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Engendering Macroeconomics: A Reconsideration of Growth Theory

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Summary. — Macroeconomics is gender-biased because of its neglect of the reproductive sector. This neglect is formalized in the assumptions, supporting most macroeconomic models, that population and the mapping from population to the labor force are determined exogenously. The use of these assumptions is demonstrated for the case of the aggregate growth models which have evolved from Harrod's original contribution. In addition, the development growth literature is shown to harbor a similar neglect. Some suggestions are made as to how these assumptions might be relaxed and some elements of a consequent theory and data project outlined.

1. INTRODUCTION

There is a considerable literature discussing how gender relations have implications for choice in adjustment policy on equity grounds (see, for example, the Commonwealth Secretariat, 1989; Afshar and Dennis, 1992). It is only relatively recently, however, that it has been argued that the failure to model gender relations may have implications for efficiency. Correct economic decisions require that gender relations be incorporated into the framework of analysis rather than used as a method of classifying or evaluating outcomes (Elson, 1991, 1992; Mayatech corporation, 1990; Haddad, Richter and Smith, 1992; Palmer, 1992). The logic of this position suggests that gender be incorporated into macroeconomic models. There are a number of difficulties, however, which make this less straightforward than at the micro or meso level of analysis. These difficulties turn on the aggregate nature of macroeconomics which submerges gender differences in circumstance and behavior.

This essay argues that progress may be made in developing a more gender-aware macroeconomics by reconsidering the assumptions made about the evolution of labor input in traditional and more recent growth theory. The typical growth model identifies the labor force with population and assumes this to be exogenous. This assumption directs attention away from the process by which labor is reproduced and maintained and how these might influence and be influenced by economic growth. A reconsideration of macroeconomic models from a gender-aware perspective should, as a first stage, attempt to provide a better treatment of labor input by recognizing its ori-

gin within a reproductive sector. This may provide new insights into the process of economic growth and provides a relatively simple way of incorporating some aspects of gender relations into macroeconomic discourse.

In what follows we first discuss the difficulties of introducing gender as an organizing principle within macroeconomics. This suggests the utility of an initial reexamination of the models which have guided macroeconomists' thinking about the evolution of the economy. The Harrod model is outlined and discussed and the treatment of labor input in its neoclassical, demographic and Keynesian offspring examined. Modern endogenous growth theory is briefly discussed. The focus is then switched to the treatment of labor input in some of the development literature. The Lewis model and Ranis and Fei's elaboration thereof are taken as examples. Finally, we discuss the difficulties of elaborating a fully gender-aware characterization of labor input; this suggests a data and theory project. A brief summary and conclusion complete the essay.

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2. EMPLOYING GENDER AS AN ORGANIZING PRINCIPLE IN MACROECONOMICS

Macroeconomics formulates its hypotheses in terms of stocks and flows of nongendered aggregates. These are only loosely based on microeconomic theorizing and are not, therefore, derived from the economic environment of individual agents — either male or female. The introduction of an explicitly gendered macroeconomics would seem for this reason to be difficult.

Of course, disaggregation is possible. At the simplest level, representative agents in different economic circumstances would carry different parameter values within a disaggregated model. A mechanical disaggregation, however, based on the fact that all economic agents are biologically male or female would be inappropriate. Gender disaggregation should correspond to our understanding of how gender relations impose constraints on the overall behavior of macro models; the analogy is disaggregation by class. In Keynesian macroeconomic models based on class the models are driven by the aggregate level of spending which becomes a function of the distribution of income between workers and capitalists. This is a structural rather than an individualist disaggregation. It is based on the different economic functions of workers and capitalists and corresponds to the institutional division between firms and households. Any disaggregation by gender should be based on a similar understanding of the way in which gender as a social institution impinges on or constrains the behavior of the macroeconomy.

An insight into how gender may constrain the behavior of the macroeconomy may be gained by looking at macroeconomics from the point of view of women and considering what activities it includes and what activities it excludes. It is evident that macroeconomics includes paid work but excludes unpaid work. Feminist economists have discussed this in terms of the inclusion of production and the exclusion of social reproduction. Here we shall build on this distinction to postulate a productive sector based on paid labor and a reproductive sector based on unpaid labor.

Gender is likely to have a predominant influence on the organization of the reproductive sector because of the rigidity of the division of labor in this sector and its organization along noncommercial lines. By reproductive sector is meant all of those activities and processes by which human beings are directly or indirectly reproduced and maintained. This can be defined at various levels of abstraction (see Benería, 1979). In this essay it is interpreted in the broadest sense to include all those activities which are undertaken to maintain and reproduce the labor force in both a physical and social sense. The recognition of the reproductive sector means that labor cannot, in aggregate, be treated as a nonproduced factor of production. How

this insight impinges on our models of the productive sector requires some conceptualization of how the reproductive and productive sectors interact.

In the economic literature there has been an inconsistent use of two contradictory formulations of the reproductive sector (see Humphries and Rubery, 1984). First, it has been formulated as absolutely autonomous. This provides the methodological justification for a complete separation of the productive and reproductive sectors. The alternative formulation is that of a reproductive sector which is simply reactive to changes in the productive economy; the effect of this is to empty the sector of separate interest. Neither approach is satisfactory — even within its own terms of reference. The assumption of absolute autonomy, for example, implies very strict constraints on the evolution of the productive economy in terms of labor input. In fact, the implicit assumption of very great flexibility is made; the reproductive sector is treated as a buffer. By contrast, the assumption of complete endogeneity models the activities of the reproductive sector simply as a subsector of the productive; it fails to acknowledge any characteristics of the sector not reducible to the utilitarian calculus. Following Humphries and Rubery, the methodological position adopted in this essay is that the reproductive sector is relatively autonomous. This acknowledges the likelihood of feedback from the activities of the reproductive sector and, therefore, demands the recognition of at least some aspects of the reproductive sector in the modeling of the productive, but also allows the reproductive sector to develop independently of the claims made upon it arising from productive relationships; this stops the reproductive sector from becoming merely a cipher for changes in the productive economy.

This conceptualization of the reproductive sector as "relatively autonomous" allows the gender bias within macroeconomics to be identified as its neglect of the influences arising from the sector; macroeconomics becomes a "bearer of gender" even though not intrinsically gendered (see Elson, 1991, 1994).

The objective is not, however, to provide formal economic specification of the reproductive sector — indeed, an element of the recognition of its relative autonomy is that this is unlikely to be fruitful — but to identify the ways in which macroeconomics has ignored any constraints arising from this sector. The most pervasive device by which macroeconomics is isolated from changes occurring in the reproductive sector is in the assumption that the labor force is determined exogenously. In what follows the use of this assumption within macroeconomic growth models is examined and some suggestions made as to how it might be relaxed. The focus of the discussion is aggregate growth models because, if gender relations have large macroeconomic effects, it is likely that these effects will be most marked over relatively long peri-

ods of time. In addition, of course, growth models have a very simple structure and provide a good index of how macroeconomists have addressed influences arising from the reproductive sector.

An examination of growth theory is also useful for a number of other reasons. First, although at a heroic level of abstraction these models have been of great importance in determining the framework in which practical policy makers have operated.¹ Second, growth models are constructed on the basis of sets of stylized facts from which explanation is to be fashioned. Such stylized facts are not theoretically neutral; they represent the world view of the theorist. In particular, such stylized facts do not occur prior to some initial conceptualization of a "problem." As Popper (1991) observes "Before we can collect data, our interest in *data of a certain kind* must be aroused: the *problem* always comes first" (italics in original). Phenomena which are not regarded as problematic will not be seen; the failure to "see" certain facts will, in turn, be reflected in the structure of the models produced. In addition, the set of stylized facts judged to capture the essential nature of the problem will be represented in the behavior of variables classified into exogenous and endogenous according to the initial view as to which causally important variables are influenced by feedbacks and so must be modeled endogenously; and which variables, although perhaps complex, are judged to be uninfluenced by feedbacks and so can be classified as exogenous. Thus, the issue of which stylized facts are brought into focus by theory and which held in the background as being outside the scope, competence or interest of the theorist is important. It has some interest in itself but also represents the prior view of the theorist about the causal patterns which theory will elaborate.

The "problem" requiring explanation which has impressed growth theorists is the existence of the long-run growth of output per head in some societies and not in others. This is the primary stylized fact which requires explanation. Among many other changes it has been accompanied by increase in capital per head; this has been the secondary stylized fact which has impressed growth theorists which has been placed at the center of explanation. The simple aggregative models, which Solow (1970) calls parables, are fashioned to be consistent with these stylized facts of experience. The endogenous classification for capital adopted by almost all macroeconomic growth theorists represents the view that capital accumulation is the essential engine of growth. By contrast the startling changes in, for example, population, and the mapping from population to the labor force are almost entirely neglected as important primary sources of growth or, indeed, as requiring explanation within growth theory.² This is reflected in this classification as exogenous or, in the small number of cases in which their behavior is endogenized, to their being reactive

to changes in the productive economy. The view that changes in population and consequent changes in the structure of the labor force might be an important source of growth or, at the least, a necessary condition for growth to proceed, although commonplace in other discourses (e.g. economic history), seems to have had remarkably little influence on macroeconomic growth theory.³

3. THE EARLY AGGREGATIVE GROWTH MODELS

(a) *The Harrod growth model*

The seminal contributions of Harrod (1939, 1948) have had an enormous influence on the literature on growth in both developed and underdeveloped economies — albeit interpreted in somewhat different ways. Even modern developments in growth theory, although perhaps unknowingly, continue to follow the structure which Harrod elaborated.⁴ The assumptions which he made about labor input have been correspondingly important to the direction taken by subsequent theorists.

Harrod's original contribution cast the Keynesian short-run equilibrium condition in a long-run setting and asked, among other questions, what, if any, mechanisms existed to allow us to suppose that a full employment balanced growth path was either possible or likely.⁵

Harrod defined the warranted rate of growth (g) as that growth rate in which the expectations upon which firms base their investment decisions are confirmed, or warranted, by the spending and saving decisions of consumers. In other words, it is that rate of growth of output which generates savings equal to the investment undertaken; a dynamic statement of the Keynesian short-run equilibrium condition of *ex-ante* savings equal to *ex-ante* investment. In a fixed coefficient economy, the capital-output ratio and the saving rate are given (v and s , respectively) so that $g = s/v$.

In order to discuss the issue of full employment in a growth model, Harrod defined a natural rate of growth (n) as "the maximum rate of growth allowed by population, accumulation of capital, technological improvement and work/leisure preference schedule, supposing that there is always full employment" (Harrod, 1939, p. 30). He then addressed, among other issues, the question of whether it was likely that $g = n$. In fact, in Harrod's formulation there is no mechanism linking n , s and v . Thus the achievement of a balanced growth path is only available by chance and, given the dynamics suggested by Harrod for the warranted growth rate, unlikely to be maintained even if achieved. The first phase of the subsequent development of growth theory consisted of asking whether

Harrod's conclusion was justified. It is important to note, however, that the focus of this literature was almost exclusively on the possibility of a developed capitalist economy delivering a long-run balanced rate of growth rather than a reexamination of the dynamics of the warranted rate.⁵

There are three alternative, but logically equivalent, ways of establishing balanced growth with $n = s/v$. Attention may focus on the malleability of the technology, represented by the parameter v ; this is the neoclassical route. Alternatively, the savings rate, s , may be regarded as a variable; this is the Keynesian/Post-Keynesian route. The third alternative is to make the "natural" rate of growth, n , a variable which responds to economic conditions. Although not exclusive devices, the literature can be classified according to the preferred parameter with which to establish the balanced growth path.

(b) Neoclassical growth theory

The most influential riposte to the difficulties identified by Harrod was the neoclassical model introduced by Solow (1956) and Swan (1956). Solow (1956) responded to Harrod's question by arguing that the apparent long-run stability in growth rates, at least in the West, suggested that mechanisms did exist to ensure that the warranted rate of growth would equal the natural rate. He developed a model in which the capital-output ratio, taken by Harrod as constant, molded itself to the current economic conditions. Growth was now conceived as the economy gliding along its production frontier as labor input increased either because of population increase or labor-augmenting technical progress.

The essential element of these models is the "normal," concave, twice differentiable production function; $Y = F(K, N)$ in obvious notation. Neoclassical theoretical presumptions (fluidity of factor prices) keep the economy on its production boundary so that the long-run evolution of the economy depends *either* on the evolution of the inputs through time *or* on the shift in the production function itself through time. Indicating differentiation with respect to time by a dot and partial derivatives with subscripts, then simply differentiating the production relationship gives:

$$\dot{Y} = F_K \dot{K} + F_N \dot{N}$$

So long as the economy is on the production function the time evolution of Y depends on the input growth, \dot{K} and \dot{N} , or the technology inherent in the marginal products, F_K and F_N . Traditional theory made the evolution of N and the change in technology exogenous and concentrated on some rule describing the evolution of K . For example, assuming $\dot{K} = I = sY$ and arbitrarily setting \dot{N} to zero we obtain

$$\dot{Y} = F_K \dot{K} = F_K I = F_K sY$$

which gives a proportionate growth rate ($= \dot{Y}/Y$) of sF_K . Of course, assuming a technology described by a fixed capital-output ratio, this is the Harrod result.

By imposing upper and lower bounds on the production function (the Inada conditions), determinate long-run steady state solutions are obtainable. From our perspective, however, the chief point to note about these models is that the evolution of the labor force is assumed to be exogenous. Solow (1956, 1970) discusses the possibility of a classical adjustment mechanism in which population growth is an increasing function of the real wage (or some other per capita income variable) and the production function makes the real wage a decreasing function of the rate of growth of output; this gives an equilibrium growth rate. But this simply addresses the Malthusian question of whether population growth sets an upper limit on the rate of growth of output; there is no discussion of how labor input might adjust in any other terms. The implicit assumption is made that population maps unproblematically into labor force. Solow's dismissal of the Malthusian possibility as being no longer relevant is then sufficient to allow labor force growth to be treated as exogenous.

A small number of neoclassical theorists have explored Solow's initial reflections; these economists provide the only investigation of the endogeneity of the labor force within the literature emanating from Harrod-Domar. The approach of this "demographic" school is straightforwardly Malthusian; population is assumed to respond to economic conditions, with its mapping into the labor force unexplored.

These ideas are well exemplified by Jorgenson (1961) who adapted the neoclassical model to a two-sector economy, with an advanced sector in which output depended on labor and capital and a traditional sector in which output depended on labor and land. Population growth was made a function of per capita income up to some limit. The depressing conclusion of this and other models is that population growth has a tendency to eliminate any increase in per capita income, with its corollary that only a reduction in the rate of population growth can lead to a sustained increase in per capita income.

(c) Keynesian growth models

An alternative class of models made the savings rate vary with the rate of growth so as to make this the equilibrating variable. The overall savings ratio was typically made to depend on a combination of the savings of workers and capitalists: $S = S_w + S_c = s_w \alpha Y + s_c (1 - \alpha) Y$, where α represents the distribution of income between wage earners and profit takers. Assuming different saving propensities between

classes, as the distribution of income varies so too does the overall savings rate. This allows the warranted rate of growth to adjust itself to the natural rate. This was the direction followed by Kaldor (1956), Passinetti (1961) and latterly the post-Keynesians. Note that, like the neoclassical models, these are full employment models with no role for labor input. The presumption is that the labor force evolves exogenously; the only issue is whether there is sufficient demand to employ the available workers. This demand becomes available through changes in the distribution of income between the classes.

A number of observations are worth making. First, note that the distribution of income within families, or, as amounts to the same thing, the control over this disposition, may have an important effect on the growth path which the economy follows. Of course, this is largely a compositional effect. It is not suggested that the aggregate level of consumption will be much different but that what income is spent on may be significantly different. There is micro-level evidence suggesting women, across a wide range of countries and income groups, have a higher marginal propensity than men to spend on consumables that benefit children and enhance their capacities (Alderman *et al.*, 1995). In more complex models in which a stock variable such as knowledge, human capital or labor quality may have an important influence on growth, the distribution of income within families may be an important determinant of the growth path. Second, the specification of classes provides some insight into how representative agents may be convincingly specified without grounding them in individualistic microeconomic reasoning. Capitalist savings behavior may be understood in terms of the institution of firms which make profits and accumulate assets, whereas workers' behavior may be understood in terms of lack of a permanent stake in the firms which employ them. The role of such agents is determined by the institution not their individual preferences and endowments. A similar insight is surely available for the key institution of the reproductive economy, the family, in which women's stake is different from that of men, particularly with respect to children (Alderman *et al.*, 1995; Kabeer, 1994; Sen, 1990). But, Keynesian theory has, like the neoclassical variants, assumed an identity between population and labor input and assumed an exogenously given increase in population.

(d) *The analysis of labor input*

It is apparent that little analysis has been directed at n . In particular, none of these models have examined non-Malthusian hypotheses about the relationship between fertility and income, despite the stylized fact of there being an inverse relationship over the

time horizon which most growth models address. In addition, and in some respects more importantly, the assumption of the demographic school has been that labor input is directly proportional to population. They have not addressed the issue of whether there are feedbacks between the productive and reproductive sectors in terms of participation, hours, effort or migration. Nor have any of the models suggested that changes in population or the labor force have any resource implications for the productive economy. There has also been silence on the possible interaction of gender inequality and population growth.

Of course, the concentration on population growth as a long-run determinant of labor input is understandable. Long-run growth seems to require explanation in terms of stock variables and population, as a proxy for the labor force, is such a variable. The objection is to the failure to progress to a more accurate characterization of the process; Malthus does not provide the only demographic theory. Yet, in general, as Stiglitz and Uzawa comment "Alternative assumptions about reproduction have played a minor role in the theory. Usually, labor is assumed to grow exponentially" (1969, p. 4).

The mapping of population into the labor force may be understood in two different ways. In the first place, it may be interpreted broadly by distinguishing between the labor force in terms of "basic" labor and a concept of effective labor. The interpretation of labor in terms of effective units allows influences other than population to contribute to (or reduce) its effective stock and provides a route for a wide range of variables (such as nutrition, social services, schooling, etc.) to influence the long run rate of growth. In the second place, the mapping may be understood as a simple proportion, ϕ , which determines how much of the population is available for paid work. Interpreted in this way, ϕ and the variables which it represents (such as participation, hours, intensity, migration) provide a more limited explanation of long-run growth; they are, in effect, levels variables. Nevertheless, even in this restricted sense their relative neglect is surprising. They are capable of providing a rich dynamic story in which it is ϕ which changes. Variations in participation, hours and intensity of work all provide mechanisms for which sensible stories can be fashioned to describe the adjustment of n to g . For example, within a neoclassical world, participation could be made to vary with disparities in g and n , either because of variations in wages or simply in response to the experience of unemployment. Imagine $g < n$ so that a growing proportion of the labor force becomes unemployed. Participation may fall to aid the rebalancing of labor demand and supply. Note that this view, however, in effect treats the reproductive economy as a buffer for the productive sector which absorbs and provides labor according to demand without further repercussions. Labor is seen

in the same way as land; higher turns extend the area of cultivation, lower returns allow it to be left fallow. Of course, the neo-classical perspective presupposes convergence. It is at least equally plausible that the downward pressure on family income may raise participation and increase the disparity between demand and supply for labor in the market. This is surely the more plausible assumption in an urban economy in which a tight money budget constraint operates; it has some support in the experience of developed economies during high unemployment periods and of urban areas in developing countries during stabilization and adjustment. As well as being responsive to disparities between g and n , ϕ may be influenced by a variety of policy instruments, from labor market regulation and the social security system to the pattern of social investment. It may also be influenced by long-run institutional changes in gender relations and in occupational structure (Howes and Singh, 1995). But, again, these influences may increase rather than decrease the disparity between demand and supply for labor.

Concern with the possible divergence between g and n reflects Harrod's Keynesian concern to model unemployment as a nontransitional phenomenon. The assumption of some degree of exogeneity, or at least of nonconvergence to g , seems to be necessary if the concept of involuntary unemployment is not to disappear as an analytical category in growth models. Its disappearance is, of course, inevitable if attention is focused exclusively on the mechanisms for achieving balanced growth. Harrod's solution was to make the natural rate of growth completely independent of the processes taking place within the productive sphere. In effect, Harrod was presupposing an absolutely autonomous reproductive sector which provided the productive sector with an exogenously determined labor input but with no labor market structure, and hence no functional relationship with any other variable in the model.

The strength of Harrod's approach is that it directs attention to the continual problem of matching and coordinating the changes in the productive economy brought about by technology and changes in income; and the autonomous and induced changes in the reproductive sector. By implication, this problem cannot be solved by changes in prices alone. But its weakness is that it overstates exogeneity by ignoring the malleability of ϕ , which may change in ways that reduce or intensify the coordination problem.

4. ENDOGENOUS GROWTH THEORY

The endogenous growth literature grew out of a dissatisfaction with the schematic neoclassical world of Solow's model. As several of the surveys of this literature point out (see, for example, Hammond and

Rodriguez-Clare, 1993) Solow's model has the unfortunate characteristic that the long-run rate of growth is determined by the exogenous natural rate of growth. This follows directly from the specification of the production function and its centrality in the neo-classical mode of analysis. As the economy is always presumed to be on the production function and as the production function displays constant returns to scale with diminishing returns to both capital and labor, "excessive" growth of either input generates diminishing returns; the long-run rate of growth is therefore constrained by the growth rate of the more limited factor. As capital is assumed to be the only accumulable factor, output growth is limited by the rate of growth of the labor force. In the absence of technological change or labor force growth, output growth asymptotically approaches a steady state value of zero. This is unacceptable because it does not correspond to the stylized facts of unequal growth rates over long periods and, in particular, the limited evidence for convergence and because, in some senses, it fails to explain growth; the long-run determinants of growth remain exogenous.⁷

One solution is simply to change the specification of the production function so as to avoid diminishing returns to the accumulable factor — capital. There are a variety of devices by which this can be achieved but they all require that, in some sense, capital is the only important factor of production. This has received its most clear-cut statement in the "AK" models associated with Rebelo (1991). Of course, in some sense these models have merely reinvented the Harrod-Domar model.⁸

A second and more interesting solution is best seen by considering the specification of the process of economic growth in the traditional literature. The traditional method of marrying the theoretical entropy of the neoclassical model with the evidence of continued growth is to introduce a shift parameter which moves the production function through time:

$$Y = AF(K, N).$$

Of course, balanced growth requires that the particular form of the shift through time should be labor-augmenting to give Harrod-neutral technical progress:

$$Y = F(K, AN).$$

Traditional theory regarded A as exogenous, made it a function of time, and rationalized the residual from growth-accounting exercises as reflecting technological improvement. The endogenous growth literature makes A a function of one of the other variables in the model so that the shift in the function, and therefore the growth of output, can be driven by the stylized behavior of the model's agents.

The favorite method of endogenizing A is to make it a function of K to give:

$$Y = F(K, A(K)N).$$

So long as $A(K)N$ grows at the same rate as K , long-run growth is possible.⁹

The dependence of the term $A(K)N$, the efficiency supply of labor, on K may be rationalized in a number of ways. The simplest way is to suppose that $A(K)$ represents human capital. Lucas (1988) allows this to be accumulated at a rate determined by "investment" of time in education. This may be interpreted as the production function having two accumulable factors. Alternatively, it may be regarded as a variant of the "AK" models in which, ultimately, only capital is important and labor becomes simply a vehicle for introducing more capital into the system.¹⁰ Alternatively, knowledge may be regarded as a stock with public good characteristics (Romer, 1986). One of the most relevant extensions of this insight is due to Barro (1990) who suggests that the effective labor input is a function of government "social" investment. This allows a role for government even in an extreme neoclassical environment.

The factors augmenting effective labor supply typically operate via an external effect arising from the accumulation of capital. The reason for this is usually unstated but clear; the individual private decision makers are still subject to diminishing returns which allows the simplifying assumption of perfect competition to be retained. Of course, without this device monopolistic competition must be introduced and some models have followed this route. But the precise details of the devices by which the dependence of effective labor input on the behavior of capital accumulation is secured are of relatively little *particular* interest.¹¹ What is important is the recognition that long-run growth is generated by a broader range of influences than those captured within traditional models and that these interests may occur via external effects and require government intervention.

From the point of view of labor input it is important to realize that these models do not attempt to integrate the growth of the labor force into the story.¹² The attempt to integrate human capital into this analysis is as a device to introduce extra capital into the story rather than as device to properly describe labor input. Nevertheless, these models have a number of interesting features for those concerned to introduce gender as an important influence on the evolution of labor input. First, these models, albeit indirectly, open the way for a treatment of labor itself as an accumulable factor which requires time to be devoted to its production. Second, the introduction of education and other aspects of knowledge as explicit influences on economic growth represents an important change in the identification of the real engines of growth. Current models use a very narrow definition of knowledge as specific skills but this could be extended to include a broader concept of socialization which creates a

capacity to acquire skills and which takes place largely through mother-child interaction within the reproductive sector. Third, the dependence of effective labor on government social investment allows the possibility of tradeoffs between cuts in government expenditures and the long-run rate of growth to be formally investigated. It also creates room for an extension of the model to consider the dependence of effective labor on investment of women's time in nurturing the current and future labor force. Fourth, the dependence of the rate of growth on preferences for investing in human capital (Lucas, 1988) provides an interesting possibility of developing a model in which the distribution of income between agents with different preferences for spending on developing human capacities might drive the long-run rate of growth. In so far as women have a greater marginal propensity to invest in the capacities of children than do men, the gender distribution of income could be a significant determinant of the rate of growth.

Of course, market-clearing assumptions and reliance on optimizing stories based on aggregate, yet still individual, representative agents make all of these models poor candidates for adequately capturing the influences of a relatively autonomous reproductive sector. Nevertheless, these models are helpful in so far as they have succeeded in refocusing growth theory on the importance of the effective labor input, and the process by which this is produced.

5. GROWTH THEORY FOR DEVELOPING COUNTRIES

The literature on growth in developing countries has traditionally paid more attention to the role of labor by focusing on intersectoral labor transfers. The departure point is Lewis who postulated a phase of development with unlimited supplies of labor (Lewis, 1954).

Lewis argued that many, and perhaps most, developing countries are labor surplus economies. If this labor surplus maintains a downward pressure on wages to keep them at an institutionally determined subsistence level, economic growth can occur rapidly due to the appropriation and reinvestment of the surplus in the modern industrial sector. The eventual elimination of the labor surplus will, however, cause the terms of trade between the industrial and agricultural sector to turn against the industrial sector, requiring an increase in the wage in terms of industrial goods to attract further labor. A crucial moment for the development process is the turning point at which labor ceases to be in unlimited supply. From then on, part of the surplus of production above subsistence needs has to be redirected to provide incentives to workers (who, it is assumed, will increase their consumption).

Lewis identifies a variety of sources of surplus labor: "... farmers, casuals, the petty traders, the retainers (domestic and commercial), women in the household, and population growth" (Lewis, 1954, p. 144). It is assumed that the modern industrial sector can draw on this surplus without reducing the output of the sectors from which it is drawn. The precise way in which this occurs is not specified although Lewis states: "Of course, they (i.e., those left behind in the traditional sectors) would have to work harder; the argument includes the proposition that they would be willing to work harder in these circumstances" (Lewis, 1954, p. 141). There has been much subsequent debate about whether this is a reasonable assumption (see, for example, Sen, 1975).

Ranis and Fei (1961) elaborated the Lewis model for situations in which the labor surplus is drawn from a traditional agricultural sector producing food. This allows them to give more precise definitions of the turning point. They identify three phases. In phase one, some agricultural workers are strictly redundant; their marginal physical productivity (*MPP*) is zero. Their absorption into an emerging industrial sector does not reduce agricultural output. So long as those left in the subsistence sector do not raise their food consumption per head and some mechanism (marketization, remittances, taxation, etc.) operates to transfer the agricultural output (food) to the new industrial workers in exchange for industrial goods, then industrial expansion through investment of all of the surplus may proceed on the basis of unlimited supplies of labor. At some point, however, the workers being absorbed from agriculture will no longer be redundant, i.e., their *MPP* > 0. The average agricultural surplus available to the industrial workers, on the assumption of a constant real agricultural wage in food units, will fall. The terms of trade for industrial goods will deteriorate so that the real wage in the industrial sector in terms of industrial goods must rise to attract further labor.

This defines phase two. The transfer from phase one to phase two is the shortage point. If the industrial sector continues to expand, the marginal productivity of the agricultural worker will rise above the institutional subsistence wage. At this point agriculture must compete to retain its workers and the real wage in agricultural units will also rise; the terms of trade will turn more sharply against industry. The movement from phase two to phase three is the commercialization point.

As Weeks (1970) emphasizes, in the appropriation of the idea of surplus labor from classical economics, Lewis and Ranis and Fei changed the mechanism by which the subsistence wage is maintained. In the classical tradition, the subsistence wage is maintained by the downward pressure of the reserve army of the unemployed; their *MPP* is zero because they have no access to the means of production. In the Lewis-Ranis-Fei version the peasantry has not been dis-

possessed and the subsistence wage is maintained because those remaining in agriculture are willing to work longer hours for the same hourly return. We must ask whether this is likely without some incentive. Standard neoclassical assumptions suggest that the remaining agricultural workers will, if they have control of output, require a rising hourly return for working longer hours. Weeks argues that underlying the Lewis-Ranis-Fei model must be a political or economic system of exploitation which is able to enforce longer hours of work in agriculture and labor transfer and the concomitant transfer of food output to the industrial sector. In contrast, Sen (1975) argues that poor people may be assumed to have zero marginal preference for leisure.

The existence of the reproductive sector is not explicitly recognized in the Lewis-Ranis-Fei analysis although Lewis mentions "women in the household" as a source of surplus labor.

In effect, a zero valuation is placed on the unpaid household labor which supports the real income of the agricultural subsistence worker and the modern sector industrial worker.³ It must be implicitly assumed within the Lewis-Ranis-Fei model either that such labor is unnecessary or that it is maintained during the process of labor transfer and reorganization. Maternal altruism would provide one explanation of women being willing to maintain their reproductive work, and also replace the contribution to the family farm of migrating males; domestic violence would provide another (Whitehead, 1990). The mobilization of the labor of young girls and old women through the relations of authority and reciprocity that characterize intergenerational ties provides yet another.

No attention is paid by Lewis or Ranis and Fei to a possible turning point stemming from the constraints placed by the demands of reproductive labor on transfer of labor to the modern growth sector, nor on the possible adverse effects which the growth of employment in the modern sector may have on the reproductive sector. The one resource which is seemingly always treated as being in unlimited supply is the unpaid labor of girls and women. But shortage of specifically female labor is the complaint heard in rapidly growing economies such as that of Singapore and Mauritius.

Thus, policies which improve productivity in the reproductive economy may be of considerable importance to the growth process. These include the extensive use of household labor-saving devices, which requires not merely their purchase but also investment in the public services which are often required for their use. The electricity and water grids are obvious examples where very large savings in women's time have a potential to release extra labor. In addition, a variety of activities within the productive sector have the potential for realization of large-scale economies if they are transferred to the productive sector. Food

processing and the production of garments provide examples. Of course, there is a potential tradeoff between the uses of the surplus in activities with a quick return which will raise the demand for labor and push the economy toward its Lewis turning point, and uses which take longer to come on stream but which potentially increase the supply of labor and move the turning point further away. These considerations also impinge on the form which industrialization takes; locational concentration of industry has some advantages but may reduce the possibility of mobilizing the labor of women and girls. A policy of greater dispersal may allow a larger potential surplus from the reproductive economy to be utilized. Naturally, the corollary of this is that improvements in transport and other infrastructure may have similar effects.

The general point remains that the Lewis-Ranis-Fei model of development by mobilization of underemployed labor and the expropriation of the surplus may be fruitfully reinterpreted from the perspective of the gender relations of the reproductive sector. In particular, many of the issues of mobilization and expropriation are centered on the dynamics of families as much as on the relations between the industrial and traditional agricultural sectors.

6. REFORMULATING AGGREGATE LABOR SUPPLY

In the earlier sections we discussed the rather empty characterizations of labor input which have been adopted in the literature on growth theory; the assumption that it is equal to population and that this is either exogenous or described by a simple neoclassical story of marginal adjustment. In this section we draw together some of the general themes which have emerged from this discussion and which might provide some guidelines for the development of a more gender-aware characterization of labor input.

The first observation to make is that a purely neoclassical approach seems an inappropriate method of characterizing the evolution of labor input. The specification of a perfectly functioning labor market in which labor supply responds voluntarily to a flexible real wage obscures the processes by which the labor force is constituted. The attempt to delve behind the market mechanism through standard microeconomic models of fertility and the family also seems unconvincing. These models appear fundamentally unsuitable for capturing interactions within the reproductive sector. It is not simply a matter of replacing unitary models of the household which postulate maximization of a joint utility function with bargaining models. There is not merely considerable evidence of nonmaximizing behavior but the fundamental requirements of the neoclassical approach — the equation of desire with satisfaction reflected in the assumption of the

exogeneity of preferences — seem much more questionable when applied to decisions about fertility and the family. The endogeneity of preferences in this area of human life seems particularly likely to be the case for women (Sen, 1990). In addition, the neoclassical method seems unsuitable for capturing the relatively autonomous behavior of the reproductive sector. As Elson (1991, p. 176) points out: "unpaid domestic labor is not carried out entirely for love, disregarding the economic costs and benefit; but neither is it another economic activity . . . Women . . . do not regard their children as just another crop."

Insofar as preferences are shaped by social norms, the norms of gendered behavior established by tradition and upheld sometimes by law and sometimes by the weight of expectation, disapproval, and coercion, seem a more fruitful starting point than the preferences of individuals. Such norms provide regularities which can provide the foundation for models of the interactions of the productive and reproductive sectors. We may note Solow's (1990) recent argument that the labor market is most fruitfully analyzed in terms of norms which are slowly changing functions of tradition and economic circumstance. This establishes a link with the classical tradition in growth theory. In classical models the subsistence wage is established partly by biological necessity and partly by social, institutional and historical contingencies. This provides a relatively autonomous anchor based within the reproductive sector which determines the limits to surplus extraction and therefore to capitalist accumulation. The classical tradition, therefore, emphasizes the centrality of the interaction of the productive and reproductive sectors to the process of economic growth (see Picchio, 1992 for a powerful case for a return to this classical analysis).

The behavior of the norms of the reproductive sector through time seems particularly important to how economies respond to different circumstances. It is noticeable that while some norms of gender roles have changed very rapidly, they have tended to change in ways that still preserve male power; for instance, gender roles have changed very quickly in response to market incentives for young women to leave the seclusion of their households and work in factories even in those societies, such as Bangladesh, in which we might have expected, *a priori*, there to be considerable resistance. There are, however, a number of asymmetries which might have important economic consequences. The gender segmentation of the workforce is largely maintained despite women entering the labor force in large numbers; some occupations become characteristically male and others female. Thus, increased female participation which does not undermine male power in the productive or reproductive economy is easily sanctioned. While there is considerable evidence, however, that women combine a substantial burden of work in the reproductive sector

with work in the productive sector, men do not usually take on major burdens of reproductive work even if displaced from the productive sector. They become unemployed in a more fundamental sense and may even shift to a variety of semi-legal or illegal informal activities.

The recognition that labor is a produced means of production directs attention to the necessity of a prior and continuing commitment of labor and other resources such as food and shelter. Any assumption about the behavior of labor which fails to take account of this is seriously misleading.¹⁴ The present representation of labor input, in effect, suffers from a failure to have a fully macro perspective; it assumes that in the aggregate labor force may be treated as a nonproduced factor because this is the perspective of a single business considering employing a particular person, for whose reproduction costs no direct responsibility is taken.

Although at rather a high level of abstraction this point has some important practical implications by first, emphasizing that there is, for a given population, an upper limit on feasible labor input to the productive economy, particularly female labor input. This is particularly important to recognize in the design and implementation of development policy. A recognition that women's labor must be released from the reproductive sector if there are not to be negative feedbacks on long-term development objectives raises the profile of policies designed to improve the efficiency of that sector. Second, in emphasizing that there is usually a lower limit based on a consumption minimum below which effective labor input is unlikely and below which the effective support for that labor cannot be provided by the reproductive sector.

This change in emphasis allows us to recognize the important possibility of the stock of effective labor depreciating in quality, and occasionally in quantity, if insufficient attention is given to its maintenance and reproduction. Some elements of this insight are, of course, captured within human capital theory and have been taken up by the new endogenous growth theory which treats education as a form of investment (Lucas, 1988). Nevertheless, that approach still treats labor itself as a nonproduced means of production. The intention here, however, is much broader and emphasizes the necessity for considerable prior commitment of resources, particularly by women, without any personal expectation of an immediate return, if a "unit" of labor is ever to become available to the economy.¹⁵ The corollary of a change in perspective from flow to stock is a fresh understanding of the way in which reductions in the flow of resources into the reproductive economy might produce deleterious effects. For example, this perspective allows an *efficiency* audit of the effect of poverty; reduced nutrition, poor health, stress and low educational provision may be regarded as policies which reduce the stock of labor

and will, in due course, reduce the flow of effective labor services and the potential and long-run rate of growth of the economy.¹⁷

In addition, this perspective allows us to consider policies which might have the effect of raising the stock of labor or maintaining that stock in the most efficient way in the face of negative shocks. In the first place it is clear that some elements of the "production function" of the reproductive economy may be provided socially. Thus government spending on various forms of social infrastructure, education, health and basic welfare maintenance may be justified as elements of an investment program to raise the quality of the stock of labor. Alternatively, if such policies, as seem likely, are characterized by economies of scale, they may be regarded as methods of releasing labor to the productive sector. In addition, this recognizes that a reduction in public spending on such programs may have the effect of reducing the responsiveness of labor to market incentives because of the prior commitments within the reproductive sector.

Of course, these discussions are far removed from the simple assumptions made in aggregate growth models. These considerations surely suggest, however, the value of exploring models in which the growth of the labor force is not exogenous but requires inputs from the productive sector and is characterized as a stock with a requisite stock equilibrium condition.

7. CONCLUSIONS

It has been argued in this essay that the limitations of macroeconomics as a "bearer of gender," despite its apparently gender-neutral language, will not be overcome by the reduction of the macro level of analysis into a micro analysis of gendered agents. Instead, we must ask how gender as a category is likely to impinge on macroeconomic aggregates.

The importance of gender follows from its centrality to the operation of the reproductive sector. The present generation of macro models isolate the productive sector from the reproductive by the assumption of labor force exogeneity. It was argued that this is likely to be particularly misleading over the longer run when a "relatively autonomous" reproductive sector might be expected to influence the quantity and quality of labor becoming available to the productive economy. Nevertheless, a broad reexamination of growth theory noted the ubiquity of the isolating assumption of exogeneity.

It was suggested that many of these models may be reanalyzed from a gender-aware perspective by changing their assumptions about labor input and recognizing some constraint arising from the reproductive sector. The formal exploration of this provides a theoretical project and a supporting empirical analysis of hypotheses a data project.¹⁷

The initial consideration of these models suggested the insights flowing from Harrod's theory, and especially the possibility of imbalance between the warranted growth rate determined in the productive economy and the natural growth rate determined in the reproductive, with a fruitful starting point. By contrast, much of the neoclassical, and indeed, the Keynesian growth literature which developed out of Harrod's theory, tended to ignore this possibility. The new endogenous growth literature, because of its concern to interpret labor as a vehicle for introduc-

ing extra capital into the production function, has some interesting possibilities for reinterpretation in a broader framework. In the development literature, the models of a labor surplus economy appear to be candidates for a reexamination from a gender aware perspective. Finally, it was suggested that any model based on a rethinking of labor input from the perspective of the reproductive sector was likely to see labor as a produced means of production with stock characteristics rather than as a nonproduced flow.

NOTES

1. It is useful to recall Keynes's famous comment: "Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist" (Keynes, 1973, p. 383).
2. Until recently technology also fell into this category; it was essentially treated as manna from heaven.
3. This is not true of the classical economists who placed the interaction between the reproductive and productive sectors at the heart of their analysis. In some senses, therefore, modern growth theory has forgotten its own history.
4. It has been observed by several authorities that the early contributors to growth theory are not referenced in the modern work.
5. We recognize that Harrod's original paper addressed several questions; Sen (1970) picks out three. For our purposes it is Harrod's confrontation of the warranted and natural growth rates which is important.
6. Sen (1970), p. 14, "Harrod's model of instability is undoubtedly incomplete, but it cannot be denied that he was focusing on an immensely important part of growth economics which subsequent pre-occupation with perfect foresight has somewhat tended to obscure."
7. This also undermines the neoclassical presumption that savings, reflecting thriftiness, are the driving force behind growth.
8. Solow (1994) makes this point in a skeptical essay.
9. This is not a trivial restriction and is not one solved by the often extremely elaborate micro foundations offered for these growth models.
10. The trouble with these models, as Solow (1994) fiercely points out, is that they require constant returns to capital if growth is not to explode or peter out. This restriction seems to have no empirical support.
11. It seems curious that much effort has been expended giving particular microeconomic stories to support the idea of effective labor having an accumulable dimension and then requiring these to be fitted into very particular forms of production function.
12. Amazingly, Hammond and Rodriguez-Clare (1993) describe labor in their survey of the new growth literature as the "nonreproducible" factor. Of course, models can be developed to endogenize fertility within this framework. See for example, Becker, Murphy and Tamura (1990). Such models are driven by agents balancing the returns from "extensive" investment in children through large families against the gains from "intensive" investment in children via education in small families. They are not the immediate focus of the present discussion, but we may note they do not allow for men and women to have systematically different stakes in this process and utilize unitary models of the household.
13. This provides one reason, among many, why labor transfer, especially if it entails migration, requires a significantly higher real wage than the average physical productivity (APP) in the traditional agricultural sector: it must be equal to APP plus the value of unpaid domestic support if any incentive effect is to be created.
14. This suggests some affinity with Von Neumann activity analysis models and the Sraffian input-output approach.
15. It is interesting to note that labor is a very "round-about" input to produce.
16. Of course, this idea has something in common with the idea of efficiency wages. That concept, however, is developed in a static and rather narrow context. The intention here is to emphasize the dynamic implications of poverty.
17. A first stage of such a project has been started at Manchester supported by an ESRC grant. A number of small spreadsheet models under different assumptions about labor input have been constructed to investigate more complex interactions between the productive and reproductive sectors.

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