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Arun Bose on Sraffa: Value Theory and Demand

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This paper provides a detailed account of the engagement of Arun Bose (1919-2003), the Marxist economist, with Piero Sraffa's Production of Commodities by Means of Commodities *(1960), based on the articles he published in the 1960s in the* Economic Journal *and* Economic Weekly. *The paper closely deals with the two fundamental aspects of Bose's involvement with Sraffa's 1960 book: (a) the assumption of constant returns to scale and (b) the role of demand in value theory. The Bose-Sraffa engagement yields a useful output – an interpretation of Sraffa's work, in the tradition of the classical economists.*

I Introduction

This article is part of a larger project which critically examines and documents the Indian reception to Piero Sraffa's 1960 revolutionary book *Production of Commodities by Means of Commodities* (*PCMC* hereafter).[1] The present paper explores Arun Bose's engagement with *PCMC* based on his published articles and his private correspondence with Sraffa, some of them being hitherto unpublished.[2] A brief account of Bose's life is presented in Section II. Section III provides an overview of Sraffa's economics. Section IV contains Bose's interpretation of Sraffa's value theory based on his published responses to the reviews of *PCMC* by Roy Harrod (1961), David Collard (1963), and Krishna Bharadwaj (1963a). Bose's (1965) engagement with the question of consumer's demand in Sraffa's value theory is critically evaluated in Section V. Section VI offers a conclusion.

II Arun Bose: A Life Sketch

Arun Bose was born in 1919 in Calcutta into the family of Bhupendra Nath Basu (Mishra 2003: 92). By the end of high school, he had become "curious about Marxian political economy" (Bose 1975: 11).[3] Bose obtained his Tripos from Cambridge University (1937-40) where his thinking was significantly influenced by Maurice Dobb and Piero Sraffa (Bose 1975: 11).[4] While at Cambridge, Bose joined the Communist Party of Great Britain and was actively involved in the student movement (Mishra 2003: 92). During the decade immediately after

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(1940-50), Bose worked as a full-time activist in the Indian communist movement (Bose 1975: 12; cf. Mishra 2003: 92). Around 1957, Bose decided "to resume the study of current literature in advanced theoretical economics" (Bose 1975: 12). And in 1960-61, he spent a year at Trinity College, Cambridge under the Commonwealth Universities Interchange scheme (Bose 1975: 11). Subsequently, he joined the newly founded Kirori Mal College in Delhi at the behest of B. N. Ganguli, the eminent economist, and Sarup Singh, the English professor who would later become the Principal of the College. It was between 1963 and 1965 that Bose closely engaged with Sraffa's *PCMC* (see Bose 1963; 1964a; 1964b; 1965). Also, it is during this period that Bose and Sraffa frequently corresponded through letters.[5] The final (documented) correspondence between them is in October 1969.

After an interlude of about six years of not publishing, Bose published two essays on Marx in the *History of Political Economy* (Bose 1971) and *Science & Society* (Bose 1972) journals. After another brief hiatus, in the November of 1975, he gave a series of lectures in Indian Statistical Institute (ISI), Calcutta, on Marxian and Post-Marxian political economy, which was later published as a book carrying the same title (Bose 1975).[6] Subsequently, in 1976-77, he was a visiting fellow at the Delhi School of Economics (DSE) where he gave lectures on capital theory. According to Bose, his *Marxian and Post-Marxian Political Econom*y (1975) should be read in conjunction with his *Political Paradoxes and Puzzles* (1977) and *Marx on Exploitation and Inequality* (1980).[7]

Before his retirement from Kirori Mal college in 1985, Bose published a letter in the *Economic & Political Weekly* titled 'Piero Sraffa' (Bose 1984) in response to P. R. Brahmananda's short obituary of Sraffa in the form of a letter (Brahmananda 1983). After his retirement, Bose employed his Sraffian-Marxian approach to explain India's socioeconomic condition (Bose 1986, 1987, 1989a, 1989b).[8] Samir Amin labels Arun Bose a "Sraffian Marxist" along with Ian Steedman and Ronald Meek (Amin 2015). Arun Bose died in 2003. Every two years, Kirori Mal College organises a memorial lecture in his name.[9]

III Sraffa's Economics

Sraffa's *PCMC* adopts the "standpoint … of the old classical economists from Adam Smith to Ricardo" (Sraffa 1960: v). The classical standpoint refers to the economics of William Petty, Richard Cantillon, François Quesnay, Adam Smith, David Ricardo, J-.C-.L-. Sismondi, Robert Malthus, and Karl Marx (although it is doubtful whether Sraffa would have included Sismondi and Malthus in this list). For the classical economists, the determination of value and distribution were interconnected but assumed wages to be separately determined – a product of history and culture. A coherent and satisfactory theory of value eluded the old classical economists. It is in Sraffa's *PCMC* that we find a logically consistent solution to the question of value.[10] Since the classical economists treated wages as exogenous, and Sraffa noted the possibility of the rate of profit alternatively being exogenously determined by the monetary rate of interest, Bharadwaj (1963a) aptly titled her review of *PCMC* 'Value through Exogenous Distribution'.

It must be noted that Sraffa, like the classical economists, developed an objective theory of value, which has its roots in the works of William Petty.

> *"The Method I take to do this, is not yet very usual; for instead of using only comparative and superlative Words, and intellectual Arguments, I have taken the course (as a Specimen of the Political Arithmetick I have long aimed at) to express myself in Terms of Number, Weight, or Measure; to use only Arguments of Sense, and to consider only such Causes, as have visible Foundations in Nature; leaving those that depend upon the mutable Minds, Opinions, Appetites, and Passions of particular Men, to the Consideration of others."* (Petty 1662: 244)

The theory of value in Sraffa is objective in the following sense: the givens (the size and composition of output, the methods of production, and the distributive variable) are observable and measurable unlike the unobservable datum of consumer preferences in the marginalist theory of value, which is subjective in nature.

Sraffa's theory also remained faithful to the classical standpoint in another significant way – the analytical separation of the price and quantity system (cf. Garegnani 1984: 296; Bharadwaj 1986: 62-64). At the same time, by eschewing terms with strong marginalist connotations such as 'capital', 'equilibrium', 'demand', and 'supply', and by showing the problems with the marginalist theory of capital, *PCMC* also served as a critique of the marginalist theory of distribution. Hence, Sraffa writes,

> *"It is … a peculiar feature of the set of propositions now published that, although they do not enter into any discussion of the marginal theory of value and distribution, they have nevertheless been designed to serve as the basis for a critique of that theory."* (Sraffa 1960: vi)

In fact, a significant part of the research programme that draws inspiration from *PCMC* deals with critiques of marginalism (see the articles by Garegnani, Harcourt, Kurz, Pasinetti, Petri, and Schefold mentioned in Aspromourgos 2004: 187).

According to Sraffa, "the rate of profit … must be uniform in all industries" (Sraffa 1960: 6). The classical economists were interested in permanent and not temporary causes. Hence, they tried to determine long-period prices (e.g., Cantillon's "intrinsic value" and Smith's "natural price") and not market prices which are transitory and therefore unsuitable for theorizing. Thus, classical economists sought to explain long-period prices under the conditions of free competition wherein labour and capital are freely mobile.[11] Under conditions of free competition, there is a tendency for the economy to reach a state where no additional profits can be obtained from the reallocation of capital; that is, shifting labour and/or capital to another industry will not yield a higher rate of profit. This state is characterized by a uniform rate of profits. To be able to say something definite, classical economic theory assumes free competition, which generates the uniform rate of profit condition. Of course, the classical economists were well aware that the real world was not characterised by free competition. Moreover, in reality, different prices exist for the same commodity even in the same location (perhaps due to imperfect information between consumers) but for purposes of theory, a uniform price is assumed. As Sraffa makes explicit in an appendix in *PCMC*.

> *"It is perhaps as well to be reminded here that we are all the time concerned merely with the implications of the assumption of a uniform price for all units of a commodity and a uniform rate of profits on all the means of production."* (Sraffa 1960: 91)[12]

Indeed, one can extend our argument to state that no two agricultural commodities or services are ever really the same in the real world and challenge the "assumption of a uniform price for all units of a commodity".[13]

Sraffa's assumption of a uniform rate of profit has been interpreted in the following two ways in the literature. First, Sraffa, following the tradition of the old classical economists is implicitly assuming free competition. Second, Sraffa's givens refer to the real-world economic system as it exists at any point in time, and to arrive at a solution for prices, the uniform-rate-of-profit assumption is a necessary consequence of given uniform wages (cf. Sinha 2016: xiii, 203-4).[14] The rationale of the former is straightforward and makes economic sense (see above). However, in the latter interpretation, how does it make sense to impose an unrealistic condition – that of the uniform rate of profit – to the real-world economic system characterized by immobilities of labour and capital, and therefore differential profit rates? Moreover, since Sraffa allows for unequal wage rates and uses the wage structure to render the heterogeneous labour homogeneous,[15] to interpret Sraffa as having assumed 'given uniform wages' is problematic.

A review of Sraffa's *PCMC* is incomplete without a discussion regarding the assumption or non-assumption of returns to scale. Sraffa is emphatic that no assumption of constant returns to scale (CRS) is made.

> *"Anyone accustomed to think in terms of the equilibrium of demand and supply may be inclined, on reading these pages, to suppose that the argument rests on a tacit assumption of constant returns in all industries. … In fact, no such assumption is made. No changes in output and no changes in the proportions in which different means of production are used by an industry are considered, so that no question arises as to the variation or constancy of returns."* (Sraffa 1960: v)

In other words, in the determination of the price system, the quantity system is assumed as given, as in the old classical economists. Indeed, if the size and composition of output is given, no question regarding returns can arise unless one adopts the marginal approach and poses the hypothetical question: what happens to the output when the inputs change? However, such a question is alien to Sraffa and to the old classical economists who did not employ the marginal method.[16]

IV Bose's *Economic Journal* and *Economic Weekly* Discussions

Roy Harrod's review of *PCMC* was published in the *Economic Journal* in 1961.[17] Sraffa responded to this review in 1962. In 1963, David Collard responded to Harrod's review.[18] Subsequently, Bose (1964a) responded to both Harrod (1961) and Collard (1963). And Bose's article yielded a response from Collard (1964) to which Bose sent a rejoinder (Bose 1964b). All the above-mentioned discussions took place in the pages of the *Economic Journal*.

The Economic Journal *Discussions*

Although Harrod writes that *PCMC* "makes a new approach to certain parts of economic theory" (Harrod 1961: 783), he thinks that Sraffa's insights can be absorbed "peacefully" by the traditional marginalist theory (Harrod 1961: 787). Harrod does not consider *PCMC* a revolutionary book nor does he think that it contributes to the revival of classical economic theory.

Harrod views the classical theory of value as a cost-of-production theory. This view requires qualification because, for instance, Smith's theory of value takes "effectual demand", a point, and not a schedule, as given.[19] In other words, "effectual demand" is exogenous to Smith's value theory, but a necessary element, with it being determined through a separate set of processes and in a different analytical domain or space. This is an instance of the separable method of the classical economists as opposed to the simultaneous determination of value (and distribution) and outputs in marginalism. And since Sraffa avoids using the phrase 'cost of production', Harrod does not place Sraffa's value theory in the same tradition as classical economics. However, it must be noted that in the case of non-basic commodities, value is determined via a cost-of-production approach because there is no "mutual dependence" unlike in the case of basic commodities where prices and costs are determined simultaneously (Sraffa 1960: 8-9).

> *"[A basic commodity's] exchange-ratio depends as much on the use that is made of it in the production of other basic commodities as on the extent to which those commodities enter its own production.*
>
> *…the price of a non-basic product depends on the prices of its means of production, but these do not depend on it."* (Sraffa 1960: 9)

Hence, Sraffa chooses to use the terms "value and price" which are "less one-sided … than cost of production" (Sraffa 1960: 9).

By approaching Sraffa's theory of value from the marginalist supply-and-demand approach, Harrod is unable to comprehend how any theory of value can be devoid of final demand and its composition (Harrod 1961: 784). In fact, he is insistent that value theory must contain final consumer demand and its composition as determinants. However, in *PCMC*, final demand does play a role insofar as they form a significant part of workers' real wages. As noted previously, the determination of the real wage in classical economics is an outcome of complex interactions between cultural and political factors, and is determined exogenously. Workers' consumption is "productive consumption",[20] to use the term employed by the classical economists. Sraffa also refers to what the classical economists called "unproductive consumption" (his examples are ostrich-eggs, raw silk, and racehorses) which plays no role in the determination of value (Sraffa 1960: 8). And since Sraffa treats the size and composition of output as given, it is only plausible that the size and composition of output will bear *some* relation to the size and composition of demand. Indeed, how else could it be in a competitive economy with profit-maximizing firms?

Harrod is also unable to make sense of a theory of value where one distributive variable (the wage rate or the profit rate) is determined exogenously.

> *"The distribution between wages and profit is not, so it appears, determined by a supply and demand relation. On the contrary, it seems to come in as an arbitrary datum."* (Harrod 1961: 784)

Sraffa's reason for treating the rate of profit as the exogenously given distributive variable *vis-à-vis* the wage rate is found in the following excerpt.

> *"The choice of the wage as the independent variable in the preliminary stages was due to its being there regarded as consisting of specified necessaries determined by physiological or social conditions which are independent of prices or the rate of profits. But as soon as the possibility of variations in the division of the product is admitted, this consideration loses much of its force. … The rate of profits, as a ratio, has a significance which is independent of any prices, and can well be 'given' before the prices are fixed. It is accordingly susceptible of being determined from outside the system of production, in particular by the level of the money rates of interest." (*Sraffa 1960: 33)

For someone accustomed to think in terms of the marginalist theory of value and distribution, the exogeneity of a distributive variable might come across as an "arbitrary datum". Moreover, it is because value is determined through exogenous distribution that classical economics is truly open to history unlike in marginalist economics where distribution is uniquely determined by narrow and impersonal economic forces alone. For instance, the current wage rate is partly determined by the *past* struggles of the workers. In sum, Harrod is unable to appreciate Sraffa's contributions to the theory of value and distribution.

Sraffa published a response to Harrod's review in 1962, which would turn out to be his last academic publication. In his response, Sraffa aimed to clarify two misunderstandings present in Harrod's review of *PCMC*. The first relates to the role of demand in value theory, a matter of importance for this paper. The second deals with the valuation of capital, which we leave aside because Bose does not engage with it. In the following extract, Sraffa clarifies that he assumes given methods of production in *PCMC*.

> *"Sir Roy [Harrod] … is led to the conclusion that a change in the composition of consumer demand 'would at once, in accordance with Mr. Sraffa's own equations, affect the price ratios' (p. 784); and even though the words which I have italicised necessarily imply that the methods of production would be unchanged."* (Sraffa 1962: 478)

As discussed earlier, Sraffa has taken the quantity system as given. In fact, in a competitive economy, there is necessarily some relation between the size and composition of output and the size and composition of consumer demand. Moreover, to presume that changes in the composition of consumer demand will result in proportionate changes in the composition of output is unwarranted because of inter-industry interdependence. In short, Sraffa's response did not favour Harrod's review.

Harrod's 1961 review also elicited a response from Collard (1963). Collard had sent a draft of his response to Sraffa on 10 June 1962 (D3/12/111: 107-9).[21] In his response, Collard demonstrates that the two approaches – commodity and labour – to value theory provide the same result. The labour approach refers to Sraffa's discussion of value theory by recourse to the "reduction to dated quantities of labour" (Sraffa 1960: 34-40). According to Collard, in order to compute the labour cost of any commodity, one needs to obtain the production equations from the "past". Here, Collard makes a highly simplifying (and very restrictive) assumption.

> *"…it is not immediately obvious how we are to derive the inputs of previous years until we know what the conditions of production were in the past. I suggest we assume production in the past was carried out in an exactly similar way to production now, i.e., that the same techniques were used and there were constant returns to scale."* (Collard 1963: 145)

Employing the CRS assumption in Sraffa's "reduction to dated quantities of labour" is unwarranted, unnecessary, and more importantly, incorrect. In Sraffa's letter to Collard,[22] he writes,

> *"But do you really need to bring in those 'stringent assumptions'? Surely nobody wants to know the story from the beginning of time …. In fact the question asked by all those who have used any form of the labour theory, from Marx to Bohm Bawerk, is in effect, 'how much direct or indirect labour would be required under present conditions', the successive stages being regarded as carried out side by side."* (D3/12/111: 113)

Moreover, there is a significant analytical difference between Sraffa's assumption of a given technology at a point in time and Collard's assumption of an invariant technology over time. Owing to the stringent assumptions of CRS and invariant technology, and its inapplicability to the multi-product industry, Collard concludes that "the labour-cost approach is inferior to the commodity approach" (Collard 1963: 146).

Bose responds disapprovingly to both Harrod's and Collard's claim that in Sraffa's *PCMC* the labour-cost approach is inferior to the commodity approach (Bose 1964a). In addition to these two approaches of determining value, Bose points out that Sraffa's book contains another method: the sub-systems approach. Furthermore, he argues that the CRS assumption is unwarranted. Collard (1964) responds to Bose (1964a) and argues that even in the sub-systems approach an implicit assumption of CRS is present. In his reply to Collard, Bose (1964b) reiterates that there is no implicit CRS assumption in the sub-systems approach because it is just a mental manipulation of the system of production under investigation. The following excerpt from Bose's reply is particularly telling.

> *"In fact, the construction of sub-systems is a purely mental manipulation leaving technical conditions unaltered. Consequently, no question of variation or constancy of returns arises. … To solve such equations [via the sub-systems and the commodity method], you have to manipulate on paper the original equations to eliminate some of the variables. When you do that you don't produce anything differently in the real word, nor do you require any additional information not given to you in the original production equations."* (Bose 1964b: 728)

To sum up, as Bose argues, there is no reason to assume CRS in any of the approaches to value theory found in Sraffa's *PCMC*.

The Economic Weekly *Discussions*

Krishna Bharadwaj published her review of *PCMC* in the *Economic Weekly* in 1963. Bharadwaj's review won Sraffa's praise and "it launched a life-long intellectual association with Sraffa that culminated in her being named the editor of his papers" (Omkarnath 2005: 459). Bharadwaj accurately places Sraffa's book in the classical economics tradition. While her assessment of *PCMC* is right on many counts (for instance, value through exogenous distribution, standard commodity, and measurement of capital), her view on the assumption of CRS in *PCMC* is problematic.

> *"Sraffa forewarns in his preface that no assumption regarding constancy of returns to scale is made. In fact, with no changes either in the scale of output or input-proportions this question is irrelevant."* (Bharadwaj 1963: 1454)

This sentence is complemented with a footnote where Bharadwaj feels that Sraffa may have implicitly assumed CRS.

> *"Nevertheless, while reading the paragraphs relating to the construction of the standard system and more particularly the Subsystems, one gets a feeling as though the assumption of constant returns to scale is necessary."* (Bharadwaj 1936: 1454n; emphasis added)

As pointed out previously, no assumption of CRS is necessary in the sub-systems approach.

Bharadwaj wonders how growth can be successfully theorised within the Sraffa system (Bharadwaj 1963: 1454). Why expect Sraffa's value theory to provide answers to the question of economic growth as well? (Nevertheless, there is a legitimate question as to how Sraffa's approach to value and distribution can be rendered consistent with growth theory.) The separate treatment of price and quantity system in classical economics and Sraffa is in contradistinction to the simultaneous and symmetrical treatment found in marginalist economics. Bharadwaj herself has noted this in her R.C. Dutt lectures published as *Classical Political Economy and Rise to Dominance of Supply and Demand Theories* (Bharadwaj 1986: 61-3). Anyone accustomed to think in marginalist terms will be tempted to develop a unified theory to explain both value (relative prices and distribution) and quantity (output and employment levels) variables.

Bose (1963) responded to Bharadwaj's review in the form of a short comment, which appeared in print about two and a half months after her review.[23] Bose argued that no implicit assumption is necessary in the construction of the standard commodity because its construction "involves nothing more than a purely 'drawing board' regrouping of the productive facilities of the actual system" (Bose 1963: 2010). In her reply to Bose, she agrees with him that the CRS assumption is unnecessary in the construction of the subsystem (Bharadwaj 1963b). However, she does not indicate whether it is because of the same reason as Bose's or something else. The only piece of evidence she provides is that Sraffa "doubly assured" her in a private communication (Bharadwaj 1963b: 2010).

To conclude, in the published comments by Bose in the *Economic Journal* (1964a, 1964b) and the *Economic Weekly* (1963), he underscores the fact that the CRS assumption is not required for Sraffa's value theory.

V Consumers' Demand and Sraffa's Value Theory

After a brief interlude of two years, Bose published an article entitled 'Consumers' demand, distributive shares and prices' (1965) in the *Economic Journal*. In this essay, Bose compares Sraffa's value theory with the non-substitution theorem and finds the former more general than the latter. Sraffa's value theory "does not merely duplicate the non-substitution-theorem-based analysis, but in all probability has wider validity" (Bose 1965: 773). In a footnote, he takes support from Sukhamoy Chakravarty's review of *PCMC* (Bose 1965: 773n).[24] In addition, Bose states that Sraffa does not assume CRS in his "standard system".

> *"It is a purely auxiliary theoretical construct used by Sraffa to show that a mathematical property of all actual systems has a crucial economic significance. The discovery having been made, there is no need to use it: all the tools required to make price calculations in actual situations may be obtained without constructing the standard system. In any case, the standard system is constructed by making pure paper manipulations, of the sort made when we solve any equation. No additional information regarding the*

> *relations between outputs and inputs, beyond what is available from the original data, are required. Thus, no assumptions regarding the constancy or variability of returns are involved."* (Bose 1965: 774)

After all, the standard system is "a purely auxiliary theoretical construct" (Bose 1965: 774). Since Sraffa's value theory is not based on potential changes, as Bose correctly writes, "the question of constancy or variability of returns does not arise (Bose 1965: 772). Moreover, Bose finds Sraffa's value theory to be "impeccably realistic and comprehensive" (Bose 1965: 775).

Subsequently, Bose argues that "consumers' demand patterns may create a problem of indeterminateness, but never determine prices; [and] that an uncontrolled exchange economy is unable to escape indeterminacy caused by demand patterns" (Bose 1965: 773). Bose uses the phrase "uncontrolled exchange economy" to refer to a decentralised economy and "controlled exchange economy" to refer to a centralized one. Harrod also had made a point about consumers' demand in his 1961 review of *PCMC*: "I cannot find anything in this more elaborate account of price determination that justifies ignoring the influence of the commodity-mix that consumers wish to have" (Harrod 1961: 785). Bose was of course well aware of this review and writes in a footnote that, in Harrod's review, "the question was raised but not pursued very far" (Bose 1965: 775n).

This problem of demand Bose describes is similar to that found in Marx's volume III of *Capital* – a disproportionality crisis (Marx 1894: 484: cf. Thomas 2015: 147-50).[25] Bose then provides instances where there could be demand-supply mismatches: "non-wage-earners' slack consumption demand; non-utilisation of the left-over quantity for enlarged investment in the next period due to the non-availability of complementary goods (or labour); inability to effect the required 'transformations' of these unsold stocks via foreign trade" (Bose 1965: 777n). In short, "if for any reason a part of the net output of good A remains unsold there will be a problem of 'indeterminacy'" (Bose 1965: 777-8).

As noted earlier, Bose does not, and rightly so, think that demand-supply mismatches will affect value theory directly (cf. Bose 1965: 773). Of course, they affect market prices, which are not an object of analysis in classical economics because they are influenced by transitory factors as opposed to systematic/permanent ones. As in the classical economists, Bose distinguishes between "production prices" (akin to classical economists' "intrinsic value" and "natural price") and "transactions prices" (akin to classical economists' "market prices").[26]

> *"The production prices will remain at the Sraffa levels, but the 'transactions prices' may in these cases [of demand-supply mismatches] be different, depending upon expected demand patterns."* (Bose 1963: 781)

It must be highlighted that Sraffa is explicit that his theory "contains no reference to market prices" (Sraffa 1960: 9). After all, the quantity system is a given.

Bose argues that these demand-supply mismatches result in "'indeterminateness' or non-fulfilment of the Sraffa conditions for self-replacement of the system" (Bose 1965: 778). And indeed, during this demand-supply mismatch situation, "industries with unsold stocks will be making losses, that is to say, earning deficient profits (below the uniform profit-rate proportioned to the capital advanced to each industry)" (Bose 1965: 778). A page later, Bose reiterates his claim more forcefully: "It may be readily conceded that in a free-market-based uncontrolled economy the Sraffa conditions [for self-replacement] will almost never be fulfilled" (Bose 1965: 779).

There is a problem with Bose's argument. Sraffa's *PCMC* contributes to value theory and not to the theory of activity levels or economic growth. Moreover, Sraffa, as did the classical economists, adopts a separable approach to determining value and distribution and activity levels. When determining value and distribution, the size and composition of output is kept constant. As Sraffa writes in the preface to *PCMC*, "[n]o changes in output … are considered…. The investigation is concerned exclusively with such properties of an economic system as do not depend on changes in the scale of production…" (Sraffa 1960: v). In the excluded parts of the above excerpt, Sraffa assumes the technology as given. Immediately afterwards, he informs the reader of the standpoint he adopts in his book: that "of the old classical economists from Adam Smith to Ricardo" (Sraffa 1960: v).

Shortly afterwards his discussion on differential profit rates in his article, Bose writes that demand-supply mismatches will not generate "corrective price-output adjustments" (Bose 1965: 779).

> *"Sectoral losses and gains will throw the whole system out of gear, instead of promoting corrective price-output adjustments. This is because the ultimate determinants of prices – the physical production relations and the social wage-profit division – will not be 'adapted' easily to the 'forces of demand' acting via divergent profit-rates, although they will almost certainly be changing autonomously from one time period to another."* (Bose 1963: 779)

In the above passage, Bose attempts to explain the disequilibrium dynamics of the economic system. However, it must be noted that classical equilibrium prices are *associated* with a balance of outputs and demands (given by the quantity system). This is unlike in marginalist economics where the equilibrium of demand and supply *determines* prices. The adoption of the separable method by classical economists, and by Sraffa, as mentioned already, makes the classical approach truly open to history and enables it to be more realistic. A very fruitful line of ongoing research marries the classical theory of value and distribution with the Kaleckian/Keynesian principle of effective demand (for instances, see Garegnani 1978, 1979; Kurz 1985; Serrano 1995; Trezzini 1995; Smith 2012); this is analytically possible because of the separable method of the classical economists.

Besides, Sraffa's system is one where the quantity system is a given and determined separately. Therefore, the "forces of demand" insofar as they are embedded in the production conditions do affect the price system. In *PCMC*, as already pointed out, the value of a basic commodity "depends as much on the use that is made of it in the production of other basic commodities as on the extent to which those commodities enter its own production" (Sraffa 1960: 9). That is, value depends on the production conditions (and the exogenously given distributive variable) and the production conditions reflect inter-industry use/demand. And of course, the inter-industry production conditions also reflect final consumption uses/demands. It ought to be clear by now that the classical theory of value, as revived by Sraffa, is not a cost-of-production theory. In a note composed in February 1955, Sraffa writes: "It may be noted that they [values] do not represent only the cost of production: they equally show the use, or disposal, of each product" (D3/12/2: 31) (as cited in Kurz 2012: 1566).

Bose's point about demand-supply mismatches is reminiscent of the Ricardo-Sismondi argument around the long period method in economics. While Ricardo assumes free competition in his economic theorizing, Sismondi, although working within the same classical tradition, emphasizes the need to examine outcomes when capital and labour are not fully mobile (cf. Thomas 2015: 107-8).

> *"In every country there is a going rate of profit in trade in the same way as there exists a going rate of interest; this profit becomes the same in all businesses which can be entered and left with ease, and it serves as a basis for general investment. But every old business, and above all, every industry which demands long training and much fixed capital, utterly avoids such competition. Its profits can be much higher or much lower, for a very long time, compared to those of an industry carried on in the same country by people who have no way of going from one to the other."* (Sismondi 1991 [1819]: 257; emphasis added)

It is now evident that Bose's expectations from Sraffa's value theory are unfair because the quantity system is theorized separately and not simultaneously. And unless a proper theoretical study of the quantity system is undertaken, nothing definitive can be said about the size and composition of output or the production conditions. Hence, while the following proposition of Bose does not affect Sraffa's value theory, it is an important consideration when studying the quantity system.

> *"It may be readily conceded that in a free-market-based uncontrolled economy the Sraffa conditions [for self-replacement] will almost never be fulfilled."* (Bose 1963: 779)

In the above excerpt, Bose is arguing that, in competitive economies, demand-supply mismatches may make self-replacement of economic systems difficult.[27] Subsequently, he argues that a "controlling authority" armed with "full information regarding the physical production relations" and the "power to set the social wage-profit division" can ensure self-replacement of the economic system. Such considerations have been articulated and ably addressed by Marx, Kalecki, and Keynes in their respective theories of activity levels and economic growth (cf. Thomas 2015: 156-161, 168-178).

VI Conclusion

Arun Bose's engagement with Sraffa started when he was an undergraduate at Cambridge. His first published work relating to Sraffa is his reply to Bharadwaj's review of *PCMC* in the *Economic Weekly*. In all his subsequent work, he points out that the CRS assumption is not implicit in Sraffa's value theory. He then proceeds to, although incorrectly, criticise Sraffa's value theory for not taking into account consumers' demand patterns. Perhaps part of the reason can be found in his reply to Bharadwaj: "it is far more important, at this stage, to discuss the validity and usefulness of the Sraffa theory on its own merits, than to decide which family of value theories known in the history of economic thought it belongs to" (Bose 1963, p. 2010). Bose wishes Sraffa's value theory to provide answers to quantity dynamics too, an impossible request, as it were. However, Bose understood Sraffa's emphasis on precision and objectivity in economic theorizing as is clear from the following passage.

> *"Piero Sraffa impressed me with his conviction that it was perfectly possible, though difficult, to develop a theory of political economy into an exact science, based on absolute precision of concept – however much we may approximate in empirical work – which could be wielded as effectively as a surgeon's or a welder's tools, to dissect or dismantle, and then reassemble the 'unseen' interconnections of the economic process, whose cognition is essential for revolutionary political action."* (Bose 1975: 11)

To conclude, it is crucial that the classical standpoint of Sraffa's value theory is underscored and revived by examining the classics. This will clarify the purpose of Sraffa's value theory and the scope of *PCMC*. A thorough examination of the classical economists' works will also make clear the analytical separability of the price and quantity system. Only such an engagement can help avoid unwarranted demands from being imposed on Sraffa's value theory – for instance, that it can be used to explain quantity dynamics. But nevertheless, if stability of the Sraffa prices is a valid question, the disequilibrium dynamics *must* involve price-quantity interactions (see Freitas and Serrano 2015; Trezzini and Palumbo 2016). Moreover, this will help to clarify the differences between the classical and the marginalist standpoints, although both of them aim to explain the same economic variables – relative price, wage rate, rate of profit, economic growth, and so on.

Endnotes

1. Omkarnath's (2005: 462) essay on Krishna Bharadwaj's review of *PCMC* is an early attempt that engages with the Indian reception to Sraffa's work. As he writes, "[a]nother issue that must await separate treatment is the engagement of other Indian economists, such as Arun Bose, P R Brahmananda, Gautam Mathur, Amartya Sen and Amit Bhaduri, with Sraffa."

2. I acknowledge Lord Eatwell, the Literary Executor of Sraffa Papers kept at Wren Library, Cambridge, for giving me permission to use them. I am also indebted to both Heinz Kurz and Christian Gehrke for sharing the Sraffa-Bose correspondence with me.
3. The preface to *Marxian and Post-Marxian Political Economy* (1975) contains autobiographical details.
4. According to Bose (1975: 11), "[d]uring extra-curricular sessions, both Maurice Dobb and Piero Sraffa discussed economic theory and Marxian political economy, leaving an indelible impression on my mind." And in Bose (1989a: viii), he acknowledges Sraffa, his "teacher".
5. Bose sent Sraffa five letters during this period and he received responses to all but one (that sent on April 2, 1964).
6. While working on his book, Bose informs the readers that he had consulted with Sukhamoy Chakravarty who had read the draft and had also familiarised Bose with "some results of modern linear economic theory" (Bose 1975: 13).
7. In *Debunking Economics*, Keen uses arguments from Bose 1980 to critique the labour theory of value (Keen 2011: 431-2, 441-2).
8. Sunil Khilnani, in his *Idea of India*, recommends Bose 1989b as an important text in "historical sociology" (Khilnani 2004: 218).
9. See Kirori Mal College website: http://www.kmcollege.ac.in/udepartmentnextdetails.jsp?details =colleges/dephistoryach/1127290520091019501.txt&depart=Economics.
10. The unsuccessful search for an invariable measure of value by Ricardo finally ended with Sraffa's standard commodity.
11. Although Sismondi also employs the classical standpoint, he puts greater emphasis on the outcomes arising from the immobilities of labour and capital (cf. Thomas 2015: 107-8).
12. As Oppocher and Steedman (2016: 13) write, Sraffa's *PCMC* "formulated a rational long period theory of production relating to the economy as a whole, based on the fundamental premise that competition tends to eliminate any divergence of profitability in the various industries."
13. I owe this point to Heinz Kurz who mentioned this during the 'Workshop on Sraffian Economics' held at Gokhale Institute of Politics & Economics, Pune, India on March 7-8, 2017, where an earlier draft of this paper was presented and discussed.
14. Sinha also maintains that Sraffa rejected "any role for demand or human psychology in his theory" of value (Sinha 2016: xii). Sinha treats demand as a subjective variable as in marginalist economics and thereby considers it equivalent to human psychology. The present paper argues that the size and composition of consumer demand (akin to Smith's effectual demand *point* and not the marginalist demand *schedules*) is embedded in one of Sraffa's givens: the size and composition of output (see section v below). Also, see the discussion on classical theory of value in Omkarnath, *et. al.*, 2011: 28-9.
15. The relevant excerpt from *PCMC* is as follows: "…we assume any differences in quality to have been previously reduced to equivalent differences in quantity so that each unit of labour receives the same wage (Sraffa 1960: 10)."
16. However, the reader might think that Ricardo's concept of intensive rent employs the marginal method. While discussing intensive rent, Ricardo writes that 'rent is always the difference between the produce obtained by the employment of two equal quantities of labour and capital' (Ricardo 1951: 71). And, since capital typically consists of a heterogeneous bundle of commodities, the knowledge of prices is necessary.
17. Harrod is a close associate of Keynes and most well-known for extending Keynes's principle of effective demand to the long period.
18. Collard got a First in the Cambridge Economics Tripos in 1960, the same year that *PCMC* was published.
19. As Smith writes in the *Wealth of Nations*, "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 ... such people

may be called the effectual demanders, and their demand the effectual demand" (Smith 1976 [1776]: 73).

20. In the first chapter entitled "production for subsistence", Sraffa uses "productive consumption" to refer to the methods of production: "We shall call these relations 'the methods of production and productive consumption', or, for short, *the methods of production*' (Sraffa 1960: 3).

21. The references to the Sraffa papers follow the catalogue prepared by Jonathan Smith, the archivist of the Wren Library in Trinity College, Cambridge.

22. The letter is originally dated 16 June 1962 and then redated to 21 June 1962.

23. Bharadwaj's review was published in the August 24 issue of the *Economic Weekly* and Bose's response appeared in the November 7 issue.

24. Bose writes in this article that "[n]o implicit constant returns assumption is involved in the use of the 'standard system' in the Sraffa analysis" (Bose 1965: 773-4) and adds a footnote after "involved" with the following declaration: "As stated by S. Chakarvarty (see Arthaniti, July 1961, p. 166, *passim*)" (Bose 1965: 773n). This footnote is surprising because the burden of proof is placed on Chakravarty whereas, as the previous section showed, Bose himself convincingly argues why Sraffa did not assume CRS implicitly. Chakravarty's review of *PCMC* was published in the *Arthaniti* (the journal of the Department of Economics, University of Calcutta) in 1961.

25. Here is the relevant passage from Marx:

> *"…a crisis could only be explained as the result of a disproportion of production in various branches of the economy, and as a result of a disproportion between the consumption of the capitalists and their accumulation. … The ultimate reason for all real crises always remains the poverty and restricted consumption of the masses….*" (Marx 1894: 484; emphasis added)

26. The phrase 'price of production' is already present in Ricardo (1951: 409).

27. But these capitalist economies *do* reproduce themselves over time – even if not at Sraffa prices, and chaotically.

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