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MARCH 1978 marked the third anniversary of the current economic expansion. Over the course of the expansion, growth in production of goods and services has been comparable to the average output growth in similar three-year periods of prior recoveries. By other measures, however, this recovery has not been average. Growth in employment, for example, has been exceptional. Moreover, the level of unemployment and the pace of inflation both have remained relatively high.

Production

In the most recent quarter, production of goods and services, as measured by real gross national product, declined at a 0.6 percent annual rate. This recent decline reflected the pervasive effects of severe winter weather early in 1978 combined with an extended strike in a major portion of the coal industry. The effects of these factors, while having a debilitating impact on the economy, are temporary in nature. The decline in aggregate production early this year should not be regarded as a signal of a failing expansion, as economic fundamentals remain strong.

Over the entire expansion, from first quarter 1975 to first quarter 1978, real gross national product increased at a 5.1 percent annual rate. This is about average compared to other postwar recoveries. During the first three years of four previous expansions, output grew, on average, at a 5.6 percent rate1 (see Table I).

While growth seems to be on track with other recoveries after three years, the path of the current recovery has taken on its own unique characteristics. Initially, the economy expanded at a rapid pace, experiencing a 9 percent rate of growth in real output of goods and services between the first and third quarters of 1975 (Chart I). During this time, inventory stocks continued to decline, but did so at a reduced rate. This slowing down of inventory decumulation as well as the dramatic rise in real final sales were reflected in the exceptional rate of growth early in the recovery. Over the first year of expansion, real output grew 7 percent.

The second year of the recovery was marked by more sustainable growth. Production of goods and services advanced 4 percent between first quarter 1976 and first quarter 1977. Real final sales expanded steadily, registering a fairly strong 4.4 percent gain in the expansion’s second year.
In the latter part of 1976, the economy experienced some inventory adjustments which induced a slowdown in the growth of total output. At the end of the year, the ratio of inventories to monthly sales in manufacturing and trade industries fell precipitously. The situation was compounded by severe weather conditions in the first quarter of 1977. Such complications limited inventory rebuilding and output growth. These temporary effects were offset, however, by faster growth in the two subsequent quarters, so that the recovery regained its footing and achieved a 5.7 percent increase over 1977 as a whole.

Many of the same factors were at work at the end of 1977 and the beginning of 1978. Inventories again declined relative to monthly sales. As noted above, severe weather combined with the coal strike temporarily hampered production. Despite these factors, output grew 4 percent in the third year of the expansion.

**Sector Activity**

The over-all expansion has been reflected in substantial growth of spending by different sectors in the economy at different stages of the recovery. In the first year, for example, consumer spending made substantial advances, while spending by businesses on plant and equipment and by the Federal Government were rather sluggish. As the expansion progressed in the next two years, growth in these sectors gradually reversed.

Personal consumption expenditures, which comprise about 64 percent of gross national product, increased rapidly early in the expansion, advancing 13 percent in the first year of the recovery as substantial gains were made in personal income. Even after accounting for inflation, real household spending registered a 7 percent growth between first quarter 1975 and first quarter 1976. Spending on consumer durables, which increased 25 percent in the first four quarters of the recovery, was boosted by heavy purchases of autos and appliances. Expenditures on nondurable consumer goods rose 9 percent over the same period. While remaining relatively strong, growth of consumption expenditures has slowed from initial rates in the recovery. Since the first quarter of 1976, spending on consumption goods and services grew in nominal terms at a 10 percent annual rate.

Investment in residential structures has also made significant gains over the course of the current expan-
sion. Residential housing advanced at a nominal rate of 28 percent per year over the three years of expansion. Housing starts surpassed 2 million units in 1977, with single-family starts exceptionally strong. This strong demand for housing partially reflected an attempt to make up for new house purchases postponed during the recession. Between second quarter 1974 and first quarter 1975, investment in residential structures had declined at more than a 21 percent rate. Recent strength of demand for housing is probably also influenced to some extent by homebuyers’ uncertainty about future home prices. As housing prices have risen sharply in the last several years, some housing purchases were based on the assumption that new homes would become even more expensive relative to income in the future.

Spending on plant and equipment, on the other hand, demonstrated little strength during the first year of the recovery, growing 4 percent in nominal terms. This relatively slow growth in investment spending was due in large part to continued business uncertainty resulting from the indefinite status of various Government regulations, proposed changes in Federal energy and tax programs, and the future course of inflation. Higher replacement costs and lower productivity of capital goods due to higher energy costs have impeded growth of capital outlays. Inflation, combined with the tax structure, has lowered the yield on, and increased the cost of obtaining the necessary funds for a given investment program, thus eroding incentives to invest. Recently, however, business fixed investment has shown signs of renewed strength. Since the fourth quarter of 1976, plant and equipment spending has advanced at about a 14 percent rate.

Government purchases of goods and services showed little strength in the first two years of the expansion. Between first quarter 1975 and first quarter 1976, real Government spending advanced 2 percent and over the following four quarters declined slightly. This pattern has been reversed, however, since the beginning of 1977. Real Government spending has increased more than 4 percent in the past year. The recent rise in the growth of Government spending has been sharpest among state and local governments, which coincides with increased grants-in-aid through the Federal Government’s 1977 eco-

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2Housing prices, as measured in the consumer price index, have risen at an 8 percent annual rate since 1970.


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nomic stimulus program. This program includes local public works, public service employment, and other employment and training programs.

**Labor Market Developments**

A significant characteristic of the present expansion has been the rapid growth of employment. In the 36 months of the expansion, civilian employment has grown at an annual rate of 3.5 percent. This growth is exceptionally high by historical standards. Over comparable 36-month periods in past expansions, civilian employment grew at an average 2.1 percent rate.

Labor force growth also has been rapid over the recovery. A record 62.8 percent of the civilian non-institutional population aged 16 and over were members of the labor force in March 1978. In other periods of relatively high employment, 1956 and 1967-69 for example, 60 and 59.8 percent, respectively, of the working-age population were in the labor force. In the three years of the current expansion, the civilian labor force has grown at a 2.6 percent rate, twice the average rate of growth achieved during the first three years of previous expansions. Demand for labor has been relatively strong, so that many in the labor force have been placed in jobs. The number of employed persons in the working-age population reached a postwar peak of 59.0 percent in March, higher than at any time in the prior 29 years.

Significant progress has been made in lowering the unemployment rate over the past three years. The unemployment rate declined from 8.6 percent in March 1975 to 6.2 percent in March 1978. Despite such progress, the rapid growth in the labor force left more than 6.1 million workers currently recorded as being unemployed.

The level of the unemployment rate reflects various factors, including structural changes in the composition of the labor force, which have tended to maintain its relatively high position. The labor force now contains relatively more women and teenagers than heretofore. Adult women comprised 37.1 percent of the labor force as of March of this year, a record high. Moreover, while the participation of women has been increasing throughout the postwar period, it has intensified within the past five years. Participation of adult women (aged 20 and over) in the labor force reached a peak of 49.1 percent in March, compared to an average participation rate of 37.8 percent in

4In April, the unemployment rate fell to 6.0 percent.
Chart II

Labor Market Trends
Annual Averages of Monthly Figures
Seasonally Adjusted

Shaded areas represent periods of business recessions.
Latest data plotted: 1978, based on first four months

in prior periods of expansion. Much of the impetus for the recent rise can be attributed to married women (spouse present) whose participation in the labor force has risen over 3.6 percentage points since 1974. Of these women, many have small children (infant to 5 years old), a characteristic whose inhibiting influence on labor market participation seems to be diminishing.

Teenagers also account for a larger proportion of the labor force than in previous periods. Labor force participation of workers aged 16-19 stood at 56.7 percent in March, nearly the highest in recent history.

Partially because of the level of skills of these groups of workers, plus the restrictions of the minimum wage and the tenuous nature of labor force attachment in the case of teenagers, higher rates of unemployment are generally experienced by women and teenagers. Due to the increased size of these groups, their unemployment rates are weighted more heavily which, in turn, tends to raise the average level of the overall unemployment rate. In March 1978, unemployment rates for adult women and teenagers were 5.8 and 17.3 percent, respectively. In the same month, adult men had an unemployment rate of 4.5 percent.

According to current data, the average duration of unemployment is less than 13 weeks. This is well within the present maximum limit for receipt of unemployment compensation. The broad scope of benefit programs, coupled with savings and other sources of aid such as food stamps, tend to reduce the economic hardship suffered by the unemployed. However, such unemployment programs also tend to reduce incentives for the jobless to obtain work, pre-
serving a high number of unemployed, even under fairly tight labor market conditions.6

**Prices**

Another feature of the current expansion which distinguishes it from others is the much higher rate of inflation which prevails. The implicit price deflator, a measure of the general level of prices, rose at a 5.7 percent rate over the twelve quarters of this recovery. In the first twelve quarters following the troughs of past recessions, the general level of prices rose an average of 3.4 percent per year.

The difference between the inflation experience in the current recovery and that in previous recoveries primarily reflects differences in the growth of money. Growth of prices is primarily determined by the trend growth rate of money. In the five years preceding this recovery, the money stock grew at a 6.2 percent rate, greater than money had grown in the five years prior to any other postwar recovery. While money stock increased at a 5.7 percent rate between November 1966 and November 1970, in the corresponding periods preceding the expansions beginning May 1954 and February 1961, money had grown at only 3.1 and 1.4 percent rates, respectively. Moreover, money growth has been accelerating since the current recovery began, reaching a 7.3 percent rate in the period from the third quarter 1976 to first quarter 1978 (Chart IV).

This expansion in the money supply reflects growth in the monetary base, its prime determinant, which has shown a marked acceleration during the recovery. In the first two years of this expansion, the monetary base had grown at an 8.2 percent rate, from the 7.7 percent rate recorded in the previous three quarters. In the expansion’s third year, the base growth accelerated to a 9.3 percent rate.

Prices, as measured by the consumer and wholesale price indexes, show a similar pattern. The consumer price index (CPI)7 rose at a 6.4 percent rate between March 1975 and March 1978 (Chart III). In the past, however, the CPI averaged a 2.9 percent annual rate of growth over similar recovery periods. On the wholesale level, prices of industrial commodities rose at a 6.6 percent rate in this expansion, compared to an average rate of 3.2 percent in other expansions.

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6See Martin Feldstein, “The Economics of the New Unemployment,” *The Public Interest* (Fall 1973), pp. 3-42.

7This CPI refers to the series for urban wage earners and clerical workers.
SUMMARY

The current expansion has reached the average length of other postwar recoveries and, in terms of production of real goods and services, has posted about the same rate of growth from the trough as have other expansions. However, specific characteristics of the current situation are unique. Plagued by severe winters and temporary shortages of energy, growth of real output has been hampered at various stages of this recovery. Inventory investment, although accelerating recently, has also been impeded by various adverse factors. Business fixed investment expenditures still remain low relative to other recoveries.

While the expansion has been reflected primarily in growth of private consumption, investment and Government expenditures may take on more prominent roles in the future. Investment expenditures as well as Federal purchases of goods and services have rebounded from their sluggish behavior in the earlier stages of the recovery. During 1977, gross private domestic investment, after accounting for inflation, grew nearly 17 percent; real Federal Government purchases advanced at a 10 percent rate over the last three quarters of the year.

Housing growth, on the other hand, which has shown exceptional strength during the recovery, may be tempered due to rising interest rates and exhaustion of “pent-up” demand forces. Rates on short-term market instruments, such as 3-month Treasury bills, have risen to levels equal to the ceiling limits on saving and loan time deposit accounts. If disintermediation becomes a serious problem, the housing sector may suffer more serious slowing.

Two problems, formerly an unusual combination, are likely to continue to be characteristic of the prevailing economic environment. The unemployment rate, which has been primarily influenced by structural and supply factors, is generally expected to remain relatively high. Inflation is also not likely to show any slowing in 1978. Based on past rates of monetary growth, inflation can be expected to run in the neighborhood of 6 percent during this year.
Comparing Per Capita Output Internationally: Has The United States Been Overtaken?

JAI-HOON YANG

In 1950 the United States was generally recognized as having the highest per capita output in the world. Using exchange rates to convert foreign output into dollars, the level of U.S. per capita output in 1950 was more than 50 percent higher than that of any other industrialized country.1 During the next two decades the conventional exchange rate-based measure of comparison indicated that these industrialized countries markedly narrowed the U.S. lead. By 1970 U.S. per capita output was still more than 15 percent higher than the next highest industrialized country, Sweden.

By 1974, however, that same conventional measure indicated that Sweden and Switzerland had overtaken the United States. Reportedly, Canada, Denmark and West Germany have joined the club.2 Citing these developments, one critic of the U.S. economic system speculated that "the lack of government planning, worker participation, and social spending may in fact be at the heart of our poor performance in recent decades."a

There is good reason to question the conclusion about the comparative levels of per capita output based on the conventional (exchange rate-based) measure. Specifically, the method of using exchange rates to convert output of different countries into a common currency, such as the U.S. dollar, has several serious drawbacks. First, actual per capita output of goods and services in different countries does not necessarily change every time exchange rates between the countries change, although the conventional measure of comparison would indicate such a change. Second, the exchange rate between currencies serves to equalize, at best, the prices of goods traded between countries. However, total output in each country also consists of goods and services which are not traded but are consumed domestically. Price differences in these non-traded goods are not necessarily captured in the exchange rate. To the extent the exchange rate does not reflect such a difference in the prices of non-traded goods, any comparison based on the conventional measure would be distorted. In addition, the prevailing exchange rate may not even equalize the prices of goods traded internationally for a variety of reasons, including government interventions in the markets for foreign exchange.

To overcome these shortcomings of the exchange rate-based measure, economists have developed an alternate measure based on the relative purchasing power of different currencies over both traded and non-traded goods. This alternate measure of international comparison indicates that the U.S. lead in per capita output in the earlier period (1950 through 1970) was generally much narrower than that indicated by the conventional measure. Also, these estimates indicate that the U.S. lead has yet to be overtaken.

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1 The concern here is with the relative per capita levels of actual output of goods and services produced (such as per capita gross national product or gross domestic product as conventionally measured in accordance with the prevailing United Nation's System of National Accounts) and not with the elusive and speculative measures of relative levels of economic welfare. The primary reason for focusing on a measure of production, such as per capita output, rather than on a measure of welfare, such as consumption per capita, adjusted for length and conditions of work, is that in most studies and popular discussions of international comparisons, measures of per capita output have been used. For a discussion of reasons why measures of production, rather than of welfare, are compared, see Milton Gilbert and Irving B. Kravis, An International Comparison of National Products and the Purchasing Power of Currencies (Paris: Organization for European Economic Cooperation (OEEC), 1954), pp. 72-76. For a discussion of the distinction between a measure of welfare and a measure of output, see Edward F. Denison, "Welfare Measurement and the GNP," Survey of Current Business (January 1971), pp. 13-16, 39.

2 West Germany was reported to have become "just a bit richer" than the U.S. on a per capita basis on June 24, 1973, See J.W. Anderson, "The Relative Wealth of Nations," Washington Post, 2 July 1973. Denmark's leap forward was reported in early 1977. See Lester C. Thurow, "The Myth of the American Economy," Newsweek (February 14, 1977), p. 11. These reports are based on a temporary (as short as a day) dip in the value of the dollar. Based on an annual or even on a quarterly average basis, Denmark and West Germany have yet to pass the United States, even in terms of the conventional measure. Canada's entry into this exclusive club was reported recently in "U.S. Slips to 4th in National Income," Washington Post, 13 May 1978.

The Conventional Measure of International Comparisons of Per Capita Output

The conventional measure of international comparisons using exchange rates between two countries, say, Germany and the United States, is quite simple. First, the per capita German output in Deutsche marks (DM) would be converted to dollars by the prevailing exchange rate. The resulting per capita German output in dollars would be divided by the per capita U.S. output, also measured in dollars. The resulting quotient, expressed in percentage form, is the conventional measure of the relative level of per capita output between Germany and the United States. For example, suppose that per capita German output in a given year is DM4,000 while U.S. per capita output is $2,000. Assume that the exchange rate is DM4/$1.00.\textsuperscript{4} To derive the conventional measure of international comparison, the per capita German output would be converted to dollars (DM4000 ÷ DM4/$1 = $1000) and then expressed as a percent of U.S. per capita output ($1000/$2000 = .50, or 50 percent). For the sake of illustration, if the exchange rate in this example changes to DM2/$1.00 (the dollar depreciates), the conventional measure becomes 100 percent. In other words, per capita output in Germany would be estimated to be equal to that of the United States.

This conventional measure of international comparisons is a unique number for given estimates of per capita output of any two countries (denominated in their respective national currencies) and a given exchange rate. Also, the conventional measure is easy to construct. These attractive features explain why the conventional measure is regularly published and widely quoted.\textsuperscript{5} However, this procedure is fraught with conceptual difficulties. So much so that since the early 1950s, there have been concerted attempts to construct more appropriate measures.\textsuperscript{6} The important point to note for now is that the allegation that the United States has lost its lead in per capita output in the 1970s has been based exclusively on the conventional measure of international comparisons.

The Nature of the Difficulty With the Conventional Measure

International comparisons of per capita output must be based, in principle, on a comparison of the quantities of both internationally traded goods (such as radios) and non-traded goods (such as haircuts) produced in different countries.\textsuperscript{7} The basic difficulty with the conventional measure, which uses prevailing exchange rates, is that this measure is known to be valid only when (a) the relative prices of traded and non-traded goods are identical between the countries (a haircut costs the same amount in terms of radios in both countries), and (b) the prevailing exchange rate is such that the prices of traded goods are equalized (an American-made radio costs just as much as one of similar quality made in Germany). These conditions, especially the one calling for identical price structures (relative prices) in each country, are unlikely to be met. Therefore, there can be no presumption that the procedure underlying the conventional measure would yield a valid measure of comparison.

To clarify this point, consider the example given in Table I. There are two hypothetical countries, Alpha and Beta. Prices in Alpha are denominated in pounds, denoted by £. Beta’s prices are denominated in dollars, denoted by $. Country Beta is assumed to produce greater amounts per capita of both traded goods, such as radios, and non-traded goods, such as haircuts. Country Alpha produces \( \frac{7}{8} \) as many radios per capita as country Beta and \( \frac{3}{4} \) as many haircuts per capita. If we compared only the traded goods, Alpha’s output would be \( \frac{7}{8} \) or 66.7 percent of Beta’s; on the basis of non-traded goods, Alpha’s output would be \( \frac{3}{4} \) or 33.3 percent of Beta’s output. However, the task of comparing per capita output internationally is to express country Alpha’s...
**Table I**

<table>
<thead>
<tr>
<th>Country</th>
<th>Price (per capita)</th>
<th>Quantity (per capita)</th>
<th>Expenditure (per capita)</th>
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**Total Output**

In Table I, the relative price of radios and haircuts is assumed to be identical in both countries, that is, radios cost 5 times as much as haircuts in both countries (£50/£10 and $5/$1). The average level of prices in Alpha (in £) is assumed to be 10 times higher than that in Beta (in $). If the exchange rate is £10/$1.00, as is likely under free trade, the underlying condition that justifies the use of the conventional measure is met. The relative level of per capita output of Alpha would be computed by dividing the aggregate value of its per capita output (£300) by the exchange rate and then expressing the resulting figure of $30 (£300 ÷ £10/$1.00) as a percentage of the aggregate value of Beta’s per capita output ($60). In this instance, the resulting conventional measure is 50 percent which falls within the limits required for a valid measure.

However, there is no presumption that the procedure underlying the conventional measure would yield a valid measure of comparison when relative prices differ between countries. To analyze a more likely case where relative prices of traded and non-traded goods are different between countries, consider the example given in Table II (which is identical to Table I except that the price of radios in Alpha is now £15 rather than £50). Relative prices in the two countries are no longer identical. Radios cost 5 times as much as haircuts in Beta whereas radios cost only 1½ times as much as haircuts in Alpha.

Since the prices of *traded goods* are assumed to be equalized internationally through adjustment in the exchange rate, the equilibrium exchange rate would be £3/$1.00 for this example. The conventional measure for comparing per capita output in this instance would be 88.9 percent [(£160 ÷ £3/$1.00) ÷ ($60) = .889]. Thus, the conventional measure is immediately seen to be an invalid measure for comparing per capita output since it is even higher than the highest of the relative quantities in the example (66.7 percent for radios, the traded good).

As these examples demonstrate, only under the twin assumptions of (a) identical domestic price structures (relative prices) across countries and (b) a market determined exchange rate which equalizes the prices of traded goods would the procedure underlying the conventional measure yield a valid measure for comparing per capita output between countries. These special assumptions are not generally met for a variety of reasons. Inter-country productivity differentials across commodity groups (such as traded vs. non-traded goods) would result in different domestic price structures. Also, government interference,

**Table II**

<table>
<thead>
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through such devices as exchange controls and import quotas, distorts the exchange rate such that it may not equalize the prices of traded goods between the two countries.

Even where the exchange rate is allowed to be determined freely in the foreign exchange market, one is not likely to observe equal prices for traded goods. Some prominent reasons given for this are the differences in (a) the cost of transportation, processing and distribution, both between and within countries, (b) tax structures (indirect vs. direct taxes), and (c) selective subsidies on certain classes of commodities.8

Hence, the conventional measure based on the exchange rate is not necessarily a valid measure for comparing per capita output between countries. The point to note is that the conclusions regarding the comparative levels of per capita output since 1950 and the allegations about the United States falling behind in the 1970s are founded on no more substantive basis than the conventional measure of international comparison discussed and illustrated in this section.

**Alternative Measure of International Comparisons Based on Purchasing Power Parities**

A generally valid measure for comparing per capita output between countries can be constructed by using what is known as the purchasing power parity (PPP) of currencies. PPP is defined as the ratio of the number of units of one country's currency (say Deutsche mark) to the number of units of another country's currency (say the U.S. dollar) which are required to purchase the same bundle of both traded and non-traded goods. To estimate PPP, the total per capita output of a given country is priced first by the prices prevailing in the given country and then by the other country's prices. An estimate of PPP is obtained by the ratio of the resulting market values of the total per capita output which has been priced. An alternative estimate of PPP may be obtained by pricing the total per capita output of the other country. Examples of PPP calculations are shown in Table III.

For the example in Table I where the price structures are identical, PPP is unique (at £10/$1.00) 8

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and would be equal to the exchange rate if the exchange rate is such that the prices of traded goods are equalized. When the price structures are different as in Table II, however, the PPP is not, in general, equal to the exchange rate.10

Hence, the alternative measure for comparing per capita output based on PPP is not in general equal to the conventional measure based on the exchange rate. To illustrate the difference in the exchange rate-based conventional and the PPP-based alternative measures of international comparisons of per capita output, refer to Table III. Computations reported in Table III illustrate that the PPP-based measures are valid for comparison in the sense that they (being 41 percent and 50 percent) lie between the upper and lower limits (66.7 percent and 33.3 percent) of relative quantities of traded and non-traded goods. As noted above, the conventional measure derived by the use of the exchange rate, on the other hand, is inappropriate in that it, being 88.9 percent, lies outside of these limits. In general, the use of PPP first to convert the per capita output of a given country into common currencies and then to express it relative to the per capita output of the base country yields without exception a valid measure for comparing the per capita output of the two countries.11

9For a discussion of the relationship between the exchange rate and the purchasing power parities (PPP) of currencies, see Bela Balassa, “The Purchasing-Power Parity Doctrine: A Reappraisal,” Journal of Political Economy (December 1964), pp. 584-96. When PPP is equal to the exchange rate, the absolute version of the purchasing power parity doctrine is said to hold. The doctrine posits a relationship between the rate of exchange between two currencies and the purchasing power of currencies over both traded and non-traded goods in two countries. The absolute version links the level of exchange rates one-for-one to the purchasing power parities, whereas the relative version of the doctrine relates the required adjustment in the exchange rate (from the posited base-period equilibrium exchange rate) to the relative changes in the general price levels. There are no theoretical reasons for either one of these versions of the doctrine to hold, unless the relative price structures either remain unchanged or become identical. See Balassa, “Doctrine,” pp. 584-57.

10Computations given in Table III show that PPP is not equal to the exchange rate (assumed to be £3/$1.00) but ranges between £5.33/$1.00 and £6.5/$1.00. This reflects the fact that, given the lower relative price of traded goods in Alpha, the comparative purchasing power in Alpha’s currency over both traded and non-traded goods is lower than that indicated by the exchange rate which takes into account only the prices of traded goods. Thus, whereas the exchange rate indicates £3 is equivalent in purchasing power (over the traded good) to $1.00, the PPP indicates that £5.33 (or £6.5) is equivalent to $1.00 in buying power over both the traded and non-traded goods. Further, the use of own quantity weights, rather than the quantity weights of Beta, results in a larger estimate of the purchasing power of £2 (that is, a smaller estimate of PPP) because relatively cheaper traded goods get a greater weight in the estimation of PPP. When PPPs are not unique, geometric averages of the different estimates of PPP are often used.

International Comparisons of Per Capita Output Based on PPPs

The alternative PPP-based measures for comparing per capita output have not been widely used in the past, however, primarily because of the relatively high cost of constructing them. Conventional measures can easily be constructed with data routinely available in regularly published statistical releases. The data collection and processing requirements for the construction of the PPP-based measures are staggering. Such measures require, in principle, price and quantity information on each individual good and service produced in different countries.12 In addition to the cost of data collection, the existence of commodities which are unique or not identical in quality (such as a Rolls-Royce vs. a Volkswagen) poses both conceptual and measurement problems.13

The high cost of using the PPP method explains why the estimates based on this method are available for only a selected number of countries and only for selected periods.14 Essentially, PPP-based estimates are available for 1950, 1960 and 1970. Table IV lists PPP-based estimates relative to the United States for a sample of countries for which data are available for some years through 1970 (with the exception of Switz-
Compared to the conventional measure given in the same table, the PPP-based measure indicates that the U.S. lead in per capita output was not as great in 1950. For example, the U.S. per capita output was a trifle more than twice that of the Netherlands according to the PPP-based measure, rather than the nearly four fold lead indicated by the exchange rate-based measure. Both measures indicate that the gap has narrowed over the 20-year period and that the U.S. lead has yet to be overtaken through 1970. The alternative (PPP-based) measure indicates, however, that the narrowing of the gap in most cases has not been as dramatic as indicated by the conventional measure.

In order to assess the allegation, based on the conventional measure, that the United States has lost its lead in per capita output in the 1970s, we proceed as follows. For each selected country the latest available PPP-based estimate of per capita output is projected forward in time by using the various countries’ actual growth rate in per capita output. The PPP-based estimate for the United States is similarly projected. Comparison of the projections for each country, expressed as percentages of the projection for the United States, is then made.

As an illustration of the method, the PPP-based estimate for West Germany in 1970 can be used. The PPP-based estimate of per capita output for West Germany in that year is 75 percent of that of the United States. To derive the PPP-based estimate for 1976, for example, the German per capita output for 1970 was calculated by first multiplying the 1970 U.S. per capita output by the PPP-based measure of comparison for priori but must be determined on a case-by-case and country-by-country basis, that is, only after the conventional measure is compared to the PPP-based measure. The observed tendency of the conventional measure to be lower than the PPP-based estimate over this period has been explained in terms of greater inter-country productivity differential in the traded-goods sector (such as manufacturing and agriculture) than in the non-traded goods sector (such as personal services and government). The presumption has been that there is a greater opportunity for technological innovations in the traded goods sector. For details, see Balassa, “Doctrine.”

Table IV

<table>
<thead>
<tr>
<th>Country</th>
<th>Conventional Measure Via Exchange Rates</th>
<th>Alternative Measure Via Purchasing Power Parities</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
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<tr>
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<td>46</td>
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<tr>
<td>Italy</td>
<td>16</td>
<td>25</td>
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<tr>
<td>India</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Japan</td>
<td>N.A.</td>
<td>16</td>
</tr>
</tbody>
</table>


*Based on extrapolation using the growth rates of real per capita output.

N.A.: not available.
Table V
International Comparisons of Per Capita Output
1970, 1974-76
(U.S. = 100)

<table>
<thead>
<tr>
<th></th>
<th>Conventional Measure Via Exchange Rates</th>
<th>Alternative Measure Via Purchasing Power Parities</th>
</tr>
</thead>
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<tr>
<td>Japan</td>
<td>39</td>
<td>62</td>
</tr>
</tbody>
</table>

Source: The same as Table IV. Computations of PPP-based measures are based on extrapolation using relative rates of growth of real per capita output.

Germany for 1970. The German per capita output in 1970 (in 1970 U.S. prices) is $3596 (75 percent of $4795 for the U.S. in 1970). This 1970 German per capita output was extrapolated to 1976 by using the average growth rate (2.3 percent per year) of the German real per capita output over the 1970-1976 period. The resulting figure of $4125 was 76 percent of the 1976 per capita U.S. output (in 1970 U.S. prices). Consequently, the estimated PPP-based measure in 1976 was 76 percent for West Germany.17

Table V provides comparisons based on these extrapolated estimates and on the conventional measure

17 This method admittedly involves the assumption that the price structure in one country has not changed relative to that of the other country over the extrapolation period. It may appear that the objection raised to the use of the exchange rate, that it assumes identical price structures across countries, is applicable to this method of extrapolating the PPP-based estimate. However, this extrapolation method is superior for the purpose of comparing the levels of per capita output since the use of the PPP provides a correct gauge of the comparative levels of per capita output for the initial period. The use of the exchange rate would not lead to a correct measure of relative levels of per capita output at any time over the entire period of comparison, as long as the price structures are not identical. The basic reasons of course, are that the PPP-based method, unlike the exchange rate method, is not distorted by the different degrees of intervention in the exchange market and that the method allows for the differences in the prices of both traded and non-traded goods. The available evidence indicates that this extrapolation method is superior to the exchange rate-based method. See the discussion below and Kravis, et al., A System of International Comparisons, pp. 8-9, especially footnote 13.

for 1970, and for 1974 through 1976.18 The numbers are in index form, with the United States scaled at 100. Therefore, if a number exceeds 100, it sustains the claim that the United States has been overtaken by that country.

The conventional measure indicates that some countries have overtaken the United States in the 1970s. Per capita output in Switzerland, for example, was 72 percent of the United States in 1970. By 1974, Swiss per capita output exceeded that of the United States, standing at 115 percent of that of the United States. Such a reversal in the comparative position is hard to accept, however, because of what it implies about the relative growth rates of per capita output over the 1970-1974 period. The conventional measure implies that per capita output in real terms in Switzerland has grown at the annual rate of 14.9 percent over this period while U.S. per capita output has grown at a 2.3 percent annual rate. Per capita output in

18 Contrary to the pattern observed in Table IV, the conventional measure using the exchange rate is higher after 1970 than the PPP-based measure in most cases. However, as noted in footnote 16, there is no necessary reason for the conventional measure to fall on either side of the PPP-based measure. In this paper, there is no discussion of the factors producing this difference in pattern. It can be noted, however, that key factors explaining the difference are (a) a steady increase over the period in the number of convertible currencies; (b) varying degrees of intervention in the foreign exchange markets; (c) varying degrees of constraints on goods and capital movements; and (d) the changing role of the U.S. dollar as a reserve currency.
Switzerland, in fact, has grown even slower than that of the United States over this period, at 2.1 percent per year compared to 2.3 percent. Such an anomalous result holds in general. Per capita output in Sweden, for example, has grown at the same rate as that for the United States over the same (1970-1974) period. The conventional measure, however, shows that per capita output in Sweden has increased substantially (close to 20 percent) relative to that for the United States.

Comparison of estimates derived from the more appropriate PPP-based measure does not support the claim that the U.S. lead in per capita output has been overtaken in the 1970s. For example, whereas the conventional measure for Sweden reached its high of 118 in 1975, the PPP-based measure was only 80 percent of U.S. per capita output. The conventional measure also placed Canada ahead of the United States in 1976; however, its PPP-based measure was below that of the United States, at 91 percent. As noted in Table V, PPP-based estimates of per capita output for Switzerland are not available. However, in view of the low growth rate of per capita output in Switzerland relative to the United States since as far back as 1960 (1.98 percent vs. 2.36 percent), when the U.S. lead was judged to have been substantial (see Table IV), it is not likely that Switzerland had overtaken the lead by 1976.

**CONCLUSION**

The allegation that the United States has been overtaken in its per capita output by a number of industrialized countries in the 1970s is based on an exchange rate-based measure which has been shown to be unreliable. When estimates of the more appropriate PPP-based measure are constructed, the allegation is not supported. That does not mean that one should be complacent about the performance of the U.S. economy. But it denies the factual basis for the claim that "[r]elative to achievements in the rest of the world, the U.S. economy no longer 'delivers the goods.'"

Although the United States has yet to lose its lead in per capita output, the estimates of PPP-based measures through 1976 indicate that the U.S. lead has indeed narrowed since 1950. One could cite many contributing factors to this development — such as the imperatives for reconstruction provided for some countries by the ravages of World War II, and the opportunities for adapting available production technologies. However, the fact that the U.S. lead has been narrowed does not necessarily mean that it is bound to be overtaken in the future. The future is not necessarily an extrapolation of past trends. The comparative levels of U.S. per capita output in the future will be determined solely by this country's relative success in harnessing opportunities for growth in per capita output.

19Thurow, “The Myth.”

Rising Farmland Prices and Falling Farm Earnings: Is Agriculture in Trouble?

NEIL A. STEVENS

U.S. farm real estate values have risen rapidly in recent years. In the five-year period from 1972 to 1977, the average price of an acre of U.S. farmland increased 114 percent, or at an annual rate of 16.5 percent. This rate of gain for farmland is the most rapid for any five-year period in this century and compares with a 6 percent annual rate of increase in the thirty years ending in 1972. At a time when some alternative investments, notably many common stocks, have performed less spectacularly, and when assets which offer a hedge against inflation are highly desired, farm real estate has been very attractive. In fact, ownership of farmland has provided more than simply a hedge against inflation as increases in farmland values have substantially outpaced the rate of general price inflation.

These increases in farmland values have brought about substantial gains in the wealth of landowners who made land purchases prior to, or in the early stages of, the present farmland price boom. Yet, while most landowners have become wealthier, lower farm commodity prices and sharply higher costs of production in recent years have substantially depressed farm earnings from the level of three to four years ago. These conditions, in turn, have led to substantial cash flow problems for those farmers who financed purchases of land at the elevated prices of recent years and who must continue to meet periodic large interest payments as well as other fixed costs. Such a financial "squeeze" apparently underlies the recent farmers’ strike movement.

Determination of Land Values

Land is an asset which is relatively fixed in supply. Since the quantity of land is not very responsive to changes in its price, especially in the near term, changes in the price of land reflect primarily changes in the demand for the services it provides. In addition to agricultural uses, land is demanded for many other uses including residential, industrial, commercial, and recreational.

The price of most agricultural land, however, reflects primarily the value of the agricultural products that it can produce. That is, the demand for farmland is derived primarily from its role as an input into the production process for food and fiber. Thus, the earnings accruing to farmland are affected by numerous supply and demand factors affecting agricultural products. Among these factors are aggregate incomes in the economy, population, export demand, prices of nonagricultural goods, prices of non-land inputs into agricultural production, agricultural technology, and government farm programs.

Farmland is a durable asset, yielding a stream of services, or earnings, over time. Consequently, the price of farmland, although influenced by current earnings, reflects the stream of earnings which are expected over its life. Investors must, therefore, ana-

\[ P = \sum_{n=1}^{\infty} \frac{E_0}{(1+i)^n} \]


3 In investment theory terminology, the stream of earnings is discounted or capitalized in order to determine its present value. The present value (P) of a constant stream of earnings can be written as

\[ P = \frac{E_0}{1+i} + \frac{E_0}{(1+i)^2} + \ldots + \frac{E_0}{(1+i)^n} \]

where \( E_0 \) is net earnings, \( i \) is the opportunity cost of credit, and \( n \) is the number of periods over which the earnings are expected. This formula can be written in shorthand form as

\[ P = \frac{E_0}{i} \sum_{n=1}^{\infty} \frac{1}{(1+i)^n} \]

For example, earnings of $100 per year for the next ten years discounted at a 5 percent interest rate is worth approximately $772 today. When \( n \) becomes very large, the formula reduces to the simple formula:

\[ P = \frac{E_0}{i} \]

When a
lyze the demand and supply factors which can influence the future income stream of the asset and form some judgment as to the probable pattern of that income stream. If, for example, population growth is expected to increase from 2 percent a year to 3 percent a year, investors would probably raise their expectations of future earnings from farmland, other things equal, and the price of farmland would be bid up immediately to incorporate this change.4

Farmland Values and Earnings — The Historical Record

Farmland has been a "good" investment over the past thirty-five years in the sense that the average value of an acre of U.S. agricultural land has increased more rapidly than the rate of inflation. Farmland values, deflated by the GNP implicit price deflator, rose at an average rate of 2.6 percent per year from 1942 to 1972. Beginning in 1972 farmland values accelerated sharply, rising almost 9 percent per year faster than the general inflation rate from 1972 to 1977 (Chart I).

Farmland investments have also performed well when compared with most common stock investments. In the past ten years, farm real estate values in nominal terms have advanced at an 11 percent annual rate while common stock prices, as measured by the Standard and Poor’s 500 Index, have remained about unchanged.5 In the previous twenty years common stock prices rose at a 9.4 percent rate, compared with a 5.2 percent rate for farmland prices. Such a divergent pattern for these two types of investments is symbolic of a substantial shift in investors’ expectations about the future earnings of these two investments.

Historical data on earnings from farmland as a separate factor of production are not readily available. However, a measure of earnings on total farm assets is computed by the U.S. Department of Agriculture and can be used here as a proxy measure for farmland earnings.6 As shown in Chart II, these earnings on farm production assets (in nominal terms) have trended upward since 1950. Especially noticeable is the sharp rise in earnings in the early 1970s when earnings from farm assets rose 200 percent from 1971 to 1973, then subsequently fell. Earnings adjusted for changes in the general price level also increased sharply in the 1971-73 period, but by 1977 real earnings were only 15 percent above the 1971 level.

An Analysis of Price and Earnings

The ratio of the value of farm production assets to earnings on these assets is a useful tool for analyzing the behavior of farm earnings and farm real estate values. This ratio, similar to the price-earnings ratio used in stock market analysis, is a measure of


5While different growth rates were observed for the two assets, the rates of return on investments are not necessarily different. In fact, over the longer term, rates of return for assets tend to equalize when differences in risks are taken into account. If, for example, the rate of return of a particular asset is substantially above that of other investments, investors will tend to switch into the higher-yielding assets, thereby bidding up the price of the asset relative to that of other assets.

6Farm real estate comprised approximately 80 percent of all farm production assets in 1977. Earnings on farm assets are total net income of farm operators from farming plus net rent to nonfarm landlords and interest on farm debt, less adjustments for farm operators’ labor and management.
the confidence that investors have in the future earnings of one investment relative to another. For example, the higher the price-earnings ratio (P/E), the greater is the expected growth rate of earnings from the current level and the more certain investors are that a given stream of earnings will be realized.7

As shown in Chart II, earnings on farm production assets and the value of these assets generally trended upward together in the 1950s and 1960s. Fluctuations in the P/E ratio occurred, but the price of farm assets averaged 26 times earnings from 1950 to 1971. The P/E ratio fell sharply in 1972 and 1973, but has risen significantly since then.

These recent movements in the P/E ratio reflect the unusual pattern of earnings in this period. The sharp rise in earnings in 1972 and 1973 was not immediately and completely incorporated into future expectations. Thus the P/E ratio fell to an abnormally low level when compared with historical values. Earnings subsequently began falling and the P/E ratio began rising. Instead of reestablishing a value at around the average ratio of the 1950s and 1960s, however, the ratio has continued to rise and by 1977 the value of farm assets was estimated to be 31 times current earnings, well above the average ratio of the 1950s and 1960s.

One interpretation of this most recent rise in the P/E ratio is that investors revised upward their expectations concerning long-run prospects for future earnings on farm assets following the surge in earnings in 1972 and 1973. An acceleration in real estate prices would accompany such an upward revision in earnings as these expectations are capitalized into current land prices. In this case, the recent shortfall in farm earnings would appear to reflect an investor view that such low earnings were a temporary phenomena.

The fact that farmland prices relative to other prices have grown at an accelerated rate beginning in 1972 strongly suggests that investors' expectations of earnings, indeed, have increased in real terms. Because of higher earnings expectations, investors have bid up the price of farmland. This has meant substantial wealth gains to landowners, but the rate of return to new farmland owners depends upon the correctness of these expectations of higher earnings which have been incorporated into land values. Should these expectations be revised downward in the market, thus leading to a general decline in farmland values, new owners will either have to sell their land at a loss or continue to farm the land at a lower rate of return than was anticipated when they made their original investment.

Cash flow problems can develop when asset values are bid up considerably above that level which is consistent with current earnings. When purchases are heavily financed, as is usually the case for most farmland purchases, large interest payments, as well as other fixed costs, must be covered by current earnings, unless other sources of income are available. Farmers who borrowed heavily to purchase land or who have borrowed on the increased market value of their land who do not have other sources of income will experience financial trouble when realized earnings are considerably below the level anticipated at the time of purchase.

The higher expectations for farm earnings reflected in the recent upsurge in land prices may be traced back to the 1972-73 period when farm commodity prices and farm asset earnings rose dramatically. The sharp rise in earnings in this period reflected changed supply and demand conditions for agricultural products. Unexpected sales of wheat and feed grains to the Soviet Union in mid-1972 served to reduce domes-
tic stocks and increase prices. A sharp decline in the production of Peruvian fish meal led to a shortfall in world protein supplies and an unanticipated increase in export demand for soybean meal. The unexpected decline in world crop production in 1972 and a realignment of world currencies led to large increases in export demand for U.S. crops. U.S. farm exports rose from about 15 percent of farm commodity sales in 1971 to 25 percent in 1975. In addition to sharply increasing export demand, domestic demand for food in the early 1970s was boosted by increases in government food assistance programs such as the food stamp program. Also, a number of factors adversely affected U.S. agricultural production in the early 1970s, such as wage-price controls, environmental regulations, sharp increases in energy prices, and a drought-induced shortfall in U.S. crop production in 1974.

All of these factors contributed to a sudden, large increase in agricultural earnings. Most of the factors behind this bulge in earnings were temporary as is indicated by the decline in earnings and farm commodity prices in recent years. As shown in Chart III, farm commodity prices rose much faster than consumer prices from 1971 to 1973, but have since come back in line with the general price level in the economy. World grain production, aided by more favorable weather, has increased 14 percent since 1972-73, and oilseed and meal production across the world has risen 38 percent. U.S. crop production also snapped back from the 1974 disaster as weather conditions normalized. In addition, funding for domestic food assistance programs has levelled off and many of the factors, such as mandatory wage-price controls, which had disruptive effects on agricultural production in the early 1970s have disappeared in recent years.

If the bulge in earnings in the early 1970s was mostly temporary, then current earnings may not be too far out of line with longer-run supply and demand forces. To the extent this bulge was the basis for the upward revision in investors’ expectations about farmland earnings, then farm assets, and farmland in particular, have become overvalued on the basis of fundamental supply and demand conditions in the market for agricultural products.8

**Implications**

The farmers’ strike movement has brought considerable attention to the current “low” earnings in agriculture. One might infer from this movement that U.S. agriculture is in trouble and is near widespread bankruptcy. However, the fundamental factors affecting U.S. agriculture appear relatively sound. The health of U.S. agriculture is heavily dependent on its ability to compete effectively in world markets. U.S. agriculture is very efficient and enjoys a comparative advantage in trade with most countries of the world.

While the long-run prospects appear sound for U.S. agriculture, “hard times” may be experienced by some farmers who possibly made incorrect decisions based, perhaps, on misinterpretation of the bulge in earnings in the early 1970s. Cash flow problems have already developed for some farmers. Should earnings not rise in accordance with the expected earnings now built into land values, then agricultural land values will decline. Continued “low” earnings, if maintained, would eventually prompt a change in expectations by investors since farmland must compete with other investments. If farmers and other investors in farmland begin to doubt the future prospects for earnings growth, they will lower their bid prices for farmland coming into the market or attempt to sell land in order to take advantage of higher-yielding investment opportunities elsewhere. Farmland values would then decline until the return on farmland has risen to a comparable level with returns on alternative investments.9

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8Based on 1977 data, either a 20 percent rise in earnings or a 17 percent fall in the value of farm assets, or some combination, would be necessary to reestablish the average ratio between farm assets and earnings which prevailed in the period from 1950 to 1971.

9The rate of increase for nominal farm real estate values has shown a tendency to slow in the past year. From February...
If land values do decline, owners of farmland will experience losses in wealth. For most, this would simply reduce some of the gains experienced as prices rose. But those farmers who bought at the higher prices of the past few years will realize a lower rate of return on their initial investment than they expected, and some who are highly leveraged may be forced to leave agriculture, and the rate of bankruptcy might increase for a time.

Yet, equity in agriculture is large. In fact, the ratio of farm real estate debt to the value of farm real estate has actually fallen in recent years, from about 14 percent in 1971 to about 11 percent in 1977. It would appear that most farmers would be able to weather some decline in land values without incurring bankruptcy. In recent years over one-half of all farmland transfers have been to existing owner-operators of farms, where equity is often substantial in existing acreages, so cash flow problems are not as severe for these farmers.

In the final analysis, the health of the agricultural industry reflects its efficiency in producing food and fiber products and the level of demand for these products. While investors' expectations determine the value of farm real estate as well as other investments, these expectations cannot stay out of line with the fundamental supply and demand conditions for these investments for very long.