 107).

The Public Service Employment approach can address both the effective demand concern and the structural change concern. This is why it is not surprising that it has been supported by many whose own work is mainly focused on the effective demand concern. When there is unemployment, this is an indication that aggregate demand is too low. Government then hires anyone ready, willing, and able to work. This generates income and eliminates unemployment. But unlike the aggregate demand approach, public employment can also address sectoral issues. As demand increases in a sector, the private sector hires out of the public employment pool. Public works can be designed

with an eye to sectoral and technological developments. Again, public employees can use those types of capital equipment that are not in short supply, more labor intensive methods may be used in the public sector to ease capital shortages, because the government can use different criteria—criteria based on larger social and macroeconomic concerns—rather than the cost minimization or private efficiency criteria (Forstater, 1998b).

Pasinetti's observation that the wage mechanism, while incapable of equilibrating a so-called 'labor market', does have the ability to induce labor mobility between sectors, is pertinent here:

appropriate advantage may be taken of the incentive-generating characteristics of the market-price mechanism in dealing with the problem that always arises inducing labourers to move across sectors. In this case, some market determined wage differentials may perform the function of inducing and favouring the labour mobility required by the structural dynamics that is due to take place (as we have seen earlier)...In other words, useful wage negotiations, with due regard to labour requirements and labour availabilities, at the sectoral and even at the individual level, may be allowed to take place to suit intervened sectoral scarcities and redundancies....They serve the purpose of giving incentives to the mobility of labour out of declining sectors and into expanding sectors." (1993, pp. 132-33)

The buffer stock aspect of the Public Service Employment approach employs the wage mechanism in just such a way. As demand increases in certain sectors, employers will have to offer workers in the public employment sector a mark-up over the public sector wage-benefits package. As employment declines in other sectors, workers will move out of those sectors and into public employment.

CONCLUSION: PUBLIC EMPLOYMENT AND THE PRIME POINT OF PASINETTI'S POLITICAL ECONOMY

For four decades, Luigi Pasinetti has demonstrated that full employment policies must consider both effective demand and structural and technological change. He has asked Post Keynesians—and heterodox economists of all stripes—to please take all the components of Keynes's description of modern industrial systems as *monetary production* economies seriously. We must consider monetary and financial factors and aggregate proportionality and balance. But we must also consider technological and structural change—including changes in the composition of final demand—and sectoral proportionality and balance as well. As a result of Pasinetti's analysis:

A vast programme of research is thereby opening up. But there also emerges a wide programme for action. Not only is there an 'institutional problem' to be solved; there is also a challenge for 'institutional action' to be met. (1993, p. 147)

Government investment policy enters the scene: not to replace (or "crowd out") private investments but to complement them because of their insufficiency, if the task to be pursued is that of achieving, and maintaining, full employment. (1997b, p. 218)

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