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# ARE U.S. FARMERS THE MOST EFFICIENT PRODUCERS OF FOOD AND FIBER IN THE 1980's?

**T. Kelly White, Jr.**

This paper addresses the question, "Are U.S. Farmers the World's Most Efficient Producers of Food and Fiber in the 1980s?" This is a very good lead-in question to the issues because the financial problems of U.S. agriculture and the farm sector have led people to ask the question, "Can the U.S. compete in world markets?" Many people attempting to answer that question begin with comparisons of technical efficiency and cost of agricultural production in the U.S. and other countries. The Economic Research Service, U.S. Department of Agriculture, launched a major program of research in 1985 in which we will study the factors that affect the ability of any country to compete in a world market. The more we have examined this question with respect to the researchable questions associated with competitiveness -- the more convinced we are that it is a very complex set of issues.

## COMPETITIVENESS IN WORLD MARKETS

This paper focuses on the issues associated with competitiveness. What causes a country to be more or less competitive in the international market? What kinds of things change the competitive position of a country? What does economic theory tell us about competitiveness? Finally, the crucial question is what the agricultural economics profession should be doing to help decision-makers -- including the policymakers in Washington -- do the things that can help resolve this set of issues. The way the question about competitiveness is being asked is; Has U.S. agriculture lost its ability to compete and if so, why? What has changed? Is it a long-term problem or is it a short-term aberration? And, finally, what can we do to change this situation?

These questions are being asked in the 1980s because of declining U.S. exports, falling market shares, and depressed economic conditions in the U.S. agricultural sector. Some very striking changes occurred between 1980 and 1985 in U.S. agriculture and its role in world markets. Between 1970 and 1980 the nominal value of U.S. agricultural exports approximately quadrupled. The prevailing scenario in the late 1970s was that rapidly growing export demand was the wave of the future and that it was going to last forever. Subsequently, between 1980 and 1985 the value of U.S. agricultural exports declined by more than 20%. The U.S. share of the world markets for major commodities also declined. In 1980

the U.S. had about 44% of the world wheat export market. By 1984, the U.S. share had declined to 36% of the export market. Moreover, the U.S. share of the feedgrains export market declined from about two-thirds to just about half the market.

Three questions posed in this paper are: 1) what is competitiveness? 2) what determines competitiveness? and 3) what should we as an agricultural economics profession be doing in the area of competitiveness?

## What is Competitiveness?

There are many different definitions and concepts of competitiveness. From the point of view of the businessman -- whether he is a farmer, a steel producer or an automobile producer -- competition is defined in terms of the ability to achieve a defined goal. Goals are usually stated in terms of maintenance or increase in sales, or in terms of maintenance or increase in market share. The goal is frequently qualified as maintenance or increase in sales, or share of a market while still making a profit. In international trade, the concept of competitiveness is the same except from a national perspective as opposed to an individual firm or entrepreneur. Perhaps the best and most encompassing definition comes from a study recently published by Harvard University (1) in which competitiveness is defined as the ability of a nation to produce, distribute, and service goods in the international economy in competition with goods and services produced in other countries and do so in a way that earns a rising standard of living. This definition assumes a national goal of improving the well-being of the population.

How do economists define competitiveness? Economic theory really does not deal with competitiveness in the sense that the term is used in the current U.S. export context. Competitiveness is dealt with by economic theory primarily in terms of defining the characteristics of a competitive market. A market structure where the profit-maximization of firms and the utility maximization of consumers result in maximization of societal welfare is defined as a "competitive market". Initial distribution of wealth and resources is taken as given. That does not reveal how to be competitive. Economic theory assumes that, in equilibrium, all production that

takes place is competitive, or else it would not occur.

#### What Determines Competitiveness?

We tend to think of this as a very simple question. And in a way it is. If you can sell your commodity in competition with other producers, you are competitive. However, that really begs the question -- what conditions have to exist in order for us to be able to sell our product at a price equal to or less than our competitors are willing to sell? International comparison of cost of production are often proposed as the way to understand competition. For a number of reasons discussed by Paarlberg, et al. (2), comparisons of available cost of production data is not a very useful way of analyzing competitiveness. Neither are cross-country comparisons of technical efficiency, in and of themselves, very helpful. Economic theory -- while not dealing with competitiveness in the sense that we use it in the 1980s U.S. agricultural export slump -- does provide a basis for understanding the problems associated with competitiveness and a basis for formulation and analyses of policy to deal with the real rather than the perceived problems associated with competitiveness.

Let me review the simple and fundamental conditions underlying the purely competitive model. The goal of a closed, competitive economy is to maximize the welfare of society given the preferences and tastes of the people and the human and physical resources available. In the context of a closed competitive economy the basic problem of economics becomes one of allocation of resource so that in equilibrium three conditions would hold. The three essential conditions in defining "competitiveness" are: 1) each factor of production earns the same return at the margin in all lines of production, 2) for each product line, the cost of a marginal increase in output by augmenting the use of each of the factors used in that production is the same, and 3) in equilibrium cost equals price -- there are no pure profits.

Under a scenario where all countries economies were completely closed and in equilibrium each would differ in the composition of production and therefore consumption, relative product prices, and relative factor prices because of differences in three things: 1) resource endowments, including the human and physical capital stocks at that point in time; 2) welfare functions or preferences and tastes; and 3) the state of technology existing in each of these countries in all lines of production.

When economies are open to trade, theory tells us that any two countries can both increase their welfare (i.e., increase the quantity of goods and services available to society for consumption and/or investment) by specializing in production and entering into

trade. They can gain from trade if their relative domestic product prices or their relative domestic cost of production differ. The emphasis is on "relative" because it is the difference in relative prices among commodities or relative cost of production among commodities in one country as opposed to another -- not the absolute level of price or the absolute level of cost of production -- that is important. Under the very restrictive conditions required for an open, perfectly competitive, market economy; comparative advantage would determine trade. It is differences in the relative domestic prices (i.e., the prices that would exist among commodities if that economy was closed) that would determine trade flows. Under a scenario of trade among countries on a barter basis -- exchange of goods and services -- then the terms of trade and the quantities of goods and services exchanged between any two countries would be determined by the nature of supply and demand within the countries themselves. Excess supply and demand stem from internal supply and demand.

However, most trade is conducted via a monetary exchange system rather than barter. Thus, the exchange rate between the currencies of the two countries becomes a factor influencing terms of trade and trade flows. Under international financial arrangements the determination of exchange rates approach a market clearing process dependent on supply and demand relationships among the currencies of the two countries. To the extent that the exchange rate or the supply and demand for currencies of the two countries is determined by the real trade between those countries -- the demand for and supply of currencies is determined by the need to buy and sell currencies of other countries in order to buy or sell goods and services -- the terms of trade would not be affected by the introduction of money and exchange rates into the system. But, as financial transactions in international money markets become relatively more important, we have no assurance that the supply and demand for dollars versus yen is going to give us the same exchange rate. Thus, the terms of trade for goods and services are impacted by currency supplies and demands in the market. In the realities of international trade, exchange rates are an important variable in determining terms of trade for goods and services between countries and trade flows.

This is, however, a static model and the world is not static. Real world conditions which determine comparative advantage or competitiveness are dynamic. In essence, under the assumption of perfect competition and global equilibrium, competition would exist but there would not be a competitiveness problem. Moreover, under the assumption of perfectly mobile factors of production within countries, economic adjustment would be costless and painless. Thus, shocks to the system from either internal or external sources would result in changes in production,

consumption, and trade patterns. However, there would be no competitiveness problem.

In reality, the competitiveness problem is an adjustment problem. Given the dynamic nature of the world economy, shocks are continuously occurring which call for changes in production and trade. Unfortunately, factors are less than perfectly mobile so adjustment is associated with changes in factor prices. Subsequently, changes in factor prices cause changes in the income and wealth positions of nations and individuals. The magnitude of the price change and therefore the effect on income and wealth positions of factor owners -- including farmers -- for a given shock increases as the mobility of the factor decreases. The more rigidities there are in the system the harder it is to adjust. Competitiveness, or changes in competitive relationships are determined by the whole set of factors which determine supply and demand within countries and which determine the terms of trade among countries. The importance of addressing the competitiveness problem as an adjustment problem is that it is no longer something new, different and mysterious which requires new theoretical development and new analytical approaches. Resource allocation and adjustment problems have been an important focus of agricultural economics research since the emergence of the profession. The difference is that historically the profession has focused on allocation and adjustment problems at the micro (firm) level -- now we need a much more aggregate view focusing on inter- and intrasectoral allocation and adjustment problems within and among nations. Understanding competitiveness requires understanding those factors which serve as sources of shocks to supply, demand, and trade relationships and which determine the ability (cost) of the system to adjust to shocks.

#### FACTORS AFFECTING COMPETITIVENESS

The list of factors affecting competitiveness is probably infinite. But, the more important factors can be divided into three groups. First there are those factors which affect the relative social cost of production. It is the social cost -- not the accounting cost -- that is important. It is cost in an opportunity cost sense. In other words, what has to be sacrificed in one line of production in order to use resources to produce something else. Opportunity costs are of most importance in determining competitive position. The natural resource endowment is important in determining relative social cost of production.

The theory of comparative advantage was developed when land and labor were the primary resources and were used as examples of determinants of comparative advantage, and therefore trade flows. Natural resources have become less important over time and may be of relatively minor importance in determining comparative advantage, competitiveness and trade flows. But we still need to take the

relative resource endowment into consideration as land area is essential in crop production. Capital stock and changes in capital stock are also important determinants of relative social cost. Capital includes human resource capital -- the skills, abilities and education of people. Third is technology -- much of which is embodied in physical capital stock. Finally and possibly most important are the policies and institutions which distort factor mobility and relative factor prices -- those things that cause rigidities in the system.

The second set of factors include those affecting the relative value of goods and services or that set of factors that determine demand within a country. These include population, income and income distribution, taste and preferences, and policies affecting income growth, income distribution, allocation of income among consumption items; and between consumption, and saving and investment.

The third set of factors are those affecting international mobility of goods, services and factors of production and those affecting terms of trade. These include trade policies, immigration policies, exchange rates and exchange rate policies, credit, and other financial policies -- the whole set of general economic policies that countries adopt and use. In addition to policy there are institutional and technological factors affecting mobility of goods, services and information.

Obviously, the competitiveness problem is a global general equilibrium problem. Unfortunately, the economics profession has a very limited capability to deal with this kind of problem. We simply do not have the analytical tools or the data to handle global general equilibrium problems. We can handle general equilibrium problems in a very simplified manner but the kinds of problems dealt with on a day-to-day basis in making policy require substantial country and commodity detail. They are not problems for which a model dealing with two countries -- the U.S. and the rest of the world -- and two commodities -- agriculture and others -- is very useful. There is a tremendous gap between the level of specificity, detail and realism needed and our ability to model. Given that we can not deal with the problem as a whole, what should agricultural economists be doing.

#### THE FUTURE ROLE OF THE ECONOMICS PROFESSION

There are two types of activities on which economists should focus. First, the profession has a responsibility to educate the broad array of interested and affected people, including policymakers, as to the nature of the competitiveness problem and what can and cannot be done about it. We should help them understand what a complex problem this is and that there is no painless way out of it.

Secondly, we need research to enable economists to better understand the

relationship among factors determining competitiveness, and to improve our ability to quantify both the costs and benefits of manipulating policy variables to change the competitive position of a country. We must go far beyond estimation of cost production in an accounting sense, and we have to go beyond just examining the primary production activity. The market infrastructure is equally as important as production at the farm level. There is a whole set of infrastructures that supports the provision of inputs to farmers and moves the product from the farmer to the ultimate consumer. We must examine production costs, in an opportunity-cost sense, and we must consider the whole production-preservation-delivery process until the product at least reaches the border of the importing country.

Research to accomplish these two objectives needs to focus on four issues: 1) accurate quantitative information on the resource base, infrastructure, technical efficiency, and costs and returns of modifying these through research and investment, 2) research which will provide, within a general equilibrium context, better understanding of the effects of policy (agricultural, general economic and trade) on resource allocation and adjustment processes, 3) research focused on the effects of macroeconomic conditions and variables on excess supply and demand relationships, and 4) continued efforts to develop capacity for modeling within a global, general equilibrium framework while retaining sufficient country and commodity detail to be useful for policy analysis.

While issues related to competitiveness do not require a "new economics", they do require

a degree of comprehensiveness and integration far greater than has been characteristic of research in the economics profession. There is much yet to be done and the task is too large and complex for any one researcher or any one institution. The economics profession needs to develop a research strategy focused on the larger set of problems associated with competitiveness. This can provide a framework into which individual research efforts on the part of many individuals and institutions can fit. In this way an emphasis on competitiveness can serve to integrate and focus ongoing research. In ERS, we are attempting to develop such a framework to guide our internal efforts. We welcome and encourage participation by university faculty.

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#### NOTES AND REFERENCES

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