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The Deficit Dilemma -- Another View

The plethora of writing on the U. S. balance of payments has ranged far and wide over various dimensions of the Nation's international financial straits. Nonetheless, several reasons seem to justify further efforts on this question. First, the importance of the issues is sufficient motive for continued and expanding exposure before the general public. Second, a great deal of confusion and uncertainty still seems to exist with regard to terminology as well as to the mechanics and interpretation of the balance-of-payments data. For that reason, this article will pay particular attention to the basic fundamentals which underlie the balance-of-payments system of accounting, as well as the practical meaning of the balance of payments itself. Finally, in order to place current U. S. payments difficulties in their proper perspective, they will be viewed in the framework of the "classical" payments deficit to determine whether a fundamental disequilibrium—or imbalance—exists.

WHAT DOES IT ALL MEAN?

The public has become aroused and anxious over the persistent and sizable deficits on the U. S. balance of payments. While some anxiety is certainly justified, any judgments on that subject should be based upon an understanding of the factors involved.

Table 1 presents an analysis of official balance-of-payments data for 1961 and 1962. While the table may appear to be unduly complex at first, the balance of payments actually is fairly easy to comprehend, both in terms of its various basic accounts and the accounting principles governing the entries.

The balance of payments is an accounting record which lists the dollar totals of the various international economic transactions be-

tween the United States and the rest of the world over a given period. It is a record of the amount of dollars or receipts that the United States accumulates as a result of foreign spending, investing, lending, and the remittance of gifts by foreigners, in comparison with the amount of dollars which the United States pays out to foreigners because of similar U. S. activities abroad. As with any typical accounting statement, there are two sides to the balance of payments—one for credit entries and the other for offsetting debit entries. Credit entries indicate dollar receipts by the United States, while debits denote U. S. payments to foreigners.

Anyone familiar with rudimentary accounting procedures will recognize this as a double-entry bookkeeping system. This means that for each transaction recorded, every debit entry is offset by a credit entry or entries in the same amount. The practical effect of this is that, insofar as the over-all balance of payments is concerned, total debits must necessarily equal total credits and, therefore, the balance of payments always "balances." This being the case, any reference to a "deficit" in the balance of payments implies a somewhat different meaning of the term than is customary.

As commonly understood, the term "deficit" refers to a shortfall in receipts or income relative to payments or expenditures. Since this cannot be the case in a double-entry system of bookkeeping, it may be asked, "What is meant by a deficit on balance of payments?" Note in Table 1 that the balance of payments is made up of a number of different accounts, such as goods and services, remittances, and private and government investments. Although it is true that the algebraic sum of all the debit and credit entries must be equal to zero, this need

official monetary assets as well as a given level of international claims against her. As a result of transactions during the period, receipts generated by U. S. exports, investment income, etc., flow into the United States from abroad. Conversely, U. S. imports, dividend payments to foreigners, Government grants or loans, etc., occasion payments which result in an outflow of funds from the United States. If the two flows are of equal volume, there is no net accretion to or drawing-down from the U. S. stock of monetary assets, nor is there any net change in the international claims position—neither a “surplus” nor a “deficit” exists. But if, as in the case of the United States in recent years, the stock of monetary assets is drawn down, or the total of international claims against the United States increases in order to finance a shortfall in U. S. receipts, a “deficit” situation exists, measured by the decrease in U. S. monetary assets and the increase in the amount of international claims against the United States.

DISEQUILIBRIA AND THE “CLASSICAL” DEFICIT

To most people, a balance-of-payments deficit probably implies a failure on the part of a country to export as much as it imports. However, this is only a part of the picture and in no way determines whether or not some fundamental disequilibrium exists in the deficit country. That is to say, the existence of a deficit on one or another of the balance-of-payments accounts is not in itself a sufficient condition for determining the existence of a fundamental disequilibrium.

Table 2 views the U. S. balance of payments somewhat differently than does Table 1. Current Account consists largely of merchandise exports and imports and, to a lesser extent, services such as those associated with transportation and tourism; investment income both here and abroad; and military outlays made by the United States as well as those of its allies.

The merchandise component of the Current Account is commonly known as the “balance of trade,” and it is this single element that many people refer to in discussions which purport to deal with the balance-of-payments deficit in its entirety. If merchandise imports exceed the dollar amount of exports, a “negative” or “unfavorable” or “adverse” balance of trade is said to exist. This would be reflected by an excess of debits over credits for this particular item, a situation which does not hold for the United States in 1962, or for that matter throughout the entire postwar period.

Table 2
**AN ALTERNATIVE VIEW OF U. S. PAYMENTS
POSITION FOR 1962**

Millions of Dollars		
	Debit (—)	Credit (+)
I. Current Account		
Merchandise	16,145	20,479
Services	4,796	4,329
Investment income	995	4,322
Military outlays	3,028	660
Net on current account, excluding transfers under military grants		4,826
II. Unilateral Transfers		
Private	491	
U. S. Government (except military grant aid)	2,148	
Net, excluding military transfers	2,639	
III. Capital Account		
U. S. private		
Short-term	507	
Long-term	2,766	
Net	3,273	
U. S. Government		
Long-term	2,133	
Repayments		1,283
Foreign currency holdings and short-term claims, net (increase —)	245	
Net	1,095	
Foreign (increase in U. S. liabilities +)		
Long-term		271
Short-term and U. S. Government		749
Increase in foreign holdings of liquid dollar assets		1,279
Net		2,299
IV. Gold and Convertible Currencies		
Gold (sales by monetary authorities +)		890
Convertible currencies (purchases —)		17
Net		907
V. Errors and Omissions		
Net	1,025	

SOURCE: U. S. Department of Commerce, Office of Business Economics.

During 1962, the United States recorded a trade surplus of approximately \$4.3 billion, while income from U. S. investments abroad exceeded outpayments to foreign investors by \$3.3 billion. These two elements of strength in the balance of payments were offset somewhat by net debits of \$467 million on services and approximately \$2.4 billion for military outlays. Nevertheless, the Current Account as a whole was a positive element in the balance-of-payments picture to the tune of nearly \$5 billion.

Unilateral Transfers represent private or public gifts and, as the debit balance indicates, they have moved outward from the United States. This has been the case for the entire postwar period. In 1962, private remittances accounted for approximately one fifth of the net outflow, with Government nonmilitary grants and payments to pensioners living abroad accounting for the remainder. Note that the effect of the debit balance on this account serves to offset, by more than half, the level of excess receipts on Current Account.

The Capital Account records changes in international claims against the United States, as well as in the level of claims which the United States holds against the rest of the world. It reflects changes in the international debtor-creditor status of a country and denotes capital inflows by credit entries, and capital outflows by debits. As Table 2 shows, these claims may be private or public, and they may be long- or short-term. The private short-term claims consist primarily of demand deposits held abroad by Americans or in the United States by foreigners. Long-term claims involve securities such as stocks and bonds—"portfolio" investment—while long-term "direct" investment takes the form of outlays on actual physical plant and equipment abroad, or acquisition of controlling interest in foreign corporations.

Consider the U. S. private capital account on Table 2. For 1962, there was net debit balance of \$3,273 million, consisting of long-

and short-term capital movements. That is to say, there was an export, or an outflow, of capital from the United States. Ignore for the moment the funds which left the United States and focus upon the movement of the claims instead. In exchange for the funds received, foreigners gave U. S. citizens international claims in the form of demand deposits in foreign banks, short-term notes, or stocks and bonds. As a result of this capital outflow, U. S. claims against the rest of the world increased or, conversely, the rest of the world's claims against the United States decreased. The funds flowed from the United States—they were exported—but the claims flowed into the United States—they were imported—and it is by regarding the import of the claim, rather than the export of the funds, that one can associate the debit entry with capital outflows. It should be clear, however, that from the point of view of the foreign country which receives the capital funds from the United States, the entire analysis is reversed. That is, the receipt of funds results in an "export" of an I.O.U. to the United States, and this would be reported as a credit, acknowledging the out-movement of the claim.

This capital accounting procedure may be illustrated by the example of a U. S. citizen who buys a foreign bond and pays for it by writing a check, in dollars, to the seller. This would be recorded on the U. S. balance of payments in the following manner: The purchase of the bond increases the amount of U. S. claims against the rest of the world but results in a capital outflow which is recorded by a debit on *long-term* capital. The receipt of the check by the foreigner, which is subsequently deposited in his bank, increases foreign dollar demand deposits, thereby increasing the rest of the world's claims against the United States and is therefore recorded as a credit on *short-term* capital. Thus, the offsetting capital entries are consistent with the double-entry system of accounting.

Gold and Convertible Currencies are media of international payment in addition to dollars, of course. They are treated in the balance of payments in the same manner as the Current Account items, but because of their significance as international media of exchange, they have been separated from the other items. As Table 2 shows, in 1962 the United States sold \$890 million worth of gold. This sale was similar to any other merchandise sale or export in that it generated receipts for the United States and therefore was recorded by a credit in the gold account. The sale of convertible currencies similarly generated receipts for the United States, much as a merchandise export would, and was therefore recorded as a credit on convertible currencies.

The final account in Table 2 is Errors and Omissions. In some balance-of-payments presentations, it is referred to as Unrecorded Transactions. It is a balancing account and owes its existence to the fact that balance-of-payments data originate in many separate agencies which utilize varying standards and principles. Thus, it is possible that some transactions may not be accounted for on both sides of the balance of payments in the same amounts at the same time. In addition, it is possible for some types of transactions to go unrecorded altogether—particularly, according to some observers, short-term capital movements. In order to provide the missing debits or credits, so as to make the over-all balance of payments balance, it becomes necessary to have an Errors and Omissions or Unrecorded Transactions account.

Having spent some time on the actual meaning of, and the mechanics involved in, the balance of payments, the relationship between deficits and disequilibria may now be considered. As stated earlier, the most commonly held view of a deficit is one which involves an unfavorable balance of trade. However, as has been pointed out, such a deficit need not imply a fundamental disequilibrium. Because a fund-

amental disequilibrium is characterized by a distortion in the basic cost-price relationships between the deficit country and the rest of the world, its effects are felt mainly on the merchandise component of Current Account. Thus, an adverse trade balance is a necessary, but not a sufficient condition for the existence of such a disequilibrium. In the case of the United States, not only has a "favorable" balance of trade been maintained during the entire postwar period, but a surplus has existed for the entire Current Account. Even if a country should experience a trade deficit, this is not in and of itself an unhealthy situation. During the latter half of the 19th century, the United States was in this position. This coincided with the wave of railroad construction which entailed considerable imports from Europe, but which was financed to a large degree by long-term capital inflows from abroad. Similarly, England for many years in this century recorded trade deficits which were offset by income from investments made years earlier. Thus, one cannot view the deficit alone to determine the existence of a fundamental disequilibrium; rather it is the manner in which the deficit is being offset or financed which makes this determination.

U. S. DEFICIT — CLASSICAL OR OTHERWISE?

Because so much importance has been attached to U. S. balance-of-payments deficits in recent years, one might suspect that they represent a new phenomenon for the United States. In point of fact, such deficits have occurred annually since 1950, the sole exception being 1957 when a small surplus was recorded in connection with increased levels of activity engendered by the earlier Suez crisis. The U. S. net position on balance of payments for the entire postwar period is included in Table 3.

The reasons for the more recent heightened concern over the deficit problem become obvious when the pre-1957 figures are contrasted with those for the period since 1958.

Table 3
NET BALANCE ON MAJOR ACCOUNTS
Millions of Dollars

	1946	1947	1948	1949	1950	1951	1952	1953	1954
Net Current Account, excluding transfers under military grants	+7,744	+11,529	+6,440	+6,149	+1,779	+3,671	+2,226	+386	+1,828
Net Unilateral (except military grant aid)	-2,899	-2,612	-4,511	-5,627	-4,007	-3,492	-2,505	-2,454	-2,262
Net Capital									
Net Private	-413	-987	-906	-553	-1,265	-1,048	-1,160	-383	-1,622
Net U. S. Government	-3,019	-4,224	-1,024	-652	-156	-156	-420	-218	+93
Net Foreign (increase in U. S. liabilities +)	-985	-1,792	+352	+72	+1,927	+601	+1,637	+1,169	+1,492
Gold and Convertible Currencies	-623	-2,850	-1,530	-164	+1,743	-53	-379	+1,161	+298
Gold (sales +)	-623	-2,850	-1,530	-164	+1,743	-53	-379	+1,161	+298
Convertible Currencies (purchases -)	-	-	-	-	-	-	-	-	-
Errors and Omissions	+195	+936	+1,179	+775	-21	+477	+601	+339	+173
Net Surplus* (+) or Net Deficit** (-)	+1,261	+4,567	+1,005	+175	-3,580	-305	-1,046	-2,152	-1,550
	1955	1956	1957	1958	1959	1960	1961	1962	
Net Current Account, excluding transfers under military grants	+2,009	+3,967	+5,729	+2,206	+134	+3,769	+5,444	+4,826	
Net Unilateral (except military grant aid)	-2,486	-2,398	-2,318	-2,338	-2,424	-2,336	-2,559	-2,639	
Net Capital									
Net Private	-1,255	-3,071	-3,577	-2,936	-2,375	-3,892	-4,150	-3,273	
Net U. S. Government	-310	-629	-958	-971	-353	-1,105	-928	-1,095	
Net Foreign (increase in U. S. liabilities +)	+1,498	+1,894	+765	+1,276	+3,875	+2,545	+2,357	+2,299	
Gold and Convertible Currencies	+41	-306	-798	+2,275	+731	+1,702	+741	+907	
Gold (sales +)	+41	-306	-798	+2,275	+731	+1,702	+857	+890	
Convertible Currencies (purchases -)	-	-	-	-	-	-	-116	+17	
Errors and Omissions	+503	+543	+1,157	+488	+412	-683	-905	-1,025	
Net Surplus* (+) or Net Deficit** (-)	-1,145	-935	+520	-3,529	-3,743	-3,881	-2,370	-2,186	

(Debits - and Credits +); *Defined as the reduction in U. S. liquid liabilities and/or increase in U. S. gold holdings; **Defined as the increase in U. S. liquid liabilities and/or reduction in U. S. gold holdings.
SOURCE: U. S. Department of Commerce, Office of Business Economics.

From 1950 through 1957, the United States experienced a cumulative deficit of some \$10.2 billion, including a net outflow of gold of about \$1.7 billion, with the remainder accounted for by an increase of about \$8.5 billion in short-term and liquid liabilities held by foreigners. From 1958 through 1962, the overall balance-of-payments deficit approximated \$15.7 billion, while the net gold outflow reached nearly \$6.5 billion. In other words, in the past 5 years, the size of the cumulative deficit has increased by almost 50 per cent, while the outflow of gold has exceeded that of earlier levels by almost four times.

Merely pointing out the ups and downs in balance-of-payments deficits during the postwar period accomplishes little if anything toward determining whether these figures indicate either a fundamental weakness in the economy or an economy which is living "beyond its means."

During the entire postwar period, the United States has experienced continuous and, for the most part, substantial "favorable" balances on its trade account—even if one excludes that portion of the export surplus which is associated with U. S. Government aid or financing, such as under Public Law 480 or the Mutual Security Program.¹ This should not imply, however, that there are grounds for complacency, since any additional improvement in the trade balance will enable the Nation to more

¹For the years 1955 through 1962, excluding 1959, the U. S. trade surplus averaged more than \$2.6 billion annually after subtracting P. L. 480 shipments and M.S.P. nonmilitary aid. The year 1959 shows an "adverse" trade balance if one subtracts these items from the over-all surplus. As noted below, this is largely explained by a sharp increase in imports associated with a cyclical rise in the level of economic activity in the United States, rather than with a decline in the level of exports.

easily accommodate the burden on the other balance-of-payments accounts. The absence of an “adverse” balance of trade, though, is a key indication that the U. S. payments deficit is not of the “classical” variety.

Without a deficit on balance of trade, it is difficult to argue that the United States has experienced any sort of fundamental disequilibrium. Table 3 verifies this point. At no time during the entire postwar period has the United States incurred a deficit on Current Account. The smallest net surpluses on Current Account were in 1953—when U. S. imports remained relatively unchanged from a year earlier while exports fell by nearly \$1 billion—and in 1959, when exports remained constant while imports rose by nearly \$2.4 billion over year-earlier levels as a result of a sharp upswing in domestic economic activity.

A further indication of a lack of the existence of a fundamental disequilibrium may be noted by observing that, with the sole exception of the gold account, the remaining accounts in each instance carry an opposite sign than that which would imply the presence of a fundamental disequilibrium. For example, on Unilateral Transfers, the string of net debit balances indicates that the United States has been a net donor, rather than a recipient of gifts. Similarly, the capital account shows net capital outflows (debits) on both private and Government accounts for each of the postwar years, the sole exception being a small inflow on Government account in 1954. Thus, the United States has provided both long-term investment funds and short-term liquid funds to foreigners rather than the converse.

CONCLUSIONS

Evidence presented so far leads to the conclusion that U. S. payments deficits have been in no sense “classical” and, furthermore, that they are not indicative of a fundamental disequilibrium. Except for the gold outflow, which is associated with classical deficits, the deficits

appear to be of a rather special variety, stemming from strength rather than weakness.² Such a view, however, is not inconsistent with the notion that the U. S. balance of payments is not in equilibrium. The absence of a fundamental disequilibrium does not imply that the payments deficits do not have serious implications. Such an interpretation would be naive in the extreme. It is important, however, to be fully aware of the varied dimensions of the balance-of-payments problem in taking steps to cure it.

The pre-1958 deficits were generally regarded as desirable in the sense that they provided the world with badly needed liquidity for purposes of conducting the smooth flow of international commerce, without unduly threatening the U. S. international reserve position. However, 5 consecutive years of substantial payments deficits entailing significant capital and gold outflows have resulted in an agonizing reappraisal of not only the strength of the U. S. international financial position, but the state of the domestic economy as well. It may seem paradoxical to question the competitive strength of an economy which has shown that it can generate sizable export surpluses year in and year out in spite of increasing rivalry from all over the globe. Nevertheless, in the face of substantial U. S. military and economic commitments over much of the world, the over-all capabilities of the economy can no longer be taken for granted or considered in isolation, but must be viewed in relation to the demands being made on it—demands which in many cases are not predicated upon economic criteria, but rather upon political, humane, or national defense considerations. Seen in this light, U. S. payments deficits, though “nonclassical” in nature, nonetheless represent a dilemma.

²A large measure of the gold outflow may be traced to the practice followed by many foreign central banks of maintaining a fixed ratio of gold reserves to dollar holdings. Speculative gold movements, on the other hand, have diminished considerably in the recent past as the probability of devaluation of the dollar has lessened.

The Market for

Farm Mortgage Credit

ECONOMISTS have not been in general agreement concerning the degree of influence that interest rates have on the supply and demand for credit. Some say there is virtually no change in the quantity of credit demanded or supplied when interest rates and other economic forces change. Others say there is considerable response.

The response undoubtedly varies among different markets for credit—that is, for various industries and for different maturities. Relatively little research has been done to estimate the responsiveness of supply and demand in various credit markets. This article summarizes a study designed to measure responsiveness to interest rates and other factors in one credit market—the market for farm mortgage credit. The research on which the article is based was sponsored jointly by the U. S. Department of Agriculture and Purdue University.

The article will discuss the economic model, or the theoretical considerations upon which the study was based. It will then present statistical estimates of the responsiveness of suppliers and users of farm mortgage credit to changes in the various economic factors in the model. Finally, it will discuss some of the implications of the estimated relationships.

One of at least three concepts could be used in studying the market for farm mortgage credit: (1) the stock of debt outstanding at some point during the year; (2) farm mortgage loans closed during the year, a gross flow concept; or (3) farm mortgage loans closed less repayments, a net flow concept. The con-

cept used in this study was the annual gross flow of farm real-estate mortgage loans.

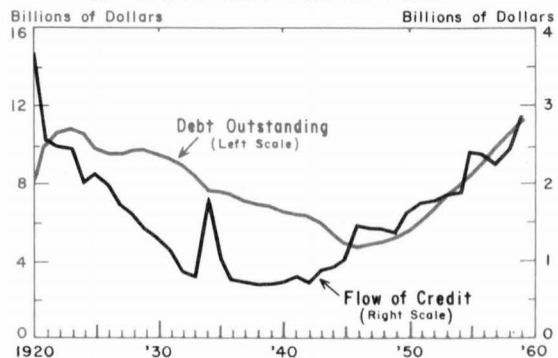
As shown in Chart 1, the volume of farm mortgage debt outstanding in the United States has fluctuated over the years, but the annual volume of farm mortgage loans issued—the flow of credit—has been even more erratic. Chart 2 indicates that the rate of interest also has fluctuated, though not so much as yields on preferred stocks, a nonfarm alternative.

AN ECONOMIC MODEL

The economic model for a study of this type contains the economic factors that are thought to influence the demand for and supply of credit.

Demand for Credit. The amount of farm mortgage credit demanded during a given period will tend to be inversely related to the

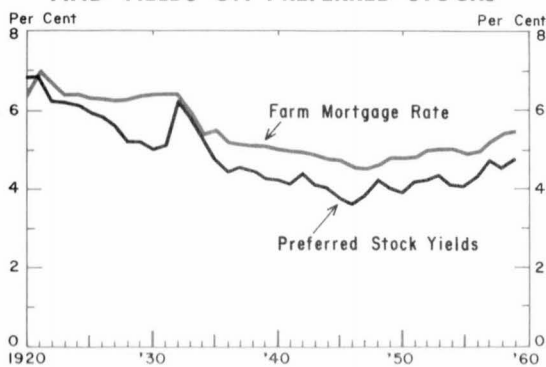
Chart 1
OUTSTANDING FARM REAL-ESTATE DEBT ON
JANUARY 1, AND ANNUAL GROSS FLOW
OF FARM REAL-ESTATE CREDIT



SOURCE: U. S. Department of Agriculture.

Chart 2

**AVERAGE RATE OF INTEREST ON CURRENTLY
NEGOTIATED FARM MORTGAGE LOANS
AND YIELDS ON PREFERRED STOCKS**



SOURCE: Purdue University; USDA; and Standard and Poor's Security Price Index Record.

average rate of interest on farm mortgage loans closed during the period. With a higher average rate, a smaller volume of loans would be closed, other things being equal. The question is how much smaller. An estimate of this comes later in the article. The rationale for expecting a negative relationship rests on the proposition that with a lower rate of interest farmers will invest more in their businesses, if other conditions are unchanged.

The amount of internal funds available to farmers will also influence the amount of credit demanded. If the amount of investment in such farm items as new equipment and buildings is relatively stable, or largely independent of short-run changes in farm income, then a negative relationship should be expected between the supply of internal funds within agriculture and the quantity of credit demanded. An increase in agriculture's internal funds brought about, say, by an increase in farm income, would be expected to decrease the demand for credit. This assumes that farmers do not use for living expenses all of the increase in income and that at least part of the saving is invested in agriculture rather than in non-farm alternatives.

Economic logic suggests two additional variables likely to influence the demand for farm mortgage credit. First, changes in farm wage rates probably change the demand for credit. As farm wage rates rise, other things being equal, capital equipment will be substituted for labor and this will probably increase the demand for credit. Second, changes in technology may change the demand for capital resources and the derived demand for credit.

Supply of Credit. The supply of long-term credit to agriculture is postulated to be positively related to the farm mortgage rate of interest, relative to the nonfarm rate. Other things being equal, increasing quantities of agricultural credit per unit of time will be supplied at successively higher relative rates of interest, and *vice versa*.

Operationally, a problem arises as to how to measure the average nonfarm rate of interest. The ideal would be a weighted average of the rates or yields on all alternatives in the economy, but this is not available. The practical solution is to use the return on an immediate alternative to farm mortgage loans—such as Government bond yields, corporate bond yields, or the yield on corporate equities—to represent the nonfarm rate. Government bonds are an entirely different category of risk for lenders than farm mortgage loans. Standard and Poor's index of yields on preferred stocks was used in the statistical analysis since, in many respects, preferred stocks represent a degree of investor risk similar to farm mortgage loans.

The supply of loanable funds in the economy is partly a function of the rate of saving and changes in the money supply. The supply of credit, or loanable funds, to a major industry of an economy would be influenced by these same variables, although different industries may be affected differently. It would be expected that the supply of credit to agriculture would be increased with an increase in the rate of national saving and with an increase in the supply of money.

The supply of credit offered to agriculture is postulated to be a function of lenders' expectations concerning the ability of farmers to repay. It is not known how lenders formulate expectations. Perhaps they consider "real" prices of farm products as an indicator. The hypothesis is tested using the ratio of the index of prices received by farmers for all farm products to the index of prices paid for items used in production as a measure of real farm prices.

It was also hypothesized that lenders consider the value of agriculture's assets in deciding how much credit to extend to the industry. The value of total farm assets is included as a variable in the supply relation.

The influence of each of the variables on the supply and demand for farm mortgage credit was estimated in a model which permits estimating the separate influence of each variable, taking into account the simultaneous influence of all the other variables being considered. Estimates were computed by using annual data for the period 1921 to 1959.

ECONOMIC IMPLICATIONS OF THE STATISTICAL RESULTS

Statistical studies of credit markets generate useful knowledge about important causal factors and their direction of influence, as well as estimates of the degree of responsiveness of both suppliers and users of credit to changes in different economic forces. Such knowledge has implications for policy formulation.

Estimates of the degree of responsiveness of suppliers and users are called elasticities. In the study being reported, the estimated elasticities of the variables, together with the observed fluctuations or changes in the variables over time, provide a basis for understanding shifts in the supply and demand for farm mortgage credit. This gives insight into the important economic forces at work, and shows the manner in which the farm mortgage market is related to both the agricultural sector and the nonfarm sectors of the economy.

The estimated elasticities of the economic variables in the model are presented in Table 1. The elasticity of demand with respect to the interest rate, minus 2.29, indicates that if all other variables are constant a 1 per cent change in the interest rate would cause an opposite change of 2.29 per cent in the quantity of farm mortgage credit demanded. More specifically, a 5 per cent decrease in the farm mortgage interest rate, say from 5.00 to 4.75 per cent, would be associated with an 11 per cent increase in the volume of credit demanded. The same interpretation is applied to changes in the other variables. For instance, a 1 per cent increase in the farm wage rate would be associated with a 1.49 per cent increase in the demand for farm mortgage credit.

The statistical results suggest that short-run fluctuations in the volume of farm mortgage credit stem more from demand forces than from changes in supply. This is in contrast to Klamman's finding in the residential mortgage market. He shows rather convincingly that supply rather than demand has determined volume and price of residential mortgage credit.¹

Two factors are probably important in explaining this difference. First, capital formation in agriculture is largely financed internally from gross farm income, with less dependence on external capital or credit. Second, the role of the internal funds variable is important in understanding why fluctuations in the farm mortgage credit market are largely initiated by demand. The results indicate that the demand for farm mortgage credit is relatively responsive to changes in internal funds. (An elasticity larger than one implies that changes in internal funds prompt a greater than proportional change in the volume of credit demanded.) In addition, internal funds are the most volatile of the demand shifters in the short-run, with 7.5

¹S. B. Klamman, *The Postwar Residential Mortgage Market*, Princeton University Press, Princeton, New Jersey, 1961.

Table 1
ELASTICITIES AND FLUCTUATIONS OF
DEMAND AND SUPPLY VARIABLES

Variable	Short-Run Elasticity	Average Annual Percentage Fluctuation
Demand		
Interest rate	-2.29	+2.2
Internal funds	-1.37	+7.5
Technology	-1.96	+5.4
Farm wage rate	+1.49	+5.9
Supply		
Interest rate	+1.51	+1.8
Yield differential	+0.14	+10.0
National saving	+0.20	+19.4
Change in the money supply	+0.16	+23.0*
Farm prices	+0.22	+5.5
Farm assets	+0.23	+5.6

*This is an average of the percentage of the second difference, since the variable is the first difference (change) of the money supply.

NOTE: Demand elasticities and fluctuations were estimated with data from 1921 to 1959; supply, from 1935 to 1959. Technology was measured by an unpublished revision of the index published in graphic form in T. T. Stout and V. W. Ruttan, "Regional Patterns of Technological Change in American Agriculture," *Journal of Farm Economics*, May 1958.

per cent average annual fluctuation. Coupled with the high elasticity, this suggests that fluctuations in internal funds are a main cause of fluctuation in the quantity of mortgage credit sought by farmers.

The conclusion that short-run fluctuations in internal funds are negatively related to the quantity of credit suggests that with a decrease in internal funds gross investment tends to be maintained by using more credit. The volatility of farm income and the relative short-run stability of investment then explain much of the fluctuation in the market for farm mortgage credit.

These relationships also go a long way in explaining the prevalence of "internal credit rationing" among farm people, or the tendency for many farmers to use less credit than is available to them. If gross investment and consumption by farmers tend to be relatively stable in the short run, and farm income tends to be comparatively volatile, then credit demands of farmers tend to be a residual source of funds that fluctuate in the opposite direction from

internal funds. In other words, farmers do not borrow as much at a given point in time as would seem to be economically rational so that they may have borrowing power to draw on when incomes temporarily decline. In this way, they can maintain investment and consumption patterns based on longer-run considerations.

The estimated elasticities for both the farm wage rate and technology provide insight into the substitution process within the agricultural industry. The demand for farm mortgage credit is relatively responsive to changes in the farm wage rate, and it is related positively. This suggests that capital equipment, with a derived demand for credit, tends to be substituted for labor with rises in wage rates, and *vice versa*. Fluctuations in the real farm wage rate have been considerable, with sizable decreases during the depression and increases during World War II. If efforts to increase the rate of economic growth are successful, and if wage rates rise with growth, the elasticity suggests additional substitution of capital for labor and, in turn, an increase in the demand for credit to finance it.

Changes in technology have also been a contributing factor to changes in the quantity of credit demanded. The output-increasing effects of technical change are such that increases in technology in agriculture lead to decreases in the aggregate demand for long-term credit. The estimated elasticity reflects the general need to transfer resources out of agriculture as the level of technology increases. It suggests that technology is substituted for capital as well as for labor; that is, that technology in agriculture has tended to be both capital-saving and labor-saving.

A classic example of an increase in technology in agriculture is the development of hybrid corn, which has made possible significant increases in output per unit of input. It now takes less land, labor, and capital to produce a given quantity of corn. This concept of technology differs from the less precise but perhaps more widely held idea that links increased

mechanization with increased technology. In the framework of this study, increased mechanization is considered either an addition to capital equipment or a substitution of capital for labor, not an increase in technology as such. This difference in definition must be understood in interpreting the elasticity for technology, because it is the former concept of technology that the index used in this study purports to measure.

The statistical results suggest that the demand for long-term farm credit is interest elastic, or very responsive to changes in the interest rate. However, average annual fluctuations in the farm mortgage rate of interest have been small historically, even though for some years the change was substantial. In general, then, fluctuations in the quantity of credit demanded have stemmed largely from causes other than changes in the rate of interest.

In interpreting the elasticity of demand with respect to the rate of interest, it is necessary to keep in mind that the quantity variable is the gross volume of farm mortgage loans issued, including loans to refinance existing debt. During periods when interest rates were lower than they had been previously, some farmers may have refinanced at the new lower rates. This would tend to increase the volume of farm mortgage loans closed during the period without changing the volume of outstanding debt. The result is that the elasticity implied from using the gross flow as a measure of the volume of credit could be expected to be larger than an elasticity obtained from using net changes in the stock of outstanding debt.

In addition, the "price" of farm mortgage credit manifests itself in more than one dimension. Besides the rate of interest, factors such as the term of the loan and size of downpayment are subject to market determination. In this study, the rate of interest was the only price factor considered. To the extent that the various price factors move together, the rate of interest may serve as an indicator for all of them.

The analysis, however, probably overstates the true price effect of the interest rate on both credit demand and supply.

The statistical results suggest that supplies of farm mortgage money are also relatively responsive to changes in the farm mortgage rate of interest. However, they indicate a much smaller response to nonfarm interest rates, as measured by differences in the yield between farm mortgage loans and preferred stocks. Nevertheless, the average annual percentage fluctuation of the differential—10 per cent—is sufficiently large that shifts in the quantity of mortgage money supplied in response to changing relative interest rates do occur, even though the elasticity may be low. Analysis of this variable is limited by low statistical significance for its coefficient, however, and inferences should be drawn with caution.

The impact that national saving and changes in the stock of money have on the supply of farm mortgage credit is of interest to policy-makers. While national saving is not directly subject to willful control, a certain amount of control does exist over the economy's money supply. The statistical results indicate that the supply of farm mortgage credit is not very responsive with respect to both national saving and changes in the money supply. The relatively large average annual percentage fluctuations in these variables, however, indicate that noticeable shifts in supply conditions do result from these factors.

CONCLUDING COMMENTS

Persons concerned with supplies of credit may be interested in estimated future amounts of farm mortgage loans closed per year and estimated interest rates. Are significant changes likely over the next several years? The elasticities, or degrees of responsiveness to economic forces, indicated by this study may be used to estimate the effects of projected changes in the economy. For instance, if farm wage rates continue to increase at an average annual rate

about as they have during the recent past, what effect will this have on the annual volume of loans closed and on farm mortgage interest rates?

In addition to wage rates, agricultural technology and the rate of national saving would each be expected to increase over time with normal growth of the economy. However, little, if any, logical reason exists for expecting either pronounced increases or decreases over a long period for the rest of the economic forces considered in this study.

One basis for estimating the effects might be to assume that farm wage rates, agricultural technology, and the rate of national saving will each continue to increase, on the average, at the same annual rate that they did during a recent period. The other factors will be assumed to be constant for estimating purposes. While they will certainly continue to fluctuate from year to year, and therefore will cause fluctuations in the annual volume of credit and interest rates, these other factors, taken separately, will probably average out over several years without creating a trend in volume or interest rates.

During the 1950's, the real farm wage rate increased an average of 2.5 per cent per year, agricultural technology by 1.7 per cent, and real national saving by 2.25 per cent per year. Estimates of future farm mortgage credit requirements and interest rates are made by pro-

jecting into the future these same average annual rates of change and by using the estimated elasticities of this study. A 2.5 per cent increase in farm wage rates would be associated with a \$37 million increase in the annual volume of farm mortgage loans closed and with an increase of 7 basis points (.07 per cent) in the average farm mortgage rate of interest. At the same time, an increase of 1.7 per cent in technology would be associated with a \$32.8 million decrease in loans closed, and so on. The cumulative effects of the indicated changes in wage, technology, and saving would be an estimated annual increase of \$9.7 million in farm mortgage loans closed and no change in the farm mortgage rate of interest. The estimated average annual increment in loans closed—\$9.7 million—is about one half of 1 per cent of the average annual volume of the 1950's, which was \$1,871 million in terms of 1954 dollars. Recognizing that credit and capital are not synonymous, this estimate is at least compatible with Tostlebe's prediction that, although the ratios of capital to labor and capital per farm will rise, growth of farm capital in the aggregate will occur ". . . at an average rate that is likely to be substantially less than 1 per cent per annum."²

The assumption that technology will continue to increase at the same rate it did during the 1950's may not be realistic. That decade was one of exceptionally rapid increases in technology in agriculture. With a slower rate of technological change, the increase in the volume of farm mortgage credit would be greater.

The estimates are in terms of a constant price level. To the extent that inflation or deflation is anticipated the estimates should be adjusted.

²Alvin S. Tostlebe, *Capital in Agriculture: Its Formation and Financing Since 1870*, National Bureau of Economic Research, Princeton University Press, Princeton, New Jersey, 1957, p. 19.

Table 2

ESTIMATED AVERAGE ANNUAL CHANGE IN FUTURE VOLUME OF FARM MORTGAGE LOANS CLOSED AND AVERAGE FARM MORTGAGE RATE OF INTEREST

	Total Annual Change	Annual Change Resulting from Increases in:		
		Wage	Tech- nology	National Saving
Volume (in millions of 1954 dollars)	+9.7	+37.0	-32.8	+5.5
Interest rate (per cent)	0	+ 0.07	-0.06	-0.01

BANKING IN THE TENTH DISTRICT

District and States	Loans				Deposits				Loans				Deposits			
	Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks	
	June 1963 Percentage Change From								May 1963 Percentage Change From							
	May 1963	June 1962	May 1963	June 1962	May 1963	June 1962	May 1963	June 1962	Apr. 1963	May 1962	Apr. 1963	May 1962	Apr. 1963	May 1962	Apr. 1963	May 1962
Tenth F. R. Dist.	+3	+9	+2	+13	+5	+6	+3	+8	†	+9	+1	+13	-2	+4	-1	+6
Colorado	+4	+12	+3	+16	+3	+8	+3	+13	+2	+9	+2	+16	-1	+5	-1	+10
Kansas	**	**	+3	+12	**	**	+4	+6	**	**	-1	+13	**	**	-2	+5
Missouri*	+2	+2	-1	+9	+7	+2	+1	+6	-1	+2	+1	+12	-2	+1	-1	+6
Nebraska	+1	+13	†	+14	+3	+2	†	+5	+1	+12	+2	+13	-1	+1	-3	+4
New Mexico*	**	**	+3	+13	**	**	+2	+8	**	**	+3	+15	**	**	-1	+2
Oklahoma*	+4	+10	+2	+13	+6	+11	+5	+11	-1	+14	+2	+13	-2	+8	-1	+8
Wyoming	**	**	+1	+12	**	**	†	+6	**	**	+3	+12	**	**	†	+5

*Tenth District portion only.

**No reserve cities in this state.

†Less than 0.5 per cent.

PRICE INDEXES, UNITED STATES

Index	June 1963	May 1963	Apr. 1963	June 1962	May 1962
Consumer Price Index (1957-59=100).....	106.6	106.2	106.2	105.3	105.2
Wholesale Price Index (1957-59=100).....	100.3	100.0r	99.7	100.0	100.2
Prices Received by Farmers (1910-14=100)....	241	240	242	239	241r
Prices Paid by Farmers (1910-14=100).....	311	311	311	306r	307r

r Revised.

TENTH DISTRICT BUSINESS INDICATORS

District and Principal Metropolitan Areas	Value of Check Payments			Value of Department Store Sales		
	Percentage change from previous year					
	June 1963	May 1963	Six Months 1963	June 1963	May 1963	Six Months 1963
Tenth Federal Reserve District.....	-2	+4	+2	+5	+2	+4
Denver.....	0	+7	+3	+2	+6	+4
Wichita.....	-5	-3	-3	+7	-5	0
Kansas City.....	0	+4	+3	+12	+5	+7
Omaha.....	-6	+5	+4	+5	-3	+2
Oklahoma City.....	-1	+11	+7	+3	+2	+4
Tulsa.....	-9	-2	-5	+5	+2	+6