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Economic thought about population consequences: Some reflections*

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Abstract. This essay discusses predecessors of long ago, and the 1950s and 1960s, who studied the effects of population change. The history is not systematic, but rather is idiosyncratic. It focuses on the valuable elements from which we may learn, not on failings. It concentrates on work which has had little influence upon subsequent thought.

I find need for more investigation of economic sub-systems and of the mechanisms that operate over very long periods – centuries and more.

1. Introduction

The main line of economic work since the 1960s concerning the effects of population change has recently been reviewed extensively and often well (Ahlburg 1987; Demeny 1986; Horlacher and MacKellar 1987; Kelley 1986, 1988; Lee 1983; McNicholl 1984; National Research Council 1986; Preston 1987; Srinivasan 1987; United Nations Working Group 1989). This essay explores some of the byways of the field. It discusses some long-ago predecessors, as well some writers of the 1950s and 1960s who laid the foundations of the recent shifts in the field. This is not a systematic history; rather, it is a brief, personal, and surely idiosyncratic review of the great predecessors in the field.

Though the essay discusses the valuable elements contributed by various writers, it does not discuss their failings or the elements in their work with which I disagree. My aim is not to evaluate these writers but to promote that which of theirs is worthy and from which we may learn.

There follow some remarks about the past few decades of work in the field, and some comments on where I hope the field will go in the future.

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* This article is largely drawn from my 1992 book and the forthcoming revision of my 1981 book.

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2. Some history of thought prior to World War II

The account that follows concentrates heavily on writers whose ideas were valuable but nevertheless had little or no influence upon subsequent thought. This differs from the usual practice of intellectual history, which mainly discusses work which is important in the historical chain of intellectual influence.

It should be noted, however, that there was almost no accumulated advance in received economic thought about the consequences of population growth between Malthus and the 1960's. This may be seen in the almost complete absence of mention of either theoretical or empirical prior work on the subject in such stocktaking volumes as the two 1956 collections edited by Joseph J. Spengler and Otis Dudley Duncan, *Demographic Analysis* and *Population Theory and Policy*, and the National Bureau of Economic Research's 1960 *Demographic and Economic Change in Developed Countries.*

Let us begin with homage to William Petty, the founding father of population economics. Seldom can intellectual paternity be so well established. And though his inquiries began with population economics, his influence extends far beyond this field. Observers as varied as Friedrich Hayek (in conversation) and Karl Marx (advertisement for T. Hutchinson, *Before Adam Smith*), judge Petty to be the founder of modern economics taken as a whole; if Marx and Hayek agree on a proposition, there must be something in it.[1]

Not only did Petty come first, but he did a better job of presenting some ideas than did even the other masters who came after him. An example is the idea of division of labor that Smith made so famous, and which is so grounded in population size. Smith wrote:

> To take an example, therefore, from a very trifling manufacture; but one in which the division of labour has been very often taken notice of, the trade of the pin-maker... One man draws out the wire, another straights it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires three distinct operations; to put it on is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which, in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them (1776/1970, pp. 109–110).

Earlier Petty had written:

> ...the Gain which is made by Manufactures, will be greater, as the Manufacture it self is greater and better...each Manufacture will be divided into as many parts as possible, whereby the Work of each Artisan will be simple and easier; As for Example. In the making of a Watch, If one Man shall make the Wheels, another the Spring, another shall Engrave the Dial-plate, and another shall make the Cases, then the Watch will be better and cheaper, than if the whole Work be put upon any one Man. And we also see that in Towns; and

[1] Letwin (1963) argues that the birth of a field of science should be dated when there first comes into being an *integrated* body of theory. Economics lacked such an integrated framework until Adam Smith came along to weld together the various fragmentary observations that already existed; Letwin persuasively argues that this was Smith's greatest achievement. On such a view, Smith and not Petty is the founder.

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> in the Streets of a great Town, where all the Inhabitants are almost of one Trade, the Commodity peculiar to those places is made better and cheaper than elsewhere...

Petty probably should get part of the credit for the founding of statistical demography, too, which is at the base of all empirical population economics. Many writers have speculated that Petty actually was responsible for Graunt's work. I do not suggest that. But it does seem plausible to me that Petty was full of his original interest – London's growth – and discussed the matter with his friend Graunt. It is reasonable that Graunt would then have picked up the question, and – perhaps in consultation with Petty, or perhaps not – designed and executed the extraordinary actual inquiry which is the first systematic study of mortality and life expectancy.

Schumpeter (1954) provided his usual fascinating history of economic thought with respect to population; his grasp of the underlying issues also seems sound to me. These are some brief excerpts. Regarding the ancient period he wrote:

> Ever since permitive tribes had solved population problems by abortion and infanticide, people in general and social philosophers in particular never ceased to worry about them...the trouble arose from a relation between birth rates and death rates that was incompatible with stationary or quasi-stationary economic environments: the problem of population was one of actual or threatening overpopulation. It was from this angle that it presented itself to Plato and Aristotle.

Spengler (1978, pp. 200–201) cites ancient Greek and Roman writers – Polybius, Plato, St. Augustine, Lucretius and others – worrying about growth-induced depletion of soil and minerals, and deforestation, in terms that sound quite contemporary.

"Roughly speaking until the end of the sixteenth century", Schumpeter says, population growth was mainly a problem.

> In the Middle Ages the dwelling places of the lower stratum of the warrior class, the simple knights, suffered from overcrowding whenever there were no crusades, wars of the Roses, epidemics, and so on to reduce numbers; and the artisans' guilds offered livelihood for restricted numbers only and experienced perennial difficulties with ever- lengthening 'waiting lists' (pp. 250–251).

Then there came a shift in conditions during the seventeenth and eighteenth centuries, which Schumpeter describes as follows:

> [T]he population problem became one of under-population. ...Accordingly, governments began to favor increase in population by all means at their command... Economists fell in with the humors of their age. With rare exceptions they were enthusiastic about 'populousness' and rapid increase in numbers.

In England, Godwin (1793/1820) wrote that humankind's fate is fixed by social institutions and not by immutable laws of nature. He believed that if society would reorganize itself properly, there would be no natural constraints upon population growth for a long time. This much was sound doctrine that we are relearning now from current events and data. But it was communalism rather than private property that Godwin believed to be the appropriate social organization. And it was reaction to this aspect of Godwin's thought that triggered Malthus's *Essay*.

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The wave of anti-population writing that bore Malthus began in the middle of the 18th Century, Schumpeter tells us, and its emergence is a puzzle.

> [C]onditions did not substantially change in the eighteenth century or even in the first decades of the nineteenth. Therefore, it is quite a problem to explain why the opposite attitude – which might be called anti-populationist or, to associate it with the name of the man who made it a popular success in the nineteenth century, Malthusian – should have asserted itself among economists from the middle of the eighteenth century on. Why was it that economists took fright at a scarecrow! (pp. 251–252).

Schumpeter then offers an explanation of the change in mood, an explanation which is necessarily quite speculative:

> [T]he cradle of the genuinely anti-populationist doctrine was France. . . . During practically the whole of the eighteenth century France was fighting a losing battle with England. Many of her leading spirits began to accept this defeat by 1760 and to discount the opportunities for national expansion. Moreover, the outworn institutional pattern of the last half century of the monarchy was not favorable to vigorous economic development at home. . . The. . . final step. . . is to explain why anti-populationist sentiment gained a hold on the English mind in spite of the fact that exactly the opposite state of things prevailed in England. . . in the Industrial Revolution of the last decades of the eighteenth century, these short-run vicissitudes grew more serious than they had been before, precisely because the pace of economic development quickened. And some economists. . . were so impressed by them as to lose sight of the trend (pp. 252–253).

Malthus's importance in catalyzing the field could not be more obvious. But Schumpeter rates Malthus' intellectual contribution very low. (I would guess that his poor grading of Malthus is due in considerable part to Schumpeter's very great emphasis on intellectual priority, especially priority as established by Schumpeter's own researches, whether or not the later developer of the idea arrived at the idea independently.)

> [T]he 'Malthusian' Principle of Population sprang fully developed from the brain of Botero in 1589. . . This path-breaking performance – the only performance in the whole history of the theory of population to deserve any credit at all – came much before the time in which its message could have spread: it was practically lost in the populationist wave of the seventeenth century. . . . the 'law of geometric progression, '. . . was suggested by Petty (1686), by Sussmilch (1740), by R. Wallace (1753), and by Ortes (1774), so that, within this range of ideas, there was nothing left for Malthus to say that had not been said before. [Non-mathematical statements came from] Franklin (1751) [and] Mirabeau (1756) – who expressed himself in his picturesque manner: men will multiply to the limits of subsistence like 'rats in a barn' (pp. 254–255).
>
> Steuart. . . presented. . . the case of the Extensive Margin: as population increases, poorer and poorer soils have to be taken into cultivation and, applied to these progressively poorer soils, equal amounts of productive effort produce progressively smaller harvests. Turgot discovered the other case of decreasing physical returns. . . the Intensive Margin: as equal quantities of [an

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> input] are successively applied to a given piece of land, the quantities of product that result from each application will first successively increase up to a certain point at which the ratio between increment of product and increment of capital will reach a maximum. Beyond this point, however, further application of equal quantities of capital will be attended by progressively smaller increase in product, and the sequence of these decreasing increases will in the end converge toward zero. This statement of what eventually came to be recognized as the genuine law of decreasing returns cannot be commended too highly. It embodies an achievement that is nothing short of brilliant and suffices in itself to place Turgot as a theorist high above A. Smith (259–160).

I am not qualified to judge the extent to which Malthus' ideas were truly new or instead were derivative from prior work. But it seems clear that Malthus did more than simply popularize well-known ideas. For example, Schumpeter gives Turgot full credit for the notion of diminishing returns. But Malthus certainly framed the issue is a very new way. And Malthus broke new ground with his empirical survey in his second and subsequent editions, which then influenced his theoretical analysis and his view of the future in a direction counter to his original "Malthusian" viewpoint (see Petersen, 1979, for a judicious analysis of the course of Malthus's thinking).

One puzzling note about Malthus should be mentioned here: Rashid (1987) – and he says that he is not the first to do so – accuses Malthus of flagrant intellectual dishonesty. His most telling evidence is a misreading by Malthus of Sussmilch's data concerning births in the year 1711 following the plague years of 1709 and 1710, making it seem that marriages in 1711 were about double what they would have been if there had been no plague in the prior years, when in actuality the number probably showed the sum of marriages in 1710 and 1711. Malthus could well have simply misread the confusing text at first. But after he was made aware of the problem, he noted (in the 1817 edition) that it was possible that he had previously misread Sussmilch. But he simply said that it was "a matter of no great importance", and did not revise the general statement which was made in reliance on it. Rashid notes that Malthus's "error" was revealed in 1807, and repeated by various writers in 1830 and 1951, but is not mentioned in the main contemporary scholarly work on Malthus.

It is difficult to believe that the person whom I meet speaking to me across the pages of Malthus' writing would stoop to such a device, and would be guilty of the other practices of which Rashid accuses him. Malthus was honest enough to alter his stated views to a considerable extent. Influenced by evidence of voluntary family limitation in various places, in the second edition he wrote, "I have endeavored to soften some of the harshest conclusions of the first Essay" (1803, p. xii of Irwin edition). And in the fifth edition he speculated that population growth had become less of a "problem" over the centuries despite increasing population. "From a review of the state of society in former periods, compared with the present, I should certainly say that the evils resulting from the principle of population have rather diminished than increased...it does not seem unreasonable to expect that they will be still further diminished (1817/1963, p. 289). But Rashid's research cannot be ignored.

Ricardo, and later Mill, did little more than put a gloss upon Malthus. Mill added esthetic arguments in favor of a stationary population.

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Alexander H. Everett[2] (1826) early on pointed out the main weaknesses of Malthus's theory in the context of the United States experience. And he was especially clear and emphatic about the induction of technical progress by population growth.

> [A]n increase of population on a given territory is followed immediately by a division of labor; which produces in its turn the invention of new machines, an improvement of methods in all the departments of industry, and a rapid progress in the various branches of art and science. The increase effected by these improvements in the productiveness of labor is obviously much greater in proportion than the increase of population, to which it is owing (p. 26).

The literature on the economics of population passed around this observation as a stream passes around a rock in the stream bed. This was to happen again and again, as will occasionally be noted below.

Henry C. Carey (1840), perhaps the first great economist in the United States, wrote at length about the positive (in both senses of the word) relationship of political organization to population density – perhaps a natural observation in a pioneer country such as the United States was then. He discussed the reduced cost of physical security against violence as people live closer together rather than widely scattered. And then he traced the consequent cumulative spiral.

> Population and capital continue to grow, producing a daily increasing tendency to union of action, rendering security more complete. The increasing facility of obtaining the means of support, is attended by an improvement of moral condition, and men are more disposed to respect the rights of their neighbours...
>
> At a later period in the progress of society, as population becomes more dense, we find the disposition to union of action constantly increasing. Men are now associated in larger communities, or nations..." (p. 98).

Carey also mentioned the increase in infrastructure such as roads or canals which accompanies increased population density (p. 102).

Engels – it is hard to separate him from Marx, but it seems to me that Engels is the fount of this stream of thought – recognized the importance of chemistry for agriculture – he cited Humphry Davy and Justus Liebig (Meek, p. 50) – and he was excited by the prospects of the increased capacity of given land area to support human life.

> The area of land is limited – that is perfectly true. But the labour power to be employed on this area increases together with the population; and even if we assume that the increase of output associated with this increase of labour is not always proportionate to the latter, there still remains a third element – which the economists, however, never consider as important – namely, science, the progress of which is just as limitless and at least as rapid as that of population (in Meek, p. 18).

Engels also offered a theory of the rate of growth of technology: "[S]cience advances in proportion to the body of knowledge passed down to it by the previous generation, that is, in the most normal conditions it also grows in geometrical progression" (in Meek, p. 51). This may be an inadequate specification of the

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[2] Salim Rashid brought Everett's work to my attention, for which I thank him.

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knowledge-production function, but it is a great advance over the view of a "race" between population and technology with the latter seen as simply arriving fortuitously, as Malthus saw it. So here we have another key strand in understanding the effects of population growth in the long run, the process by which resources become more abundant rather than more scarce as population and income grow.

von Thunen (1826–1863/1966) described with extraordinary statistical precision the Belgian and Mecklenburg systems of cultivation, and he showed clearly how the difference in techniques used was related to population density. And his theoretical analysis explained well why different techniques are used at different distances from centers of population.

Chayanov worked out the formal utility theory, and adduced impressive data from turn-of-the-century Russian village surveys, to show that larger families caused there to be more labor expended "either by an intensification of work methods or by using more labor-intensive crops and jobs" or both (1925/1966, p. 113). But the interests of von Thunen and Chayanov were not population economics per se, and therefore perhaps it was unavoidable that their ideas were not taken into the body of population economics, but had to be rediscovered by Slicher van Bath and Boserup.

Henry George[3], in the context of his proposal for a "single tax" on land, opposed Malthus vigorously, though his ideas are not spelled out neatly. "[E]verywhere the vice and misery attributed to overpopulation can be traced to the warfare, tyranny, and oppression *which prevent knowledge from being utilized* and deny the security essential to production" (p. 123, italics added).

George noticed that there is a positive correlation between nations' population density and their level of development. And he implied that increased social capital, better social organization, increases in technology, and higher levels of human capital flow from greater density, as they also lead to further increases in population. He remarked upon a phenomenon that has made a considerable impression upon economists after World War II, situations "where war or other calamity has swept away wealth, leaving population unimpaired. There is not less wealth in London today because of the great fire of 1666; nor yet is there less wealth in Chicago because of the great fire in 1870" (p. 148).

Two pithy sayings embody much of George's thinking on the subject: "No one who has seen Melbourne or San Francisco can doubt that if the population of England were transported to New Zealand, leaving all accumulated wealth behind, New Zealand would seen be as rich as England is now" (p. 148–149). And "Both the jayhawk and the man eat chickens, but the more jayhawks the fewer chickens, while the more men the more chickens" (p. 131).

It is a tragedy – not so much for the state of knowledge as for the lives of millions of human beings affected by the coercive population policies that resulted – that the intellectual discoveries of Everett, Engels, von Thunen, Carey, Chayanov, and George (and undoubtedly other writers who also understood the core issues) have had no noticeable imprint on later writers about the subject. As is too often the case, later writers selected some existing theoretical elements for further development, and left out others entirely, to be lost until independently rediscovered. And the selection – in this case, as in so many others – seems to be on the basis of what is amenable to mathematical manipulation and/or what popular opinion and sources of funding believe is true even before the work is done.

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[3] Lowell Harris kindly brought George's work to my attention.

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There was a heyday of interest in population economics in Great Britain marked by contributions from Cannan (1928), Dalton (1928), Robbins (1927), Wicksell (1928), and others. Some of the work displayed a very wide general grasp of the subject (e.g., Dalton 1928). But the focus mainly was on the concept of the "optimum population", which was something of a step backwards. Whereas Malthus' theory was a two-variable dynamic model of the interrelated effects of income and population growth, the optimum-population notion is a static examination of the trade-off between the gains from division of labor and economies of scale, on the one hand, and the loss from diminishing returns to additional labor with a given stock of capital, on the other hand. This notion was in accord with the economics of its time, and the optimum-population theorizing was very neat even if not useful. But this line of thought, and the subsequent work in growth theory that appeared starting in the 1950's, will not be pursued further here because it is more normative than positive.

Then in the 1930's economists lost interest in population growth. The old bugaboo of over-population no longer seemed frightening. In Western Europe growth seemed to have ceased, and economists were then little aware of the underdeveloped world. In the absence of perceived threat from population increase, the interest of economists naturally dried up.

Keynes[4] deserves a special mention. He was intensely interested in population growth. At first he was a fiery Malthusian. In his 1920 *Economic Consequences of the Peace*, for example, he wrote:

> Before the eighteenth century mankind entertained no false hopes. To lay the illusions which grew popular at that age's latter end, Malthus disclosed a Devil. For half a century all serious economical writings held that Devil in clear prospect. For the next half century he was chained up and out of sight. Now perhaps we have loosed him again (1920, p. 10).

He was deeply concerned about what he called "the disruptive powers of excessive national fecundity" (p. 15). And he worried about supplies of raw materials, especially coal and iron (Chapter IV, Part II). He charged that in Russia "the disruptive powers of excessive national fecundity may have played a greater part in bursting the bonds of convention; than either the power of ideas or the errors of autocracy" (p. 15). This was in accord with his general view that "The great events of history are often due to secular changes in the growth of population and other fundamental economic causes" (p. 14, 15).

Keynes did understand that under benign social and economic circumstances, the increase in productivity could offset the increase in fertility. "One geometrical ratio might cancel another, [as] the nineteenth century was able to forget the fertility of the species in a contemplation of the dizzy virtues of compound interest" (p. 21). But this could only happen if saving cut deeply into consumption. And he still worried about the "pitfall" of "population still outstripping accumulation, our self-denials promot[ing] not happiness but numbers" (p. 21).

Later, after he developed his "Keynesian" demand analysis, he turned around and became an enthusiast for population growth as a means of increasing effective demand. Still later still he arrived at being ambivalent about population

[4] Petersen (1955) traces Keynes's intellectual history with respect to population.

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growth. Though his writings on the subject were very influential, none contains material of lasting intellectual value.

3. Classic modern work

Kuznets was the pre-eminent population economist of the twentieth century. His statistical analyses broke wholly-new ground and he executed them with his usual quantitative ingenuity and rigor.[5] They have been substantiated by many subsequent studies with new and better data, and more elaborate designs.

Kuznets's theoretical speculations were daring as well as careful, though his theorizing seems to have been slighted because it is contained in free-ranging prose and in his framework of data-gathering and presentation rather than in formalism. (It should be said that Kuznets was more concerned about the short-run effects of population growth in poor countries than is this writer, but the difference concerns policy more than analysis.) As, however, is the way with modern science that acts as if everything worthwhile can be found in a publication dated within the last ten years, Kuznets now is almost wholly neglected by contemporary writers on population economics.

For many years Colin Clark almost all alone carried the flag of economic argument against simplistic Malthusian thinking and the ensuing population control programs. (Alfred Sauvy was his counterpart in France, but Sauvy wrote mostly in French and therefore had a much smaller effect on the larger world of social science. Bennett, 1954, Chap. 3, saw the matter just the way we see it now, but I have never seen a reference to this statement except by Thomas Poleman, his former student.) It was a misfortune for the state of knowledge that Clark was a Catholic (and even worse, a convert!) and therefore subject to having his ideas and data dismissed on that ground alone, though the entire corpus of his work shows him to be a painstaking, prodigious, clear-thinking, and scrupulous scholar. He played an important role in bringing Ester Boserup's work to scholars' attention by writing a foreword to her 1965 book. He deserves our gratitude.

Harold Barnett (in sometime company with Chandler Morse 1963) made an enormous contribution to the field by demonstrating with both impeccable theory and far-ranging data that natural resources have historically become more available rather than more scarce. Theodore Schultz performed a similar task with respect to agricultural land (1951). Schultz complemented his work on land with later seminal work on human capital, the input to production which has come to have importance inversely to the decline in land and other capital.

Barnett was fully aware of the implications of his work for the economics of population growth, as may be seen in his polemical 1971 article. I believe that Barnett will get his reward in economists' heaven, that is, in the next great history of economic thought in the tradition of Schumpeter's; that reward has not yet been forthcoming on earth.

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[5] Alfred Bonne's statistical essay on population and economic growth in the Middle East had many of the elements of Kuznets's first studies, and arrived at the same conclusion. And Kuznets spent much time in Jerusalem, where Bonne worked, so perhaps Bonne influenced Kuznets. But Kuznets's studies were important because of their systematic and wide-ranging nature which is Kuznets's special genius, as well as because of the general design.

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Friedrich Hayek (1989) recently published important work on the very-long-run evolutionary effects of population growth upon cultural patterns. The reason for mentioning this work in a historical survey is that Hayek harbored these ideas for half a century, and they are implicit in his discussion of the market as a discovery process (1960, early chapters); he refrained from publishing these ideas because he did not know of empirical evidence that contradicted the conventional wisdom that population growth has negative effects in the intermediate and long run.[6]

Ester Boserup (1965) theorized that known but unused labor-agricultural intensive techniques are brought into use when existing techniques no longer supply sufficient sustenance. Boserup offered case studies and anecdotal evidence to support her (and before her, von Thunen's and Chayanov's) view that population growth forces this transition to greater labor-intensivity. Reconciling the ideas of Malthus and Boserup then became necessary. As is so often in such debates, the contending ideas apply to different phenomena. In this case, the explanation lies in the different natures of inventions, some of which fit Malthus' scheme and some fit Boserup's scheme (Simon 1978; 1977, Chap. 8; 1992). A Malthusian-type invention is immediately followed by a population increase which eventually "eats up" the benefits of the invention until the population returns to subsistence living, whereas a Boserupian-type invention is only used when population pressure increases to the extent that it is worthwhile to adopt the new invention. Some inventions fit Malthus' view and some Boserup's. (It is also relevant that Malthus focuses on *invention* whereas Boserup focuses on *adoption of known inventions.*)

An interesting sidelight about Boserup's work is that anthropologists found and made good use of it earlier than almost any economists.

4. Economists and present fashions

A fascinating episode in the sociology of thought occurred among economists at large, and among population economists in particular, at the end of the 1960's. Though economists certainly did not exhibit the intensity of environmental alarm evident in the rest of the academic community – perhaps their views were moderated by the fundamental economic understanding that shortages lead to adjustments – even most economists forecast increasing shortages of natural

[6] In a letter that means more to me than anything else that anyone has written about my work – indeed, there is no competition – Hayek wrote:

> I have never before written a fan letter to a professional colleague, but to discover that you have in your *Economics of Population Growth* provided the empirical evidence for what with me is the result of a life-time of theoretical speculation, is too exciting an experience not to share it with you. The upshot of my theoretical work has been the conclusion that those traditional rules of conduct (esp. of several property) which led to the greatest increases of the numbers of the groups practicing them leads to their displacing the others – not on "Darwinian" principles but because based on the transmission of learned rules – a concept of evolution which is much older than Darwin. I doubt whether welfare economics has really much helped you to the right conclusions. I claim as little as you do that population growth as such is good – only that it is the cause of the selection of the morals which guide our individual action. It follows, of course, that our fear of a population explosion is unjustified so long as the local increases are the result of groups being able to feed larger numbers, but may become a severe embarrassment if we start subsidising the growth of groups unable to feed themselves.

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resources. I remember around 1970 attending a talk by an economist who used exactly the same sort of physical-quantity "engineering " reasoning that was then so prevalent among biologists and the lay public: So much of X is known to be in the ground, so much of X is used each year, X must run out in T years. Just one colleague (Hans Brems) among a roomful of perhaps 50 persons, mostly economists, shared with me the view that the same situation had held all throughout human history, and yet availability had increased secularly because of the mechanism of economic adjustment. That economists should so easily have strayed from the fundamental truths of the profession, simply because the newspapers and television offered a scary scenario built upon uneconomic reasoning, was amazing and shocking. As Schumpeter put it about the populationist attitude in the 17th and 18th centuries, "Economists fell in with the humors of their age" (1954, p. 251).

The saddest part of all this was how quickly economists departed from the fundamental intellectual glory of the field, the conception – dating back to David Hume and Adam Smith (or perhaps to Bernard Mandeville) – of macro adjustment to disequilibrium brought about by the spontaneous micro responses of individuals seeking to profit from the situation. In the case of natural resources, this social adjustment has in the past tended to eventually outweigh the forces that set in motion the movement toward greater scarcity.

I choose Paul Samuelson as an example of this dismaying phenomenon because his colleagues have regarded him as the most brilliant star in their firmament, the first American to receive the Nobel prize in economics, received for having "done more than any other contemporary economist to raise the level of scientific analysis in economic theory" (New York Times, October 27, 1970, p. 1). Unlike some others, Samuelson did not fall into vulgar error simply by speaking or writing unthinkingly, parroting the journalism of the day. Rather, Samuelson has been interested in population-related ideas since his first paper.

In 1975, Samuelson published an article entitled "The Optimum Growth Rate for Population" which analysed saving under different population regimes. The central argument implies that higher population leads to higher income. Then, at the end of this complex paper full of careful proofs, Samuelson delivered himself of an ex cathedra statement wholly at odds with the paper's reasoned conclusion, a statement which constitutes no more and no less than the crudest Malthusian "common sense". That is, he asserts faster population growth more quickly brings about resource exhaustion simply because of diminishing returns. Here is that last paragraph:

> Ultimately, positive exponential population growth will presumably bring back into importance the scarcity of natural resources ignored by the model... For several generations people may benefit on a lifetime basis by having numerous children to support them well in their old ages, out of filial piety or by means of social security. And yet until the end of time their increases in population will cause the law of diminishing returns to be brought into play to leave all subsequent generations in a worsened situation. To the degree that childhood dependency is intrinsically less costly relative to old-age dependency, this dyshygienic temptation becomes all the more dangerous (1975, p. 537).

It is significant that Samuelson's concluding paragraph not only has no careful, formal theoretical basis, but – more important – it is devoid of empirical

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evidence. Indeed, it runs counter to copious well-known data. Samuelson apparently it unaware of that empirical evidence.

An honorable exception to the bulk of the profession was the performance of the economists who participated in the work of the President's Commission on Population Growth and the American Future (1972), especially Allen Kelley who wrote the central review-paper, Richard Easterlin, and Edmund Phelps. They did not succumb to the hysteria of the times and the hanging-jury nature of the Commission, but rather allowed the data to convince them that population growth was not the problem it was commonly supposed to be.

Recent work on the subject has been chronicled in a large number of reviews, as mentioned in the introductory paragraph. But the extent to which the course of thinking has been changed still is unclear. In 1984, Lee wrote: "I think most scholars [population economists] would agree that rapid population growth is a development problem, but certainly not all do" (p. 130). The latter clause in Lee's assessment would not have been true ten or even five years earlier than 1984. Also in 1984, the World Bank – for many years the strongest and shrillest voice calling for reduction in the rate of population growth – in its 1984 *World Development Report* did a complete about-face and said that natural resources are not a reason to be concerned about population growth. On the other hand, in that year as well-respected an economist as Nobelist Jan Tinbergen wrote: "[C]continued population growth constitutes a threat to humankind's welfare. ...It is...highly desirable – in fact inescapable – that population growth be stopped as soon as possible...Among governments the one extreme is represented by the Chinese government, whose attitude is to be applauded..." (pp. 137–138).

In 1986, the National Research Council of the National Academy of Sciences went even further. A report on *Population Growth and Economic Development*, whose primary draft was written by Samuel Preston, almost completely reversed a 1971 report on the same subject from the same institution. On the specific issue of raw materials that has been the subject of so much alarm, NRC-NAS concluded: "The scarcity of exhaustible resources is at most a minor constraint on economic growth."

By 1993, the intensity of concern clearly has diminished enormously even among those economists who consider population growth a problem. It is safe to say that whereas most scholars in the field of population economics, along with most other demographers and laypersons writing about population, assumed through the 1970's that views on the subject were settled, all now agree that the subject can be described as "controversial."

5. Postscript: Assessing modern economics and population growth

Modern economics clearly has been less bad than other disciplines in the soundness of its views with respect to population growth. With some exceptions noted above, economists have seldom been among the alarmists about population growth in modern decades – unlike Malthus before he learned some facts and wrote his second edition – at least in contrast to the members of such disciplines as (notoriously) biology. But there is some question about just how bad or good economics has been.

Allen Kelley (forthcoming) has argued that "a *major* change did *not* in fact occur amongst most American *economists* engaged in scholarly research on the consequences of population growth. Rather, what we appear to be seeing is a

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change in the relative influence of the economists vis-a-vis the non-economists in the *summary assessments* of the major reports, and in public debate. As a result, highlighting a significant shift toward "revisionism" *among economists* in the 1980s is inappropriate" (forthcoming, p. 3, italics in original). That is, he asserts that the economics profession taken as a whole has believed *all along* in what Kelley calls the "revisionist" view that more people are not a bad thing.

Kelley notes that the analytic process in economists' writings on population has consistently contained "three elements of the revisionist's perspective – attention to the longer run, numerous positive and negative impacts, and indirect effects" (p. 9), and he finds them in the major official reports from the 1950s on. This is sound scholarship. I would add that economists customarily look for adjustments to problems; it is natural for economists to recognize that forces arise to increase supply in consequence of diminutions in supply and increases in price.

Nevertheless, this mindset did not lead economists – with the exceptions noted above – to reject the proposition that population growth on balance is bad for economic development. Here is some relevant evidence:

1. The most salient theoretical literature has been neo-classical growth theory from Solow in the 1950s until the 1980s, all of which (except for some work of Phelps) implied that more people reduce per capita consumption.
2. Many prominent economists urged vigourously that population growth hinders economic growth. Samuelson and Tinbergen were mentioned earlier. James Meade (1955, 1961) gave prominence to his straightforward Malthusian conclusions both in theory and with respect to the case study of Mauritius. (Meade, like Keynes, was a member of the Eugenics Society, which was devoted to improving human characteristics by selective breeding, which has since the 1920s been intertwined with population control. Partha Dasgupta, following Meade (1955) presented welfare analysis based on the assumption that some peoples' lives are so poor that they are not worth living, and hence population growth should be controlled.) And there were many others, including Leontief. But no prominent economists asserted that the contrary was not true – that population growth was *not bad*; not even Kuznets would go this far.
3. Casual inspection of texts in economic development and introductory economics shows them ranging from skepticism that population growth is an *important* drag on development, to simple-minded Malthusianism – including the "low level equilibrium trap", along with the Coale-Hoover book the most prominent theoretical statement. I found not one which forthrightly denied a negative effect on average. (Indeed, not even the 1986 NAS report goes that far.)
4. A telling anecdote comes from Kelley's own history with this issue. He was responsible for the central review-paper on economic aspects of population change for the 1970 Commission on Population Growth and the American Future, and Richard Easterlin had the task of evaluating Kelley's study. This was the evolution of their views, as described by Easterlin:

> It is instructive, I think, to note Kelley's own statement on the change in his views as a result of this research. Whereas he started out in the expectation that an anti- natal government policy was justifiable on economic and ecological grounds, he ended up in a much more neutral position. In this respect, Kelley's experience is representative, I think, of that of many of us who have tried to look into the arguments and evidence about the "population problem" (Easterlin, 1972, p. 45).

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That describes my own intellectual history, too. These experiences show, I believe, that a non-negative view of population growth is not naturally acquired and is not well-planted in our minds when we emerge from the cradle of economic knowledge.

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