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Conflicts Over Changes in Scarcity: An Economic Approach*

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If we knew how to arrive at social unity freely and openly, we would have the key to a Good Society. If reasoning could reconcile the ideologies that divide men, there would be some hope for discussion achieving the desired goal, but talk does not, as a rule, bring about social unity. Frank Knight said it succinctly, "The more intelligent people are, the more certain they are to disagree on matters of social principles and policy, and the more acute will be the disagreement."

Not knowing how to reconcile differences in values and beliefs, the art of economics is to conceal these differences. It is done so astutely that we come to see only social unity. Our models are virtually foolproof in immunizing graduate students against the divisiveness of Marx, Veblen, and Commons and other mavericks. But despite our protective apparatus the conflicts that divide people persist. Marx was wrong, however, in his belief that governments would wither away under his economic system. Veblen's property owning leisure class has come to count for less and less, as high wages and salaries

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have come to dominate personal incomes. The legal foundations of property, the hallmark of Commons' approach, have also diminished in economic importance. The virtual elimination of private property and of class distinctions, as announced in principle by the governments of China and the Soviet Union, has not led to social unity within or between them. Our own foreign policy of imposing political unity within other countries has been anything but successful. Nor are we spared disunity within the United States; consider, only, such recent divisive issues as the environment, pollution, energy and discrimination.

Intellectually there is a woeful lack of comprehension of the universality of the struggles for scarce resources. It is as old as human life reaching back far beyond known history. Nor are animals spared as is clear from their struggle for territorial rights. Struggle for existence of the members of any natural population is the mainspring of Darwinian evolution. Economic competition in accordance with established rules is one part of this struggle.

Although it is true that the sources of conflicts that divide people and the changes in them over time are exceedingly hard to comprehend, especially so for economists who hold fast to a consistent unified system of preferences, we could do much better than this by extending the domain of economic analysis. How useful such extensions

would be is not predictable, but there are good reasons for giving them a try.

Human conflicts are not occasional events; on the contrary, they are as universal and persistent as resource scarcities. Both are basic attributes of human circumstances that are ever present. They may be viewed as two overlapping domains and economic analysis is applicable to the overlapping parts where there are conflicts that pertain to the scarcity of resources. My approach is to look for the interactions between them. I shall treat resources as the supply constraint and the conflicts pertaining thereto as belonging to the demand for them. It is my contention that regardless of the ideology of a society, of the type of government, or of the organization of the economy, resources never have been and never will be unlimited; and the disagreements about their allocation and how the benefits derived from them are to be shared, will not fade away no matter how rich people become. Building on this proposition of the interplay between resources and conflicts, economics should have a good deal to say because the foundation of economic analysis is the scarcity of resources for satisfying human wants, whether or not they are neatly consistent wants. It follows that the class of human conflicts to which this paper is addressed would not exist in an Utopia in which there were no scarce resources. But a search for such an Utopia is as pointless

as looking for the Holy Grail.

Aside from reconciling differences in scarcity by means of the market, standard economic theory is not designed to analyze social and political conflicts over scarcity. Economics, as already noted, deals with the implications of a socially consistent set of preferences in a context of a specified set of resources from which it derives the properties of an economic equilibrium. Although the concept of an equilibrium can be a useful guide in analyzing disequilibria, social and political responses to basic changes in scarcity of resources are not at home in standard theory.

In my thinking many social and political conflicts that pertain to changes in scarcity can be treated as manifestations of disequilibria. The objective is to resolve such conflicts in the context of adjustments that tend toward an equilibrium. The basic implication of this approach is that when a society arrives at such an equilibrium, there would be no conflicts of this type. What we observe, however, are all manner of disequilibria; moreover as some of these are resolved, changes in resource scarcities and related events give rise to numerous new disequilibria and to conflicts with respect to how the losses and benefits entailed by these disequilibria are to be distributed. It is indeed a never ending process. But by holding fast to the proposition derived from the concept of an equilibrium, we have a useful guide in bringing economic analysis to bear on this important class of ever present human

conflicts. It should be obvious that I am not assuming that all of these conflicts can be resolved by a market economy; on the contrary, some of them can only be resolved by political processes and by social and legal institutions.

Our own political history is replete with human conflicts, for example, as we emerged from colonial status to that of an independent country, the federation of the several states was a loose accommodation of many diverse conflicting interests. Charles Beard saw the federal constitution as a compromise of the major economic interests of that period. The pre-Civil War conflict between the slave owning planters of the South and the anti-slavery North proved to be intractable politically. It is all too easy to forget the long standing political conflict between the free trade agricultural South and the industrial protectionism of the North. The Granger and Populist movements in opposition to railroads and other industrial elements of monopoly and to the thorned "crown of gold," a proxy for the then gold standard, are all very recent. Our historical perspective is short as we forget these deep seated conflicts of the past, and we tend to exaggerate those that are upon us presently.

I. Economic Changes That Engender Conflicts

The oil embargo, the purchase of vast quantities of wheat by the Soviet Union, the dish pan parades in Chile, and our own meat boycott all come to mind as recent events associated

with abrupt changes in supply. The gradual increases in crop yields, the large reductions in acreage devoted to corn and cotton since the thirties, the forty year rapid decline in the U.S. farm population and the marked rise in the economic value of human time are all secular changes that are, in general, non-reversible.

The supplies of various resources in a modern economy are constantly undergoing change. Viewed as supply curves, some change abruptly, some gradually become more or less steep, and most of them shift unevenly to the right over fairly long periods of time. These changes are of two general types, one of which is a consequence of developmental factors, and the other occurs as a result of sporadic and concurrent instability that affect the supplies of particular resources abruptly. Both engender social and political conflicts. Those associated with sporadic instability are, as a rule, in the forefront of public concern. The welfare effects of the persistent, secular developmental factors are, however, more important, in terms of real changes in scarcity. I shall for this reason consider mainly the conflict behavior related to developments affecting the scarcity of resources. With respect to the supply, standard theory gives us a set of positively inclined supply curves but leaves us in the dark with regard to the processes that shift these curves to the right.

We are adept in using the concept of demand confined to observable market behavior. Theory guides us in deriving the price effects but we are dependent upon the data in ascertaining the income effects. It is all rather simple when the personal distribution of human and non-human capital is given. When income and relative prices change gradually over time, the conept of demand confined to market behavior remains useful. Moreover, some expected fluctuations in income can be analyzed by separating the effects of the transitory and permanent income components on the demand. So far so good. But the problems associated with social and political conflicts introduce "demands" that go beyond those that are observable in market behavior. The fact that these "demands" are not revealed in the market does not make them illegitimate. Although most of the rhetoric on behalf of these "demands" appears to imply that they can be satisfied at virtually no costs, economic analysis has contributed all too little in determining the resources that would be required to satisfy them. Consider how little we know about the economic effects over a generation and longer of satisfying the demand for a more equal personal distribution of income, and for public services related to schooling, health, housing and our food stamp program. To the extent that scientific research gives us public goods, are our public expenditures on such research close to an optimum? The demand for more environmental quality entails a very complex array of costs that the Environmental

Movement fails to reckon. All of these issues call for analysis that go beyond the market and so does a large part of the allocation of scarce resources in household production.

We have a plethora of growth models, a lot of doomsday "limits of growth" projections, and a wide array of indexes of resources; but, we have very little economic knowledge of the underlying factors that account for the vast increases in resources over time. Although some of the economic development literature, a good deal of it by agricultural economists, is beginning to establish a taxonomy of the growth processes. See, for example, Kuznets [3], Ruttan [6a] and Schultz [8]. But these contributions are not as yet at home in theoretical economics.

The early English economists, notably Ricardo and Malthus, saw economic development occurring under conditions where the supply of food producing land is highly inelastic and subject to strong diminishing returns and under social conditions where population growth tends to exhaust the gains from capital accumulation including the gains from the advances in the productive arts. According to their model the share of the income of society accruing to landowners increases, giving rise to critical social and political conflicts between landowners and other economic classes. In the realm of ideas about class conflicts, including a good deal of economics, the Ricardo-Malthus model continues to hold sway despite its obvious inconsistency with the facts of modern economic development. These facts do not imply, however, that landowners

in some of the low income, less developed countries, are not a source of conflict with regard to social principles and policies in an modernizing economy.

Our economic knowledge is still far too incomplete to identify and measure the effects of the various processes that account for modern economic development. Not knowing more than we do about these processes, theory is wanting and models obviously require theory that is appropriate to the task. We need to explain the marked secular rise in the real earnings of labor, the decline in the share of income accruing to owners of property, and the secular decreases in the economic scarcity of material resources. Why has the price of the services of material goods declined so much relative to the price of human time during the last three or four decades, prior to the abrupt price distortions of the last two years? Although we are troubled and much confused by the high rate of inflation, by the recent sharp increases in primary product prices, including farm commodities, by the devaluation of the dollar and by the oil supply control by the Arab oil producing countries, the prospects are that the pervasive developmental factors of the fifties and sixties, which are presently swamped by all manner of distortions, will again prevail.

II. An Appeal to Developmental Propositions

By going beyond the boundary of standard theory, economic

analysis can be extended to deal with some of these developmental changes in the supply of and demand for resources. We can analyze the effects of man-made substitutes for farmland, the effects of modernization of agriculture on the environment, the effects of the research sector on the scarcity of resources, the effects of human capital on production and consumption, and the effects of the rise in the value of time on household production, investment in children and fertility. I shall approach these effects by presenting briefly and with a minimum of evidence the implications of a series of developmental propositions.

1. The first proposition pertains to the new opportunities favorable to the reallocation of land to non-agricultural uses and to the decline of the role of the owners of farmland in our economy. Urban people are demanding more land for industry, residences, recreation, and for a more satisfying environment. In large part it is the increases in their income that makes their demand effective and the modernization of agriculture contributes to the supply. Our bias, however, is to resist such reallocations of land because of a deep-seated belief that good farmland should never be paved or put to urban uses, as insurance against a shortage of land suitable for agriculture. But the supply effects of agricultural modernization do not support our bias on this issue. The virtually fixed land area suitable for growing crops is not the critical factor of production in increasing

the supply of agricultural products as it was envisioned by Ricardo. The economic importance of cropland declines as a consequence of the modernization of agriculture. Although only about one-tenth of the land area of the earth is cropland, its productivity in high income countries has, in general, been vastly increased by investments in land improvements. More important still are the man-made substitutes for cropland.

The major implications of this proposition are the following: (1) the value productivity of the original, natural properties of the soil (Ricardian) declines relative to that of the land improvement investments that are made by man; (2) farmland rent declines relative to the other costs incurred in agricultural production and relative to the total retail costs entering into the food and fiber chain serving consumers; (3) real wages rise relative to farmland rent in constant dollars; (4) farmland rent becomes a very small component in our national income; (5) owners of farmland as a class become very small compared to the other economic classes in the economy; and (6) at many margins over space throughout the economy some farmland becomes more valuable for non-agricultural uses than for agricultural production. I contend that economic studies should clear the way for orderly transfers as is our want. Such studies could contribute substantially to a reduction in the apparent social conflicts that characterize this area of development. In principle the same

reasoning applies to the allocation of water between agricultural and urban uses.

2. The next proposition pertains to the interaction between agriculture and the quality of the environment. Presumably the demand for environmental quality exceeds the supply. Our political institutions are telling us that the market sector is not satisfying this demand for quality. I take it to be true that there are, in fact, various significant disequilibria. The key difficulty in analyzing these disequilibria is in identifying the real demand. The political movements to obtain more environmental quality do not in general reckon the full costs of the additional quality. The quality that is wanted is not a free good. Nevertheless, when these costs have been fully reckoned, we will, in fact, discover that there are many real disequilibria, and we will also find that the increases in the demand for environmental quality are, in large part, the effect of the marked rise in personal incomes. In my view, our economy faces many adjustments in coming to terms with the real demands for additional environmental quality. Meanwhile, what we observe are unresolved conflicts of interest, much confusion, a lack of clarity with regard to the evidence and a lot of rhetoric. Clearly the environment is a scarce natural resource, a resource that encompasses a wide array of physical, chemical, and biological attributes. It is obvious that these attributes of Nature affect agriculture and that agriculture, in turn, affects

these natural attributes of the environment.

We need to remind ourselves that public concern about the misuse of our natural resources has a long history. The New Deal launched a series of programs devoted to soil conservation. Shelter belts of trees to impede wind erosion and terraces and water courses to reduce soil erosion are the more visible contributions of these programs. In fact, however, the Conservation Movement started long before the New Deal.

For the purpose at hand, I shall concentrate on reconciling the high income effects on the demand for more food that require additional agricultural resources and for additional quality in the environment to the extent that it is affected by agricultural activities. The basic propostion that should guide our analysis in this connection is that the process of modernizing agriculture tends to shift the biological possibilities of Nature to the right and thereby enlarge the real opportunities to satisfy the increases in these two demand components, Schultz [9]. It is a process that makes it possible to have more of the costly foods and also more of the environmental quality components over time.

The major implications of this propositon are that these favorable shifts of the biological possibilities of Nature change our options in the following ways. (1) It reduces the acreage required for our major crops. With respect to corn, wheat and cotton, the three major crops during the early thirties, the farmland devoted to them had declined by about

76 million acres prior to the price explosion of 1973; and, the combined production of corn and wheat more than doubled. (2) The much reduced corn and cotton acreage, the two large row crops that are associated with soil erosion when planted on hilly land are now being grown on land that is, in general, much less subject to soil erosion. It is noteworthy that in Mexico the improved wheat varieties have also made it possible to concentrate the wheat acreage on what are mainly irrigated areas that are not subject to soil erosion. (3) The mechanization of agriculture has made possible many improvements in the control of water and thereby has reduced the adverse effects of uncontrolled water on the natural environment. (4) The mechanization of agriculture in the Plains States of the United States has substantially reduced the vulnerability of that area to the extraordinary dust storms that characterized the mid-thirties. See Johnson and Gustafson [2]. In the application of commercial fertilizers, modern agriculture has not as yet come to terms with some aspects of its effects on the biological environment. A more controversial issue pertains to the uses of chemicals for plant protection including weed control. In solving this ussue it is essential to understand the inherent hostility of Nature to domesticated crops (also to all domesticated animals). It is fair to say, that as yet the Environmental Movement has failed to reckon the food supply implications of abolishing the uses of chemicals in agricultural production; nor have we contributed appreci-

ably to the clarification of the effects of this option compared to alternative options.

3. Although there is much unnecessary ignorance about economics of the agricultural research sector, we know enough to deal with the following questions: (1) Is it worthwhile? (2) Who benefits? and (3) Who should pay the bill? But there must be something in the sociology of agricultural economics that accounts for the general neglect of these questions. Is it because of our bias against virtually all aspects of economic history? Clearly organized agricultural research has a long history with a lot of evidence on its performance. See Mayer and Mayer [4]. Is it because this research is largely outside of the market sector? In fact agricultural research is an important endogenous part of our economic system. It contributes substantially to the increases in the supply of resources and thereby to the gains in real income of society. Viewed comprehensively, Vernon Ruttan [6] has put it cogently, "The impact of science and technology has been to expand the size of 'space ship earth' along those dimensions that are most significant for human existence." The rate of return on public expenditures in support of agricultural research is in general much higher than the "normal" rate of return to alternative investment opportunities. Robert Evenson's studies [1] show that the research investment opportunities associated with agriculture are better in the less developed than the more developed countries, and they show a higher

rate of return to scientific investigations than to applications, although both are above the "normal" rate. The adoption process of the useful contributions of this research the better educated and more informed farmers gain relative to the other farmers and once the adoption process has been completed the gains are transferred to consumers via competition.

The useful contributions of scientific investigations have the attribute of a public good. We have the analytical tools to determine not only who should pay for such research, but also to ascertain approximately the amount of resources that should be allocated to these endeavors. Yet all too small a fraction of our economic talents is committed to this task.

4. Disagreements about the human effects of technology are acute. Most intellectuals see modern technology as a curse like original sin in theology. They see it as bad for labor, for the yeoman farmer, for hapless consumers and for the natural environment. Worst of all it debases our values. Many economists are ambivalent and understandably so because the concept is a Pandora's box. Unless one is striving for ambiguity, it is the better part of valor to avoid the term "technology" and deal instead with the production, price and income effects of specific new agricultural inputs. But even then there is a tendency to add to the confusion. For example, we have a raft of papers without evidence proclaiming that the adoption of Mexican wheats in India worsened the economic

lot of agricultural labor and left the small farmers behind. In fact, however, the adoption of these new varieties has increased the demand for labor, and real wages have risen. Moreover, small farmers got into the act more promptly than might have been expected. While the effects of the new wheat varieties on the personal distribution of income among farm families could not have been predicted, there are now two studies, Satyanarayana and Muralidharan [7] and Singh [11], that show that in fact it has reduced the inequality.

In my view the present approach to agricultural development of the World Bank in low income countries, which in effect calls on scientists to come up with new varieties of wheat, rice and other crops that will increase the yields on small farms but not on large farms, is an absurd approach. A not unrelated line of reasoning is implicit in some proposals to reform U.S. agricultural research--be it for soft tomatoes that require more farm labor or for administering the research so that it is fully responsible for all of its human effects. A recent paper by Randell [5] equates research information with power and distortions and concludes that agricultural experiment stations and universities generally should not release any useful information derived from their research unless and until they have produced complementary research findings that would with certainty offset fully the "power" effects of whatever information they release. It is akin to a dance of the angels on the head of a pin.

5. The last propostion to be considered here deals ever so briefly with human capital. The investment in human capital begins in the home primarily by what mothers do for their children. It continues with the acquisition of schooling and experience and with provisions for health. Then, too, for many people it entails migration; and, for virtually everyone it involves the acquisition of abilities to deal with social and economic changes. The education of women has a strong negative effect on fertility; it also increases the quality of the home investment in children; and, it contributes to health and to the efficiency of the household production, Schultz [10]. Since upward of four-fifths of our national personal income consists of earnings, even though the measurement of it omits the contributions of housewives to real income in household production, changes in the level and personal distribution of the stock of human capital have strong effects on the personal distribution of income.

It has long been evident that the existing functional distribution of income by the market and by public income transfers including public services are not sufficient to satisfy the social and political "demands" for less inequality in the personal distribution of income. It is also true that the personal distribution of income among farm families is more unequal than it is among urban families; furthermore, farm children in general acquire fewer of the quality components than do urban children. One of the important keys in resolving

these social problems is in the personal distribution of human capital.

Like Alice in her Wonderland I have given you five propositions and that is enough. The time has come to turn to more (less) important things.

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> Few scientists think of agriculture as the chief, or the model science. Many, indeed, do not consider it as a

> science at all. Yet it was the first science--the mother of sciences; it remains the science which make human life possible; and it may well be that, before the century is over, the success or failure of Science as a whole will be judged by the success or failure of agriculture.

Several parts of this essay contain important historical insights pertaining to agricultural research. In learning from these insights, one need not accept a number of the authors' naive national and international policy proposals.

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