

# Fisherian and Wicksellian Price-Stabilization Models in the History of Monetary Thought

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*If money became scarce, as shown by a tendency of the price level to fall, more could be supplied instantly; and if superabundant, some could be withdrawn with equal promptness. . . . The money management would thus consist . . . of buying [securities on the open market] whenever the price level threatened to fall below the stipulated par and selling whenever it threatened to rise above that par.*

-Irving Fisher [3, p. 97]

*That interest on borrowed money is for one reason or another either below or above the level which would normally be governed by the real rate ruling at the time [is] a circumstance which, so long as it lasts, must cause a progressive rise or fall in prices. . . . [Thus] there should be a common policy, a raising or lowering of bank rates . . . from time to time in order to depress the commodity price level when it showed a tendency to rise and to raise it when it showed a tendency to fall.*

-Knut Wicksell [17, pp. 215, 223]

## Introduction

Central bankers charged with the responsibility for stabilizing the general level of prices need to know at least two things. First, what causes prices to deviate from their desired fixed target level? Secondly, what policy rule or response most effectively corrects those deviations and restores prices to target?

Historically, proponents of price stability developed two basic reduced-form models to answer these questions. One model, associated with Irving Fisher, attributes price movements to shocks operating through excess money supply and demand. It calls for money-stock adjustments to keep prices at their target level. The other model, associated with Knut Wicksell, ascribes price movements to discrepancies between market and natural (equilibrium) rates of interest. It prescribes interest-rate adjustments to restore prices to target. Although both models are fairly well known, their historical significance has not always been fully appreciated. Until the Keynesian revolution of the 1930s and

1940s they constituted the dominant policy models in nineteenth and twentieth century central banking tradition. In fact, many celebrated economists before Fisher and Wicksell contributed to their development.

Given the importance of price stability as a policy goal, it is useful to reexamine these historical models. As simple, stripped-down prototypes of the more elaborate macroeconomic models employed today, they reveal in sharp focus much about the mechanics of price-level stabilization. In particular, they provide information on the relative price-stabilizing powers of alternative policy feedback rules—e.g., money stock rules versus interest rate rules. Accordingly, the threefold purpose of this article is (1) to describe the structure and logic of the two reduced-form models, (2) to sketch their evolution in the history of monetary thought, and (3) to analyze each to see if they yield dynamic stability such that prices return to target equilibrium following economic shocks. The central message is that both models, if properly formulated, still provide reliable guides to policy.

## The Models Outlined

Before tracing the historical development of the models, it is necessary to sketch their essential features so as to identify what particular contributors had to say about each. As presented here, both reduced-form models consist of (1) a price-change equation relating price movements to the variables that cause them and (2) a policy-response function specifying the feedback rule the central bank follows to keep prices on target.

### Fisherian Model

The Fisherian model says that prices rise or fall when the existing quantity of money exceeds or falls short of the amount people wish to hold at prevailing prices and real incomes. It also says that policymakers can correct deviations of prices from target by expanding or contracting the money stock (or at least its high-powered base component) as prices are below or above their target level. In symbols:

$$(1) \quad dP/dt = \alpha(M - kPy)$$

$$(2) \quad dM/dt = \beta(P_T - P)$$

where  $dP/dt$  denotes price change,  $P$  actual prices,  $P_T$  their fixed target level,  $M$  the money stock,  $dM/dt$  its change,  $k$  the inverse of money's turnover velocity or the fraction of nominal income people wish to hold in money,  $y$  real income, and  $\alpha$  and  $\beta$  positive constants.

Thus suppose a money-control error or decrease in money demand produces an excess supply of money. The resulting attempts by cashholders to get rid of the excess cash through spending puts upward pressure on prices according to equation 1. As prices begin to rise above target, the central bank responds by contracting the money stock according to the feedback policy rule represented by equation 2. In this way the central bank eventually contracts the money stock sufficiently to restore prices to target. Such is the underlying logic of the Fisherian model.

### Wicksellian Model

The alternative Wicksellian model attributes price movements to the differential between the natural (equilibrium) and market rates of interest. Prices rise when the market rate is below the unobservable natural rate, fall when the market rate exceeds the natural rate, and remain unchanged at a stationary level when the two rates coincide. When prices start

to rise or fall the central bank acts to restore them to target by raising or lowering the market rate in proportion to prices' deviation from target. Stated mathematically:

$$(3) \quad dP/dt = \alpha(r - i)$$

$$(4) \quad di/dt = \beta(P - P_T)$$

where  $r$  denotes the natural rate,  $i$  the market rate,  $di/dt$  its adjustment, and the other symbols are as defined above.

These reduced-form equations are derived from a larger model that explains how the interest rate differential affects (1) real investment and saving, (2) loan supply and demand, (3) money supply and demand, and (4) aggregate supply and demand. Through these factors the rate differential moves the price level.

Thus when the loan rate lies below the natural rate (the rate that equilibrates saving and investment) investors demand more funds from banks than savers deposit there. Assuming banks accommodate these extra loan demands by issuing notes and creating checking deposits, a monetary expansion occurs. Since neither real income nor prices have changed in cashholders' money demand functions, the additional money constitutes an excess supply of cash that spills over into the product market in the form of an excess demand for goods. This excess demand puts upward pressure on prices which continue to rise until the rate differential vanishes. Since the model in its pure credit or inside money version contains no automatic self-equilibrating market mechanism to eliminate the rate differential, the central bank must do the job. To arrest and reverse the price rise the bank must raise the market rate until prices return to target.

Of course if the central bank knew the level of the natural rate it could always keep the market rate there and no price movements would occur. But the essence of the Wicksellian model is that the natural rate is an unobservable variable that moves around under the impact of productivity shocks, technological progress, factor endowment changes, and other real disturbances that cause it to deviate from the market rate. In such circumstances the central bank does not know what the natural rate is. It knows only that the resulting price level movements indicate that the market rate is not at its natural level and must be changed. That is, the bank must adjust the market

rate in the same direction that prices are deviating from target, ceasing only when they finally stabilize there.

### Historical Evolution of the Models

Having outlined the essential features of the two price-stabilization models, one can readily trace their evolution in the history of monetary thought. At least four classical and neoclassical economists contributed to the development of the Fisherian model: David Hume (1711-1776), David Ricardo (1772-1823), Irving Fisher (1867-1947), and Lloyd Mints (1888-1989). Likewise at least four monetary economists helped advance the Wicksellian model: Henry Thornton (1760-1815), Thomas Joplin (c.1790-1847), Knut Wicksell (1851-1926), and Gustav Cassel (1866-1945).

#### David Hume

The Fisherian model is much older than Irving Fisher. The origins of the model date back at least to David Hume's 1752 essay "Of the Balance of Trade." There Hume stated the gist of the model's equations, albeit in words rather than algebraic symbols (see Waterman [15, pp. 86-7]). True, as noted below, he substituted the world gold price of goods  $P_w$  for target prices  $P_T$  in the model's feedback policy rule or money adjustment equation. He also assumed that corrective money stock adjustments were achieved through international specie flows rather than through central bank action. But these are superficial differences only. Basically his equations were those of the Fisherian model.

Hume applied the model to a small open economy operating under a metallic (gold standard) regime with fixed exchange rates and a currency convertible into gold at a fixed price on demand. He showed how inflows and outflows of gold through the balance of payments would operate to correct monetary disequilibria and bring domestic prices in line with given world prices. In his famous exposition of the international price-specie-flow mechanism he assumed a sudden contraction of the domestic money stock and argued that three results would ensue.

First, the money stock contraction would, by reducing the existing quantity of money below the amount people desired to hold, produce domestic price deflation. Prices would fall in proportion to the monetary shortage or excess demand for cash:

$$(5) \quad dP/dt = \alpha(M - kPy).$$

Second, the fall in domestic prices  $P$  relative to given foreign (world) prices  $P_w$  would generate a trade balance surplus  $B$  as cheaper domestic goods out-sold dearer foreign ones at home and abroad:

$$(6) \quad B = \beta(P_w - P).$$

Third, the trade surplus would be paid for by a compensating inflow of monetary gold from abroad:

$$(7) \quad B = dM/dt.$$

Substituting equation 7 into equation 6 yields

$$(8) \quad dM/dt = \beta(P_w - P)$$

which implies that the domestic money stock adjusts through specie flows until domestic prices stabilize at the fixed level of world prices as required for balance-of-payments and monetary equilibria. Here is the Fisherian model with (1) world prices replacing target prices and (2) the balance of payments replacing the central bank as adjuster of the money stock.

#### David Ricardo

Hume applied the model to a metallic or convertible currency regime. Ricardo, writing almost sixty years later, extended Hume's model to an inconvertible paper currency regime with floating exchange rates and a variable price of gold.

Ricardo wrote during the Bank Restriction period (1797-1821) of the Napoleonic Wars when the Bank of England had suspended the convertibility of the pound into gold at a fixed price upon demand. The suspension of specie payments and the resulting move to inconvertible paper was followed by a rise in the paper pound price of commodities, gold bullion, and foreign currencies. A debate then arose over the question: Was there inflation in England and if so what was its cause?

Ricardo's answer was definitive. In various newspaper articles and pamphlets, most notably his 1810 *High Price of Bullion, A Proof of the Depreciation of Bank Notes*, he argued that inflation did exist, that overissue of banknotes by the Bank of England was the cause, and that the premium on gold (the difference between the market and official mint price of gold in terms of paper money) together with the pound's depreciation on the foreign exchanges constituted the proof. He reproached the Bank's directors for having taken advantage of the suspension

of convertibility to overissue the currency. And he admonished them to contract the note issue until the preexisting noninflationary price situation was restored. Here is the model's core postulate: that rising prices spell a redundancy of money requiring immediate corrective contraction.

In employing the model, Ricardo dropped Hume's assumption of an observable general level of prices since few reliable general price indexes existed at the time. He argued that given inconvertibility, gold's price and the exchange rate constituted good proxies for the unobservable general price level whose movements they matched almost one-for-one. This tight linkage derived from the notion that the pound price of goods was by definition equal to the pound price of gold times the world (and English) gold price of goods. Likewise it derived from the corresponding idea that the pound price of goods equalled the pound price of foreign currency times the foreign currency price of goods. With the price of goods in terms of gold and foreign currency given and normalized at unity, it followed that the paper pound price of goods moved one-for-one with the pound price of gold and foreign exchange.

Accordingly, in the model's equations he made three small changes. He substituted gold's price and the exchange rate for general prices  $P$ . He likewise used gold's premium over the official mint price and the depreciation of the exchange rate to represent price rises  $dP/dt$ . Finally, he used gold's mint price and the pre-existing exchange rate to stand for target prices  $P_T$ .

He then condensed the equations into his famous *Ricardian definition of excess* according to which if gold commands a premium and the exchange rate is depreciated then the currency is by definition excessive and must be contracted. His definition states that rising prices, or rather their empirical proxies, the gold premium and depreciated exchanges, signify an excess supply of money according to the expression  $dP/dt = \alpha(M - kPy)$ . His definition also directs the central bank to reduce the money supply when gold's price exceeds its old mint price and when the exchange rate is depreciated relative to its pre-existing level. As these two differentials represent the corresponding gap between actual and target prices, one obtains the expression  $dM/dt = \beta(P_T - P)$ . Hence the Ricardian definition of monetary excess embodies both equations of the model.

### Irving Fisher

The two main twentieth century proponents of the monetary model were the American quantity theorists

and price stabilizationists Irving Fisher and Lloyd Mints. Fisher employed the model in developing his famous "compensated dollar" rule for stabilizing the purchasing power of the dollar. His rule called for adjusting the gold content of the dollar or its inverse, the official buying and selling price of gold, equiproportionally with changes in the preceding month's general price index. In essence his proposal was based on the relationship: dollar price of goods equals dollar price of gold times gold price of goods. It required adjusting the dollar price of gold to offset movements in the gold price of goods (as proxied by last month's general price index) so as to stabilize the dollar price of goods.

Thus if excess supplies of monetary gold were elevating the price of goods (both in terms of gold and dollars) in the equation  $dP/dt = \alpha(M - kPy)$  the monetary authorities would respond with compensating reductions in the dollar price of gold. The fall in gold's price would have a twofold stabilizing effect. It would neutralize the inflationary impact of the rise in the gold price of goods such that dollar prices would remain unchanged. It would also, by rendering gold cheaper to industry and the arts, divert existing stocks from monetary to nonmonetary uses. The result would be to reduce the excess supply of monetary gold that put upward pressure on prices. Money (and prices) would move in the direction dictated by the expression  $dM/dt = \beta(P_T - P)$ .

Fisher also used the monetary model in developing his alternative proposal to stabilize prices through open market operations. He stated the essentials of the model most clearly in his 1935 book *100% Money*. There he argued (1) that price level movements stem from excess money supplies and demands, (2) that prices can be restored to target via corrective adjustments in the money stock, and (3) that such corrective adjustments can be achieved through open market operations. As he put it:

If money became scarce, as shown by a tendency of the price level to fall, more could be supplied instantly; and if superabundant, some could be withdrawn with equal promptness. . . . The money management would thus consist, ordinarily, of buying [securities] whenever the price level threatened to fall below the stipulated par and selling whenever it threatened to rise about that par. (p. 97).

Via such operations, the monetary authority could, he claimed, precisely adjust the quantity of money so as to "stabilize the price level at the prescribed point." (p. 90).

## Lloyd Mints

Fisher emphasized the efficacy of open market operations. Lloyd Mints's innovation was to note that corrective money stock adjustments could be achieved through government budget deficits and surpluses as well as through open market operations. In his 1946 article "Monetary Policy" and his 1950 book *Monetary Policy for a Competitive Society*, he pointed out that since deficits had to be financed either by new money creation or by expansion of the public debt, one could choose the former route and use those deficits to augment the money stock. Likewise, budget surpluses could be used to contract the money stock rather than to retire the public debt. As to how those deficits and surpluses were to be obtained, he favored variations in tax collections with expenditures held constant. In any case, he argued that the purpose of budget deficits and surpluses is to increase or decrease the money stock  $M$  so as to bring prices to target in the equation  $dM/dt = \beta(P_T - P)$ . Here is his contribution to the Fisherian model.

## Historical Development of the Wicksellian Model: Thornton and Joplin

Like the Fisherian model, the alternative Wicksellian interest rate model has its roots in the writings of English classical economists (see Humphrey [6]). Rudiments of the model's price-change equation  $dP/dt = \alpha(r - i)$  trace back to Henry Thornton's classic 1802 volume *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain*. There he defined the two interest rates that enter the equation and described the underlying inflationary transmission mechanism through which they operate to raise prices.

He argued that business loan demands depend on a comparison of the loan rate of interest ( $i$ ) with the expected rate of return ( $r$ ) on the use of the borrowed funds as proxied by the prevailing rate of profit on mercantile capital. He further argued (1) that a positive profit rate-loan rate differential induces an expansion of loan demands, (2) that banks accommodate these demands by issuing notes and creating checking deposits, and (3) that the resulting monetary expansion, by stimulating aggregate expenditure in an economy already operating close to full employment, puts upward pressure on prices which continue to rise as long as the rate differential persists. Taken together, these arguments imply that rising prices and the money growth that supports them stem from discrepancies between natural (equilibrium) and market (loan) rates of interest as indicated by the expression  $dP/dt = \alpha(r - i)$ .

Thornton did not state the model's interest-rate adjustment equation  $di/dt = \beta(P - P_T)$ . But he did note that the Bank of England could have forestalled price rises by setting its loan rate equal to the going rate of profit on capital had statutory usury ceilings not prevented it from doing so. On this point he differed from Wicksell and Cassel both of whom viewed the natural rate as an empirically unobservable variable impossible to target.

Following Thornton, Thomas Joplin in the 1820s and early 1830s added saving and investment schedules to the theoretical inflationary mechanism that leads to the price-change equation  $dP/dt = \alpha(r - i)$ . He did so in his *Outlines of a System of Political Economy* (1823), *Views on the Currency* (1828), and *An Analysis and History of the Currency Question* (1832). In those works Joplin pointed out that desired investment expenditure constitutes the demand for loanable funds. He noted that saving constitutes part of the supply of such funds. Finally, he stated that an excess of investment over saving caused by a positive natural rate-loan rate differential must be financed by net money creation that puts upward pressure on prices.

## Wicksell's Contribution

The pioneering efforts of Thornton and Joplin notwithstanding, economists today chiefly associate the interest rate model with the Swedish economist Knut Wicksell. It was Wicksell who, in the late 1890s and early 1900s, derived the model's reduced-form price-change equation from a full structural model of the inflationary process and who supplied the interest-rate adjustment equation that closed the model. Containing the most complete account of the logic and assumptions underlying the price-change equation, his structural model merits examination in some detail.

Following Wicksell, define the natural rate as the rate that equilibrates saving and investment and that corresponds to the marginal productivity of capital. Likewise define the market rate as the rate banks charge on loans and pay on deposits. Assume that all saving is deposited in banks, that all investment is bank financed, and that banks lend only to finance investment. Let saving and investment be increasing and decreasing functions of the market rate on the grounds that a rise in the rate encourages thrift but discourages capital formation. Assume absolute full employment such that shifts in aggregate demand affect prices and not real output. These definitions and assumptions yield the following equations linking the variables planned real investment  $I$ , planned real saving  $S$ , market (loan) rate  $i$ , natural rate  $r$ , loan

demand  $L_D$ , loan supply  $L_S$ , excess money supply  $X$ , excess aggregate demand  $E$ , money-stock change  $dM/dt$ , price-level change  $dP/dt$ , and market rate change  $di/dt$ .

First, natural rate-market rate differentials produce corresponding gaps between investment and saving:

$$(9) \quad I - S = a(r - i)$$

where the coefficient  $a$  relates the rate differential to the  $I - S$  gap.

Second, investment-savings gaps are matched by new money created to finance them:

$$(10) \quad I - S = dM/dt.$$

In other words, since banks create money by lending, monetary expansion occurs when they lend more to investors than they receive in deposits from savers. To see this, denote the investment demand for loans as  $L_D = I(i)$ . Similarly, denote loan supply as the sum of saving plus new money created by banks in accommodating loan demands; in short  $L_S = S(i) + dM/dt$ . Equating loan demand and supply ( $L_D = L_S$ ) yields equation 10.

Third, since the demand for money to hold at existing prices and real incomes remains unchanged, the new money created in accommodating loan demands constitutes an excess supply of money  $X$ :

$$(11) \quad dM/dt = X.$$

Fourth, cash-holders attempt to get rid of this excess money by spending it. As a result, the excess supply of money spills over into the commodity market in the form of an excess demand for goods as aggregate expenditure at full employment outruns real supply:

$$(12) \quad X = E.$$

Fifth, this excess demand bids up prices, which rise in proportion to the excess demand:

$$(13) \quad dP/dt = kE.$$

Substituting equations (9) through (12) into (13) yields the model's reduced-form price-change equation:

$$(14) \quad dP/dt = \alpha(r - i) \quad \text{where } \alpha = ka$$

which says that price-level changes stem from the discrepancy between the natural and market rates of interest.

As for the interest-rate adjustment equation that closes the model and brings price movements to an end, Wicksell suggested two. The first:

$$(15) \quad di/dt = b(dP/dt)$$

directs the central bank to adjust market rates in the same direction that prices are moving, stopping only when price movements cease. In Wicksell's own words:

So long as prices remain unaltered the banks' rate of interest is to remain unaltered. If prices rise, the rate of interest is to be raised; and if prices fall, the rate of interest is to be lowered; and the rate of interest is henceforth to be maintained at its new level until a further movement of prices calls for a further change in one direction or the other. [18, p. 189]

The foregoing rule has one shortcoming: it brings prices to a standstill but leaves them higher or lower than before. Because it fails to restore prices to their pre-existing target level Wicksell replaced it with his second rule which he thought would stabilize prices. That rule:

$$(16) \quad di/dt = \beta(P - P_T)$$

directs the bank to adjust market rates to correct price-level deviations from target.

That Wicksell proposed such a rule to roll back prices to their original level after they had risen or fallen is clearly evident in his writings. It appears in his statement that bank rates should be raised or lowered "to depress the commodity price level when it showed a tendency to rise and to raise it when it showed a tendency to fall." [17, p. 223]. Stronger still is his 1919 proposal to reverse inflation by deflating Swedish prices to their 1914 level.

In my opinion, we should try to return to the prewar price level. It is difficult to present any valid argument for stopping half way. The means to do this is to maintain a high discount rate . . . in order to reduce the stock of notes to the 1914 level. It is a very painful process, but it is probably better to do it now rather than to wait. [19, p. 27, quoted in 7, p. 465]

He repeated his advice again in 1921 when he argued for

a withdrawal by the *Riksbank* of the total stock of notes in circulation. Half this stock should be destroyed and the rest returned to the holders of notes . . . , our prices would fall to a level slightly below half the present level of prices. Then it should be the duty of the *Riksbank* to hold *this* level constant. [20, p. 86, quoted in 7, p. 465]

In short, he advocated raising the discount rate so as to contract the money stock and thus lower prices to their pre-existing level. Here is the essence of Wicksell's feedback rule  $di/dt = \beta(P - P_T)$ . Whether that rule does in fact possess the price-stabilizing powers he sought is discussed below. Before doing so, however, it is necessary to identify Gustav Cassel's contribution to the model.

### Cassel's Contribution

Wicksell's policy rule can be criticized as being inferior to the alternative rule of maintaining equality between market and natural rates such that price changes never occur. Gustav Cassel's contribution was to rebut this criticism. In his famous 1928 article "The Rate of Interest, the Bank Rate, and the Stabilization of Prices" he argued that any rule requiring knowledge of the unobservable natural rate was completely non-operational and therefore of little use to central bankers. Policymakers could never know what the natural rate is. But they could observe the price signals generated by departures from the natural rate. And these very signals constitute the arguments of the feedback policy rule  $di/dt = \beta(P - P_T)$ , thereby rendering that rule operational. On this ground Cassel contended that Wicksell's feedback rule dominated the alternative natural rate rule.

### Dynamic Stability of Equilibrium

Without exception all the economists discussed above saw their models as offering reliable guides to policy. None questioned the ability of those models to deliver price stability. It never occurred to them that the models might be dynamically unstable such that policy attempts to stabilize prices would destabilize them instead. They simply assumed that the models' feedback policy rules would always be sufficient to restore prices to target.

It is now time to test the validity of that assumption by formal stability analysis. And it is extremely important to do so. For if the models indeed are dynamically unstable such that attempts to stabilize prices destabilize them instead then those models are useless as policy guides and should have been discarded long ago. It turns out that both models are stable provided one adds a price-change variable to the Wicksellian model's policy response function.

### Stability of the Fisherian Model

Demonstrating the dynamic stability of the Fisherian model requires expressing its equations in

matrix form and then examining the signs—positive, negative, or zero—of the determinant and trace of the coefficient matrix (see Chiang [2, pp. 638-643]). Expressed in matrix form, the model's equations are:

$$(17) \begin{bmatrix} dP/dt \\ dM/dt \end{bmatrix} = \begin{bmatrix} -\alpha k y & \alpha \\ -\beta & 0 \end{bmatrix} \begin{bmatrix} P \\ M \end{bmatrix} + \begin{bmatrix} 0 \\ \beta P_T \end{bmatrix}.$$

Stability is ensured in this second-order case if the determinant  $\beta\alpha$  of the coefficient matrix is positive and the trace  $-\alpha k y$  is negative. Since both conditions are met, the model is stable. In other words, the roots of the system's characteristic equation are either real and negative, implying monotonic movement to equilibrium, or they are imaginary with negative real parts, implying convergent cycles. In either case the policy authorities, provided they adhere to the rule of adjusting the money stock to counter price-level deviations from target, can always bring prices back to target. Indeed the model's phase diagram displays this result; prices and the money stock invariably return to equilibrium directly or via convergent counterclockwise paths (see Figure 1).

### Oscillatory Behavior of the Wicksellian Model

The same techniques of dynamic stability analysis can be applied to the Wicksellian model. One simply expresses the model in matrix form and examines the signs of the determinant and trace of the coefficient matrix. As shown below, the model generates perpetual oscillations of prices and interest rates about equilibrium until a price-change variable is added to the policy response function. Then the model converges to equilibrium.

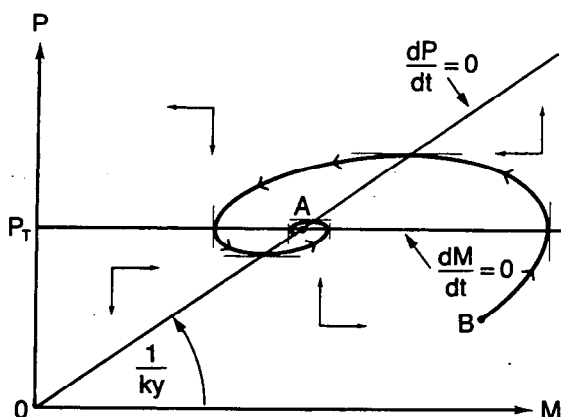
To demonstrate the validity of these assertions write the model  $dP/dt = \alpha(r - i)$  and  $di/dt = \beta(P - P_T)$  in matrix form:

$$(18) \begin{bmatrix} dP/dt \\ di/dt \end{bmatrix} = \begin{bmatrix} 0 & -\alpha \\ \beta & 0 \end{bmatrix} \begin{bmatrix} P \\ i \end{bmatrix} + \begin{bmatrix} \alpha r \\ -\beta P_T \end{bmatrix}.$$

Examination reveals that the determinant  $\alpha\beta$  of the coefficient matrix is positive and the trace is zero. This in turn means that the characteristic roots of the system are imaginary with zero real parts, implying cycles of constant amplitude without convergence or divergence. Thus the best the policy-makers can do when adhering to the feedback policy rule of adjusting interest rates to counter price deviations from target is to keep prices cycling forever

Figure 1

## Fisherian Model's Phase Diagram



This diagram depicts the dynamical behavior of the two-equation monetary model  $dP/dt = \alpha(M - kPy)$  and  $dM/dt = \beta(P_T - P)$ . The positively sloped line shows all P-M combinations that yield zero excess money supply such that prices do not change. It is the graph of the expression  $P = (1/ky)M$  obtained by setting  $dP/dt$  equal to zero in the model's first equation. Points above the line represent situations of excess demand for money putting downward pressure on prices (see vertical arrows). Points below the line represent situations of excess supply of money putting upward pressure on prices (see vertical arrows). The horizontal line graphs the expression  $P_T = P$  obtained by setting  $dM/dt$  equal to zero in the model's second equation. The line shows that when prices are on target no corrective money stock changes are required. Points above the line represent positive price deviations from target requiring contractions of the money stock (see horizontal arrows). Points below the line represent negative price deviations from target requiring expansions of the money stock (see horizontal arrows). Starting from any disequilibrium point B prices and money will converge to equilibrium A either directly or via the counter-clockwise path shown.

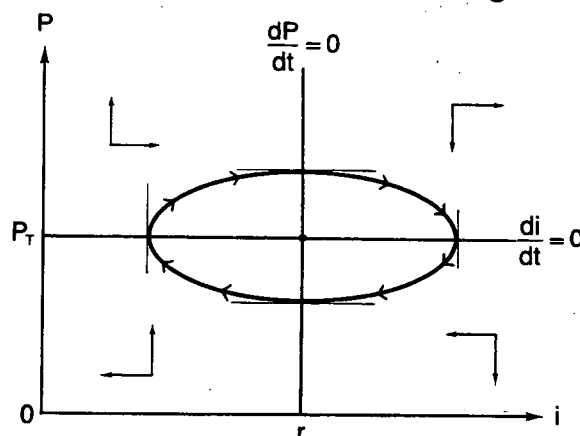
around target. Indeed the model's phase diagram displays this result: the path of prices and interest rates orbits ceaselessly around equilibrium without approaching it (see Figure 2). True, prices conform to target *on average* over the whole cycle. But they also are forever rising and falling. Clearly this is not the sort of absolute price stability Wicksell or Cassel sought. Their model represented by matrix equation 18 cannot deliver such stability.

## Response Function Fully Specified

The foregoing result stems from the particular policy response function embedded in the Wicksellian model. That response function derives from

Figure 2

## Wicksellian Model's Phase Diagram



This diagram depicts the dynamical behavior of the Wicksellian two-equation interest rate model  $dP/dt = \alpha(r - i)$  and  $di/dt = \beta(P - P_T)$ . The vertical line graphs the expression  $i = r$  obtained by setting  $dP/dt$  equal to zero in the model's first equation. The line shows that when the market rate equals the natural rate no price changes occur. Points to the left of the line represent situations in which the market rate is below the natural rate causing prices to rise (see vertical arrows). Points to the right of the line represent situations in which the market rate is above the natural rate causing prices to fall (see vertical arrows). The horizontal line graphs the expression  $P = P_T$  obtained by setting  $di/dt$  equal to zero in the model's second equation. The line shows that when prices are on target no corrective interest rate changes are required. Points above the line represent positive price deviations from target requiring corrective rises in the market rate (see horizontal arrows). Points below the line represent negative price deviations from target requiring corrective falls in the market rate (see horizontal arrows). Formal stability analysis reveals that the coefficient matrix of this system has a zero trace and a positive determinant. This means that the characteristic roots are imaginary with real parts zero, implying cycles of constant amplitude without convergence. The system ceaselessly orbits equilibrium without approaching it.

Wicksell's advice to the policymakers to adjust interest rates to counter price deviations from target. Consistent with that recommendation response function  $di/dt = \beta(P - P_T)$  contains but one argument, namely the gap  $P - P_T$  between actual and target prices. As noted above, however, Wicksell also postulated an alternative response function containing price changes  $dP/dt$  as the independent variable. Incorporating that variable into equation 4 yields the augmented or fully specified function:

$$(19) \quad di/dt = \beta(P - P_T) + b(dP/dt)$$



that directs the authorities to adjust the market rate in response to two variables, namely price changes and the gap between actual and target price levels. In other words, the equation's last term  $b(dP/dt)$  halts inflation or deflation in its tracks while the first term  $\beta(P - P_T)$  seeks to undo the damage already done by bringing prices back to target. This rule seems eminently sensible. Certainly the Federal Reserve, if charged with the duty to stabilize prices, would respond to emerging inflation and deflation as well as to price gaps.

### Stability of Equilibrium

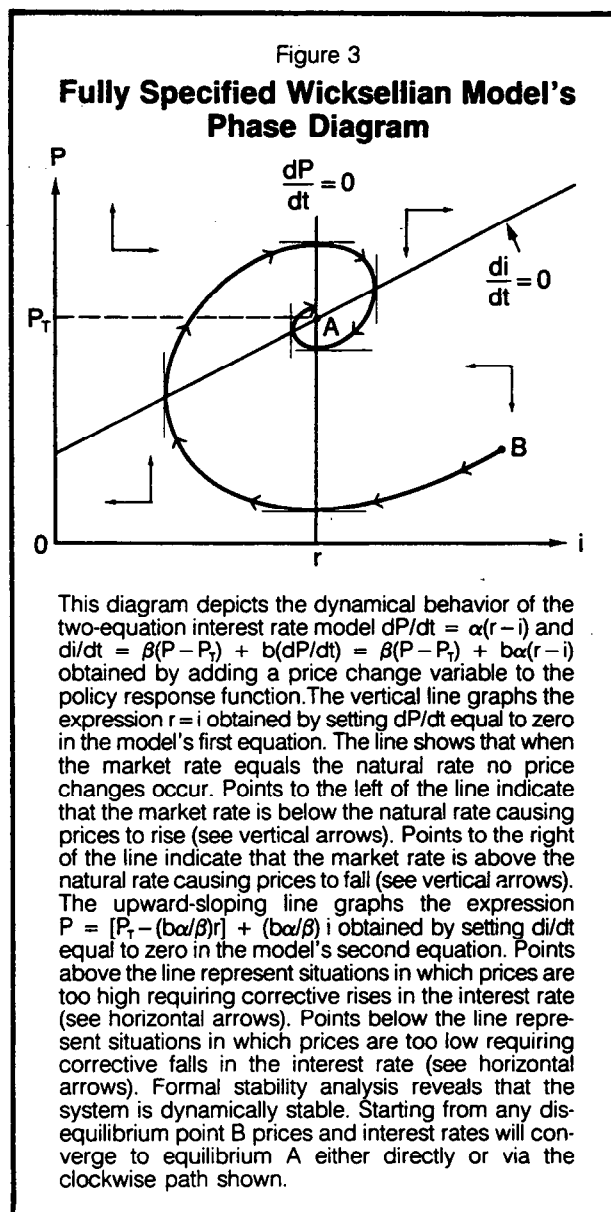
Incorporation of the price-change variable into the policy response function renders the Wicksellian model dynamically stable. To show this, first substitute equation 3 into equation 19 to obtain  $di/dt = \beta(P - P_T) + b\alpha(r - i)$ . Then express this equation together with equation 3 in matrix form:

$$(20) \begin{bmatrix} dP/dt \\ di/dt \end{bmatrix} = \begin{bmatrix} 0 & -\alpha \\ \beta & -b\alpha \end{bmatrix} \begin{bmatrix} P \\ i \end{bmatrix} + \begin{bmatrix} \alpha r \\ b\alpha r - \beta P_T \end{bmatrix}$$

Stability requires that the coefficient matrix possess a negative trace and a positive determinant. The model passes both tests. The trace  $-\alpha$  is negative and the determinant  $\beta\alpha$  is positive as required. This means one of two things: Either the roots of the system's characteristic equation are real and negative, implying monotonic movement to equilibrium, or they are imaginary with negative real parts, implying convergent cycles. In either case the policy authorities, provided they adhere to the rule of adjusting interest rates to counter price movements and price-level deviations from target, can always bring prices back to target. Indeed, the model's phase diagram displays this result. Instead of orbiting continuously around equilibrium, prices and interest rates invariably return to equilibrium via a convergent clockwise path (see Figure 3). In short, the fully specified Wicksellian model yields dynamic stability after all. It follows that central banks conducting monetary policy through Wicksellian interest-rate adjustment rules have not been seriously misadvised.

### Conclusion

The main conclusions of this paper can be stated succinctly. Two models—monetary and interest-rate—historically have dominated analytical discussions of the policy problem of price-level stabilization. Of these, the Fisherian monetary model unambiguously yields price stability. By contrast, the Wicksellian



interest rate model in which policymakers adjust market rates in response to gaps between actual and target prices does not deliver the absolute price stability its authors sought. Instead it yields perpetual oscillations of prices about their target level. Such an outcome can be avoided by adding a price-change variable to the model's policy response function. Doing so renders the model dynamically stable such that the policymakers can always restore prices to target. Policymakers can rest assured that neither the Fisherian model nor the augmented or fully specified version of the Wicksellian model will lead them astray.

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# Free Enterprise and Central Banking in Formerly Communist Countries

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## I. INTRODUCTION

The economic difficulties manifest in communist countries have encouraged a desire in many of them to move toward a market economy. This paper surveys specific reasons for the breakdown of centrally planned economies and discusses the difficulties of making the transition to a market economy. A general theme is that a market economy requires the limitation of government intervention in the marketplace. This theme is illustrated by a discussion of the central bank. The final part of the paper advances the proposal that formerly communist countries eliminate their central banks by adopting the currency of a large western country with a stable currency. This proposal is discussed in the context of the German monetary union, which will eliminate the East German central bank.

## II. BREAKDOWN OF THE SOCIALIST ECONOMIES

### Market Pricing

The economies of communist countries collapsed in part because external forces overwhelmed their pricing system. In a market economy, prices equate the value consumers attach to consuming more of a good to the costs of producing more of it. This equality between the (marginal) cost of consuming and producing a good derives from the incentives in the price system to eliminate discrepancies between the marginal benefit of consuming and marginal cost of producing a good. In contrast, central planners set prices as part of an implicit tax-and-transfer policy designed to subsidize some goods by taxing others. On first pass, central planners set the price of a firm's output at whatever level is necessary to cover its average labor costs. They then adjust price differentials among firms in order to tax some kinds of output and subsidize others.

Typically, basic foodstuffs and commodities are subsidized, while goods considered luxuries are taxed. For example, the *New York Times* (1/7/90, p. E3) reports that every pound of butter sold in Czechoslovakia costs the government more than \$1.70 in subsidies. The *Times* (4/3/90, p. A16) also reports that in the Soviet Union, "the government is forced to spend about \$160 billion in subsidies on food and some consumer goods annually, while the cost of many industrial goods is far higher than in the West." The banking system extends credit to cover the deficits of firms whose prices are set below average cost.

Because central planners did not change prices in line with changes on world markets, over time, the subsidies required by their price system became intolerably expensive. For example, in the Soviet Union, energy prices were not raised with the rise in world prices. The resulting increased subsidy to energy-intensive activities and to Comecon countries receiving oil and natural gas exports removed the incentive to economize on the use of energy and forced the Soviet Union to make large investments in energy production that strained its economy. The lack of a free-market price system to coordinate economic activity in communist economies meant that these economies could not adjust to changes in the world economy.

Communist countries promised equality and individual security to their citizens in return for their acceptance of authoritarian control. As the standard of living in communist countries fell behind that of capitalist countries, the need to deliver on this promise became more pressing. In practice, in communist countries, equality meant subsidizing basic commodities and foodstuffs. Individual security meant keeping open inefficient enterprises in order to prevent unemployment. The required system of taxes and transfers became too costly and collapsed. The rationale for communism then collapsed.

In countries like Poland and the Soviet Union, the pressure to provide subsidies overcame the ability

\* I received useful criticism from John Caskey, Norman Fieleke, Anne Krueger, Ivo Maes, Mark Swinburne, Steven Webb and colleagues at the Richmond Fed.

of the government to tax. From that point on, credit extension to enterprises running a deficit had to be financed by printing money. The resulting inflation interacted with unchanged, centrally set prices to produce shortages and lines. The time spent waiting in line raises the effective price paid for goods and limits demand. Workers waiting in line, however, cannot produce. As production fell, the tax base also fell and exacerbated the lack of revenue needed to finance subsidies. In a letter to the *New York Times* (12/11/89, p. A15), a visitor to Poland wrote:

I can testify to the harshness of everyday life, where there were lines for every kind of food, for appliances and clothing, etc. There were lines of people waiting in the morning when we went to work, and they were still there in the evening. There were lines forming on Sundays, awaiting the stores' opening on Monday if some home appliances such as refrigerators, TVs or kitchen stoves were promised. The average housewife had to run out before 6 a.m. to get some breakfast, and after work or school each member of the family had an assigned task to stand in line for foodstuffs or other essentials.

By reducing the real value of fixed prices, inflation lowered the return to producers, who then decreased supplies. An article in the *New York Times* (10/31/89, p. A4) reported that:

. . . in the last three years stocks of hogs, Poland's principal livestock, fell from 22 million to fewer than 14 million. . . . In a reversal that would be bizarre in the West, but is common enough here, the supply of pork has diminished precisely as the demand has grown. What has happened is that the farmers have killed off their own herds rather than prolong their own agony of paying the high prices fixed for fed grain available only from a state monopoly and at the same time selling their butchered hogs for prices fixed low enough to appease consumers.

Market pricing requires an end to price controls. Price reform, however, is difficult because it redistributes income. The queueing produced by the use of price controls to suppress inflation redistributes income to people whose time has little market value, such as the elderly and unskilled. The price rises necessary to eliminate suppressed inflation eliminate queues, but they also raise relative prices to groups with a comparative advantage in queueing.

The bribery and black markets that inflation and price controls create also render price reform difficult politically. Because price rationing through bribery and the "high" price of black markets is illegal, these rationing mechanisms create a class of criminals. The popular impression is that this class enriches itself at the expense of the ordinary person by charging exorbitant prices. This impression is correct when

state employees accept bribes and when individuals who sell in black markets acquire goods from state-owned enterprises at controlled prices. As a result, the public believes that market-determined prices favor the few.

Piecemeal decontrol of prices exacerbates the public's distrust of market pricing because groups selling goods at prices that are high relative to state-controlled prices become a target of popular resentment. For example, in the Soviet Union, the private cooperatives, which initially could sell at unregulated prices, became natural scapegoats for politicians in crises. The *New York Times* (11/20/89, p. A1) reports, "Mr. Gorbachev told the Soviet parliament this fall that the soap shortage was the fault of the fledgling private sector cooperative movement, something that he began as part of perestroika but which has become so unpopular with the people—because of allegations of profiteering—that even Mr. Gorbachev himself often finds it an easy target."

## Free Trade

In a market economy, resource allocation is based on the value placed on private property by market prices. In market economies, price-coordinated voluntary exchange among individuals solves the related problems of how to assign value to scarce resources and of how to allocate them. Integration into the world economy requires that a country make its pricing system compatible with that of the world economy by adopting market pricing.

The practice in communist countries of using the price system to provide subsidies collapsed when they lost their ability to limit foreign trade. With free trade, market economies export goods for which they possess a comparative advantage in production. By contrast, with free trade, communist economies export goods they subsidize, thus creating bargain bazaars for foreigners until the communist governments run out of funds to finance exports. As explained to the *New York Times* (11/30/89, p. A1) by Gerhard Stauch, Chief Inspector for East German customs:

The smuggling-speculation spree has been stimulated by the relative abundance here of consumer goods that are inexpensive because they are subsidized up to 45 percent by the East German Government. . . . Last Friday the East German government initiated measures to curb the smuggling and speculation by declaring it illegal for foreigners, including American soldiers, to purchase a variety of goods. This placed an additional burden on the customs service, Mr. Stauch said, because many of his officers had to be posted in . . . department stores.

Local governments in the Soviet Union are even attempting to keep Soviet citizens from other areas from purchasing subsidized goods available locally. According to the *Financial Times* (3/9/90, p. 19),

In Leningrad . . . the City Council has just introduced a measure which forbids non-residents from buying a wide range of basic consumer goods: fresh fruit and vegetables, cheese, meat, sausage, knit-wear, china, watches, and so on. This act of self-defense against marauders from neighboring towns is certain to provoke counter-measures and could, if unchecked, lead to fragmentation of large parts of the Soviet economy.

### Private Property

In the Soviet Union, Hungary and Yugoslavia, decentralization of decision-making without allowing free-market pricing and without creating private property rights has exacerbated poor economic performance. In communist countries, coordination among enterprises is effected through commands issued by a central committee to ministries that in turn issue commands to enterprises. Committees of party members in enterprises enforce the centrally issued commands. Party members exercise control through the nomenklatura system, under which they appoint key officials in enterprises. In the Soviet Union, for example, this system gives the party direct control over as many as three million key jobs (*Financial Times*, 10/17/89, p. 2). In the Soviet Union, perestroika abandoned this system of coordination without replacing it with coordination by the price system.

Under communism, capital is controlled by members of the Communist Party. Authoritarian control of party members places control of the capital stock in the hands of the central committee. The breakdown in the authority exercised by the Communist Party with perestroika and with the discrediting of the party has meant that effective control of the capital stock has passed into the hands of the managers of enterprises. Pricing decisions then are based on the ability of managers to exploit the relative monopoly power of their enterprises. The returns to monopoly power are divided between managers and workers. This system, despite its decentralized decision-making, has proven to be even more inefficient than the centrally planned system it replaced. The *Financial Times* (3/12/90, p. XIII) reports, "A large part of the Soviet economy is like a quasi-medieval economy, based on exchange of goods in kind in an inefficient market, which operates without publicised prices. It is run by powerful industrial fiefdoms, rather than central planners."

## III.

### CREATING PRIVATE PROPERTY RIGHTS

#### Transferring State-Owned Property

In attempting to make the transition to a market economy, the most difficult problem formerly communist countries face is how to transfer the state-owned capital stock to private ownership. In countries like the Soviet Union, there is a lack of popular support for private ownership. Historically, ownership of resources has been determined through the coercive power of the state. In the Soviet Union, when the system of serfdom broke down and was replaced by the system of industrial labor relations in which workers are employed by capital owners, it was natural to view the capital owners as simply replacing the old landowners. Control of capital, like control of land formerly, was viewed as the basis for exploitation of workers. The belief that the ownership of resources is arbitrarily determined to benefit a few undermines the respect for property rights necessary to maintain a market economy.

The sale and pricing of state-owned assets will be socially divisive. Consider houses, which are owned by the government and rented at uniform rates. Viktor Geraschenko, President of the State Bank of the USSR, noted, ". . . housing is supplied by the state at a ridiculously low price which fails to differentiate between an apartment in the center of Moscow and one in the suburbs that is more than an hour's bus ride away." (*Corriere della Sera*, 11/22/89). In East Germany, the monthly rent for a two-bedroom house in the center of East Berlin is less than a meal for one person in a medium-priced restaurant in West Berlin (*New York Times*, 1/7/90, p. E3). The sale of houses at market prices established through auction would upset ownership patterns completely. The people who lost their houses would be dissatisfied. The sale of houses at below-market, uniform prices to current occupants, however, would preserve a status quo in property rights that was established arbitrarily or established through political influence.

Transferring state assets to private owners gradually will be difficult. The existence of private firms along with state firms creates incentives to loot the state firms by secretly transferring assets to the private

firms.<sup>1</sup> There may be no procedures for selling off state assets that will engender widespread public support for the resulting distribution of property. Governments may simply have to hold open auctions of all state-owned enterprises and accept that there will be winners and losers.<sup>2</sup>

### Committing to Private Property Rights

In a market economy, individual producers and consumers are the planners, and their plans are coordinated by the price system. Each individual (each planner) needs to know only the prices immediately relevant to his activity. In this way, the price system economizes on the knowledge that each individual (each planner) must possess. As a consequence, plans can be made by those who possess detailed information about particular productive activities. In contrast, a central planner needs in principle to know everything about an economy. The flaw in central planning is that no planner can organize such a vast amount of information—the infinite complexity and rapid change of modern economies simply overwhelm him.

The planners of a market economy, that is, the individual producers and consumers, follow the price system's signals out of a desire to find the most remunerative use for their physical and human resources. Private ownership provides the incentive to use resources productively. Governments of countries desiring to make the transition to a market economy must protect private property rights. Instead of assigning property rights directly, they must

allow the marketplace to do so. Government must maintain the rules of the competition over ownership of property and must provide an independent judiciary to adjudicate disputes over property rights, rather than decide the outcome of the competition for ownership of property.

A primary difficulty in maintaining private property rights in a market economy is the inherent ambiguity between private and public property. In particular, taxes appropriate part of the return on private property for the state and effectively force the individual to share ownership of property with the state. Although private ownership of property is not established in an absolute sense, market economies have been able to use the rule of law and public support for private property to reserve a large part of the return (and risk) of ownership of property to individuals. Just as important, these economies have been able to provide a significant degree of consistency in the rules that determine the share of the return to private property appropriated by the state through taxes. This consistency is essential in providing an incentive to accumulate productive property.

Communist countries have had difficulty in providing individual incentives because of their inability to commit to this fiscal consistency. As described above, in centrally planned economies, prices are maintained through a tax-and-transfer policy that subsidizes some activities by taxing others. Under pressure to provide subsidies, communist governments were unable to commit to allowing productive enterprises to retain some of their surpluses. Litwack (1989) describes how, in the Soviet Union, ministries under pressure to fund enterprises running a deficit impose taxes at their discretion at whatever rates are necessary to appropriate the surpluses of the remaining firms. Firms then have no incentive to operate efficiently and generate surpluses. On the contrary, discretionary taxation creates incentives to run a deficit. Establishment of private property rights requires a fiscal system that is operated without discretion and that ensures consistency in the share of income appropriated through taxes.

Countries desiring to make the transition to a market economy must find ways of committing their governments to a nondiscretionary fiscal system. More generally, they must find ways of limiting discretionary government intervention in the marketplace. It is, however, difficult to devise the institutional safeguards that provide for this kind of

<sup>1</sup> In western countries, when a firm becomes insolvent, it is immediately placed in court receivership to prevent looting by the management. In the United States, the exception to this practice was the insolvent S&Ls in the early 1980s that were allowed to remain open through deposit insurance that relieved their creditors of default risk. The S&L experience is analogous, say, to what has happened in Poland, where the managers of insolvent state-owned enterprises have transferred resources of these enterprises to their own private firms.

<sup>2</sup> In the absence of market prices that can be used to value firms for sale, governments must simply release as much information as possible about these firms through independent audits. By offering large numbers of shares in these firms to the public, individual shares will be available in small denominations that can be purchased by individuals with only small savings. The auction of shares could be modelled after the U. S. Treasury bill auction. That is, investors would submit a tender in two forms. With a competitive tender, an investor specifies a price and the number of shares desired. With a noncompetitive tender, an investor specifies the number of shares desired (up to some maximum amount determined by the government) and agrees to buy that number of shares at the average of the competitive bids that are accepted. (A minimum payment is required when tenders are submitted.) The government then accepts competitive bids up to a given fraction of the total shares and assigns the remaining shares to the noncompetitive bidders.

commitment. Incumbent politicians possess an incentive to build the coalitions that keep them in power by assigning property rights and control over markets to groups that support them politically. Communist countries represent an extreme of this phenomenon. No competition is allowed over ownership of resources. Control over resources is assigned to party members in return for their support of the communist dictatorship.

There is a relationship between democracy and a market economy in that each requires a restriction of the government's ability to limit competition. Democracy is unusual historically because of the difficulty of devising ways to keep the coercive power of the state from being used to limit competition for political power. The self-interest of individuals in government works over time to erode the safeguards placed on the ability of others to compete openly for political power. Success in achieving democracy and a market economy will depend on the success of formerly communist countries in solving the related problems of how to put into place institutional arrangements that safeguard free competition in the political arena and in the economic marketplace.

#### IV. CENTRAL BANKS AND THE TRANSITION TO A MARKET ECONOMY

##### Monetary Stability

Countries desiring to establish relative prices that measure the interaction between resource scarcity and consumer preferences need price level stability. Determining equilibrium relative prices is complicated by a constantly changing, unpredictable average price level. Price stability requires an end to rapid money creation which, in turn, requires fiscal discipline. Governments too weak politically to levy explicit taxes resort to an inflation tax, which does not require legislation. Eliminating inflation therefore requires that a government possess enough popular support to enforce payment of taxes.

Another difficulty in making the transition to market prices and price stability is the need to end price controls and allow a one-time rise in the price level to eliminate past, suppressed inflation. This one-time price rise will cause a perception of loss of wealth to the extent that persons were valuing their nominal assets with a shadow price level lower than the equilibrium price level. In countries like the Soviet Union, where the government has always maintained that inflation is confined to capitalist countries,

it seems likely that an open price rise will be seen by the public as destructive of its wealth.

Eliminating the ability of the central bank to create surprise inflation is an important part of limiting the ability of government to interfere arbitrarily in the economy. Surprise inflation appropriates part of the value of existing money holdings and fixed income securities. It is inconsistent with a fiscal system providing consistent rules to determine the share of private property appropriated for public use. Price stability also prevents the government from raising revenue through the interaction of a nonindexed tax code and inflation. In raising revenue, government must respect the democratic safeguards provided by requiring that taxes be enacted through explicit legislation. Finally, price stability prevents governments from creating a shadow fiscal system that redistributes income to politically influential constituencies through the combination of inflation and price controls. [The ideas of this paragraph are developed in Hetzel (1990).]

##### Market Allocation of Capital

In communist countries, banks are the only creditors of enterprises. In the transition to a market economy, banks will be *the* arbiters of which enterprises meet the market test of viability. Banks must be required to make the hard choice not to continue lending to an insolvent institution through having their own capital and their own depositors' money at stake. Bank failures must impose losses on holders of bank liabilities.

In general, in a market economy, the government must allow firms to disappear if the marketplace determines they are nonviable. Firm closings, however, produce concentrated pressures that governments find hard to resist. Separation of the central bank from commercial banks is necessary to prevent the government from using the central bank to lend to commercial banks in return for their lending to insolvent but politically influential enterprises. The base money creation of the central bank must be restricted to controlling commercial bank deposit creation and the price level, rather than subsidizing particular uses of credit. In particular, either the central bank should not lend at all to commercial banks or, if it does, it should lend only for short-term liquidity needs. Cutting commercial banks off from central bank credit ensures that commercial banks risk their own capital when they lend.

From a wider perspective, it is essential that legal arrangements strike a balance between requiring

lenders to be at risk and providing them with an incentive to lend. An incentive to lend rests on well-defined property rights and on an independent judiciary that adjudicates disputes over property rights. Legal arrangements must include bankruptcy laws that allow borrowers to post collateral that can be seized in case of default and, more generally, determine how the assets of bankrupt firms will be distributed among creditors. Private property rights also require elimination of government price controls. Banks cannot assess solvency without a price system that measures market-determined scarcity and demand. Price controls render problematic bank decisions about solvency. Nonviable enterprises can appear profitable because they obtain inputs at artificially low prices, while viable enterprises can appear unprofitable because they are forced to sell at artificially low prices.

### A Free Market in Foreign Exchange

A market economy requires a private market in foreign exchange with no capital controls. Communist countries have used their monopoly on trading in foreign exchange and capital controls to enforce an artificially high value for their currencies for two reasons. First, as discussed above, these countries subsidize basic commodities and food. If there were a free market in foreign exchange, these items would be exported. An overvalued exchange rate makes subsidized goods expensive to foreigners while allowing the state to sell them cheaply to domestic residents. Second, an overvalued exchange rate means that the free market price of the foreign exchange turned over to the government by exporters exceeds the price that the government charges importers. This excess is the economic equivalent of an excise tax on foreign exchange transactions. Like a regular tax, it can be distributed by the government. For a weak government, it is an easy tax to collect and distribute to politically potent state enterprises.

The price paid for an overvalued exchange rate is isolation from the world economy.<sup>3</sup> Market pricing and a market-determined exchange rate would produce efficient allocation of resources by encouraging a more open, export-oriented economy, which would bring the benefit of exports into line with their domestic resource cost. International trade has produced rising prosperity for countries integrated into

<sup>3</sup> Through Comecon, communist countries entered into a large number of barter arrangements with each other. These centrally imposed trades, however, do not indicate the existence of an open economy that produces according to its international comparative advantage.

the world economy through an efficient allocation of production and through the encouragement to innovation from worldwide competition.

## V.

### GERMAN MONETARY UNION

Governments desiring to establish a market economy can limit government intervention in the economy by limiting the ability of their central banks to produce unpredictable changes in the price level, to allocate capital, and to allocate foreign exchange. The most direct way to limit intervention of the central bank in the economy is to eliminate the central bank. Countries making the transition to a market economy should consider simply adopting the currency of a large western neighbor with whom they trade to a significant degree and which possesses a stable currency. The experience of East Germany with monetary union is interesting because it will demonstrate one practical way of limiting government intervention in the marketplace—elimination of a central bank.

This proposal was made earlier by Milton Friedman (1973, p. 59) in the context of LDCs:

For most such [developing] countries, I believe the best policy would be to eschew the revenue from money creation, to unify its currency with the currency of a large, relatively stable developed country with which it has close economic relations, and to impose no barriers to the movement of money or prices, wages, or interest rates. Such a policy requires not having a central bank.

The proposal is also similar in spirit to Wayne Angell's (1989) proposal that the Soviet Union adopt a gold standard.

Monetary union eliminates the East German central bank. East Germany, like states in the United States, will have surrendered its ability to run its own monetary policy. For example, without a central bank, Texas could not postpone the difficult adjustments required by the fall in the oil price in the mid-1980s. First, because Texas cannot exercise discretion over its money stock, it had no recourse to an inflation tax. It could not print money to finance the deficit in the state budget caused by the oil-related fall in revenues.

Second, the state of Texas could not use a central bank to keep alive thrifts rendered insolvent by the fall in the price of real estate. It could not lend to insolvent thrifts through use of the money-creating powers of a central bank. When the price of oil fell, Texas could not keep its terms of trade with the rest



of the United States from deteriorating by maintaining an overvalued exchange rate. Texas had no choice but to let its price level fall to reflect a deterioration in its terms of trade. Also, no one suggested that Texas impose capital controls to prevent capital outflows from reducing the value of its currency.

German monetary union can serve as a model for other East European countries. A country desiring to eliminate its central bank and adopt a deutsche-mark standard would first allow its currency to float freely to determine its equilibrium value relative to the mark. The central bank would borrow marks, perhaps through the new European Development Bank. On a preannounced day, it would exchange domestic currency turned in to banks for marks at the prevailing free market exchange rate. It would also exchange bank reserves for marks. The central bank would then go out of business. The country would maintain no restrictions on trade in foreign exchange and no capital controls. Henceforth, the marketplace would determine the quantity of money through the balance of payments. If the Treasury wanted to affect the domestic quantity of money, it would have to draw on mark accounts held with West German banks.

There are, of course, problems in eliminating a central bank. One problem is that if countries in Eastern Europe establish a mark standard, West Germany receives the seigniorage from money creation. Overall, however, governments can determine the net wealth transfer between Western and Eastern Europe. For example, partial forgiveness of the debts owed by Eastern European countries could offset the wealth transfer necessary to finance their imports of marks. The new European Development Bank could also finance the initial import of marks through interest-free loans. Another problem is that countries that suffered under Nazi occupation may be unwilling to use the mark as a currency. These countries could adopt the dollar as a currency. An example is Poland, whose residents already save partly through dollars received from workers in the United States.

Conversion to a mark standard requires a period during which countries stabilize the foreign exchange value of their currency in a freely operated foreign exchange market. After doing so, they may see no need then to abolish their own currency. A market economy, however, is not established by a one-time reform. It requires a lasting commitment to limiting the role of the government in economic activity. The existence of a central bank provides a continuing incentive for politicians under pressure to confuse

money creation with wealth creation. The resulting inflation then leads to myriad interventions in the economy in the form of wage, price, interest rate, exchange market, and capital controls. Eliminating the central bank is one way of committing to a limited role for the state.<sup>4</sup>

A few years ago, this proposal would have been radical. Today, it is quite conventional. It simply telescopes the likely evolution of monetary arrangements in Eastern Europe into a one-time reform. The countries of Eastern Europe want to integrate their economies with the economies of western Europe. Western Europe is itself moving toward monetary union. By adopting a mark standard, the countries of Eastern Europe simply accelerate the process of economic and monetary integration with Europe. They also eliminate the inflation, credit allocation, foreign exchange controls, overvalued exchange rate, and other mistaken policies that political systems under stress require of their central banks.

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<sup>4</sup> Creation of a currency board would be a close substitute for the proposal to eliminate the central bank. [See Hanke and Walters (1990).] With a currency board, base money is created only when someone turns in to the board a specified foreign currency, say, marks. Similarly, base money is extinguished when someone presents domestic currency to the board and asks for the foreign currency. A currency board would have the political advantage that a domestic currency would circulate, rather than a foreign currency. Also, the foreign currency held by the board could be kept in the government securities of the foreign country, so that the seigniorage from money creation would not go to the foreign country. The disadvantage of a currency board is that there is no absolutely binding way to keep the government from forcing it to devalue for domestic political reasons.

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# Is Saving Too Low in the United States?

William E. Cullison

*A higher American savings rate would enhance our economic independence, reduce inflationary pressures, increase productivity, improve living standards and enable us to reduce what are still obscenely high interest rates after close to a decade of disinflation. What is needed is a national, nonpartisan effort to increase American savings, including better incentives for private retirement plans and a firm rein on taxes generally.*

—Louis Rukeyser

*America's savings crisis is a chimera. Different accounting methods make it seem as if the U.S. is dangerously behind Japan in savings and investment. But when the necessary adjustments are made the gap disappears.*

—Paul Craig Roberts

The foregoing statement by Louis Rukeyser, host of the public television program "Wall Street Week," was published in his nationally syndicated newspaper column—run August 19, 1989 in the local Richmond newspaper [17]. Rukeyser also stated that the Japanese save at a rate three times the U.S. rate, which "... enables such foreigners to amass the means to both finance our deficits ... and to buy American property."

Martin Feldstein, former Chairman of the President's Council of Economic Advisers, has also lamented the low rate of saving in the U.S. economy, stating:

The United States has long had one of the lowest saving rates in the world. . . . The low rate of saving means that the United States has a lower rate of income and possibly a substantially lower level of income growth than would otherwise be possible. The already low rate of saving fell precipitously in the 1980s. [7, p.4].

Observers in other countries are also concerned about declining savings rates. The British *Economist*, for example, has recently published an article concerning the worldwide reduction in the savings rate, stating:

. . . Over the past three decades saving has fallen sharply in almost every rich country. The industrial countries as a group have saved less than 10% of their income in the 1980s, compared with 15% or so in the 1960s. This decline has come at an awkward time. In the 1990s and beyond, demands on the world's pool of savings are likely to be huge. [21, p.13]

Feldstein, Rukeyser, and the *Economist* summarize fairly well the conventional wisdom about saving in the U.S. and world economies. But other observers contend that the conventional wisdom may be wrong. For example, in addition to Paul Craig Roberts (quoted above), Robert Eisner [5] and Robert J. Samuelson [18] have also written columns critical of the conventional wisdom. Eisner's piece is titled "Low U.S. Savings Rate: A Myth," while Samuelson's is titled "The Great Savings Debate: A Smoke Screen."

This article examines the concept of saving and evaluates the contentions that the growth rate of U.S. saving in the 1980s has been slow relative to its own past and slow relative to the rates of saving and investment registered in other countries. The paper is organized as follows:

- I. Saving and Investment Defined: these definitions are necessary for evaluating savings statistics
- II. National Income and Product Accounts (NIPA): definitions
- III. The Current Condition of U.S. Saving and Investment, NIPA basis
- IV. Alternatives or Complements to the NIPA: including United Nations System of National Accounts (UNSNA), Flow-of-Funds, Hendershott-Peck, Total Incomes System of Accounts (TISA), and Jorgenson-Fraumeni

- V. Comparison of Systems of National Accounts: The Historical Record: current and past U.S. savings compared under different methodologies
- VI. Interim Conclusions and Observations
- VII. U.S. Saving Relative to Saving in Other Industrial Countries
- VIII. Conclusions

## I.

### SAVING AND INVESTMENT DEFINED

What is saving? Children are encouraged to save by putting their loose change into a "piggy" bank. The concept of saving that parents attempt to teach their children is that if they refrain from spending now, they can get something better in the future. Thus, saving takes place when consumption is foregone.

The definition of saving from an economist's point of view is analogous to the view of saving that parents teach to children; namely, saving is refraining from consuming. Can one spend his income and still be saving? Yes. Suppose an entrepreneurial child who has a lemonade stand uses his earnings to buy additional lemons and sugar instead of putting them in the piggy bank. The parent would undoubtedly commend the child for using money wisely, but probably would not think that the child had saved the money. Economists, on the other hand, would consider the young entrepreneur's action as saving (and investing in inventory). The key is that goods purchased for investment are not consumed.

### The Equality of Saving and Investment

In the case of the young entrepreneur, all of the money saved was invested. This concept—what is saved is invested—is important. Saving and investment are usually different acts by different people. Nonetheless, from an economist's viewpoint, the amount of total saving in an economy is always equal to the amount of total investment.

Thus, to an economist, a statement that the U.S. savings rate is too low is equivalent to a statement that the U.S. is consuming too much and investing too little of its national output. The debate about the adequacy of the savings rate, therefore, is essentially a debate about the future growth of the U.S. economy and whether there is sufficient plant and equipment spending to sustain adequate future economic growth.

The logic of the somewhat counterintuitive equality between saving and investment can be illustrated by the following simplification. A certain quantity of real goods and services will be produced in the economy this year. Those who buy the goods and services will either consume them or use them to produce other goods. Thus, national product (X) is equal to consumption (C) plus investment (I). By the same token, incomes (wages, rents, interest, and profits) are generated when the national product is produced. The sum of these incomes, known as the national income (Y), goes to firms and individuals, who either use it for consumption (C) or savings (S). Since national product is equal to national income, saving is equal to investment. Thus, in this simplified example,

$$X = C + I$$

and

$$Y = C + S,$$

so, because  $X = Y$ ,

$$S = I.$$

## II.

### THE NATIONAL INCOME AND PRODUCT ACCOUNTS

The U.S. National Income and Product Accounts (NIPA) are compiled and reported quarterly by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. Virtually all of the debate about the existence or extent of a saving and investment shortage in the United States has to do with definitions used in the NIPA, mainly those relating to decisions about what goods and services to include in national production and, of those included, which to count as being "used up" or "consumed." A review of the NIPA is thus in order.

The NIPA defines National Income as the sum of wages, rents, interest, and profits, and Net National Product as the measure of national product that is conceptually equal to the National Income.<sup>1</sup> The Net National Product (NNP) thus is the NIPA account that corresponds to "X" in the conceptual example above. Gross National Product (GNP), which is the most widely publicized NIPA measure, is equal to NNP plus depreciation.

<sup>1</sup> Net National Product is not quite equal to National Income. It differs because of indirect business taxes, business transfer payments, statistical discrepancy, and subsidies.

NNP and GNP are measures of final goods and services produced in the country in a year, and they are divided into subaccounts by type of purchaser of the good or service. For example, NNP is broken down into Personal Consumption Expenditures (purchases by consumers), Net Private Domestic Investment (net purchases of investment goods and additions to inventory by businesses), Government Purchases of Goods and Services, and Net Exports. GNP has the same breakdown except that the investment account is Gross Private Domestic Investment, which is net investment plus depreciation.

The NIPA adopts the concept of saving discussed in the section above, namely, that saving is refraining from consuming. Thus, the NIPA defines personal saving as that part of personal income that is neither paid out in taxes nor spent for personal outlays.<sup>2</sup> Consistently, business saving is defined as that part of profits that is neither paid out in taxes nor distributed to shareholders, and government saving (or dissaving) is the combined budget surplus (or deficit) of federal, state, and local governments. The sum of personal, business, and governmental saving equals the sum of net private domestic investment and net foreign investment.<sup>3</sup>

The reader may have noticed that NNP differs from "X" in the simplified example of the preceding section in that it has separate government and foreign accounts. This segregation of the government and the foreign sectors results from special treatment accorded government and foreign investment spending. Government capital formation (or investment) is not recognized in the NIPA; government purchases of investment-type goods and services are not considered investment. Also, the funds used to purchase such goods are not considered to be saving. This treatment of government purchases is not followed by most countries.<sup>4</sup>

<sup>2</sup> Mainly purchases of goods and services for current consumption, but outlays also include interest payments to businesses and net personal transfer payments to foreigners.

<sup>3</sup> Personal saving in the NIPA is derived by deducting personal taxes and personal consumption expenditures from personal income. Business saving is found by summing undistributed corporate profits (plus the inventory valuation and capital consumption adjustments), corporate and noncorporate capital consumption allowances, and net wage accruals. Government saving is the sum of the Federal and state and local budget surpluses (or deficits, which are counted as negative saving). Net foreign investment is defined as exports of goods and services less imports, transfer payments to foreigners, and government interest payments to foreigners.

<sup>4</sup> See the discussion of the United Nations System of National Accounts, below.

The NIPA also segregate the foreign sector and include net exports (exports minus imports) as an element of national product. The rationale for this treatment is that when individuals (firms) purchase imported goods for consumption (investment) purposes, those goods are included in the personal consumption expenditure (domestic investment) account, but they are not produced in the United States, so they should not be included in the U.S. national product. On the other hand, when foreigners abroad buy U.S. goods, the value of the goods is not included in U.S. consumption or investment accounts, but the goods are produced in the U.S., so they should be included in the U.S. national product. This method works well for determining the market value of final goods and services produced in the U.S., which is the definition of national product, but because net exports are defined as part of investment, it can produce anomalies in the investment account.<sup>5</sup>

### Critique of NIPA Investment

The NIPA definition of investment has been criticized for its treatment of net exports as foreign investment and because it excludes from investment: (1) all types of government spending, (2) all consumer durables purchases, (3) "human capital" spending, and (4) most research and development spending. Discussion of these criticisms follows.

Net foreign investment is defined as net exports less transfer payments to foreigners and government interest payments to foreigners. This definition means that a consumer in Japan who buys and eats an American-made frozen pizza adds to U.S. investment, while a police department in Maryland that buys a Japanese-made truck reduces U.S. investment.

<sup>5</sup> Some economists have been concerned with the relation between saving rates and capital flows across countries. Their argument goes that since  $X - M = S - I$ , where  $X - M$  is net exports,  $S$  is saving, and  $I$  is private domestic investment, any excess of investment over saving must be offset by a deficit in the balance of payments current account. This deficit in the balance of payments account is interpreted to mean that foreign capital flows into the deficit country to supplement domestic saving.

This seemingly simple argument is actually incredibly complex, involving real exchange rates, real interest rates, marginal propensities to consume and import, and potential investment opportunities. It is too complex to investigate here in any depth. Interested readers are invited to read Roger S. Smith's comprehensive review article [19]. Smith concludes that much of the economists' concern about the relation between savings rates and capital flows is misplaced.

Of these two examples, only the second transaction, which reduces measured investment, actually adds to the real capital stock in the U.S.

Although consumer purchases of new housing are defined as investment, the NIPA do not consider consumer purchases of durable goods to be investment. Thus, consumer purchases of automobiles are considered as current consumption even though automobiles, like houses and other capital goods, yield a stream of services over a period of many years. Business purchases of automobiles, on the other hand, are defined as investment.

A number of economists have criticized the treatment of government expenditures and consumer purchases of durables in the U.S. national income and product accounts. As Robert Eisner puts it:

If Hertz, Avis, or any other private company buys an automobile, that constitutes investment. If a police car or any other automobile is purchased by any branch of government, that shows up merely in "government purchases of goods and services." And automobiles purchased by households are part of personal consumption expenditures. Yet, in terms of economic theory and analysis, the automobile in each case, like any other durable good, is investment in that it will provide future services. . . . Is a nation really investing less if it builds highways and produces automobiles than if it invests in trains and busses? [6, pp. 6-7]

The NIPA definition of investment excludes expenditures for human capital (such as education, job training, health, etc.). These expenditures are classified as current consumption, as are other expenditures designed to maintain or improve one's ability to work. Business spending for research and development is also excluded from business investment.

Eisner has also criticized these exclusions:

Research and development efforts by business are treated as intermediate products, . . . research and development expenditures by nonprofit institutions turn up as consumption, . . . and government expenditures for research are buried in . . . government purchases of goods and services. Yet, research and development expenditures may well prove more of an economic investment in future output than much of what is currently treated as "gross investment." And what are we to make of the vast amounts of expenditures . . . for education, training, and health, let alone the raising of our children, which create the human capital on which our future depends? Can we confidently say that the United States is lagging far behind other nations in investment without counting R&D, education, government capital, and expenditures for household durables in ways that are comprehensive as well as comparable across countries? [6, pp. 6-7]

The implications of the exclusions of government and consumer purchases of investment-type goods, R&D spending, and human capital expenditures from the NIPA definition of investment have been analyzed extensively in the economics literature. Before discussing these analyses, this article examines the current condition of U.S. saving and investment as depicted by the NIPA.

### III.

#### THE CURRENT CONDITION OF U.S. SAVING AND INVESTMENT, NIPA BASIS

Chart 1 displays gross saving as a percent of the Gross National Product and net saving as a percent of Net National Product. As the chart indicates, gross saving as a percent of GNP has declined in recent years. It averaged 16.5 percent from 1960 to 1981, 14.3 percent in 1982-1984, and 12.9 percent in 1985-1989.

A better measure of the potential effects of saving and investment on the economy, however, is given by net saving and investment, which exclude depreciation. It is important to know, for example, whether a firm's purchase of five new machines is made to add to its capacity or whether the five machines simply replace five old worn-out machines.

Chart 1 also illustrates that net saving has declined relatively more than gross saving in recent years. Net saving as a percent of NNP averaged 8.0 percent from 1960-1981, 3.0 percent from 1982-1984, and 2.4 percent from 1985-1989. This reduction in saving is consistent with the Feldstein-Rukeyser statements mentioned at the outset.

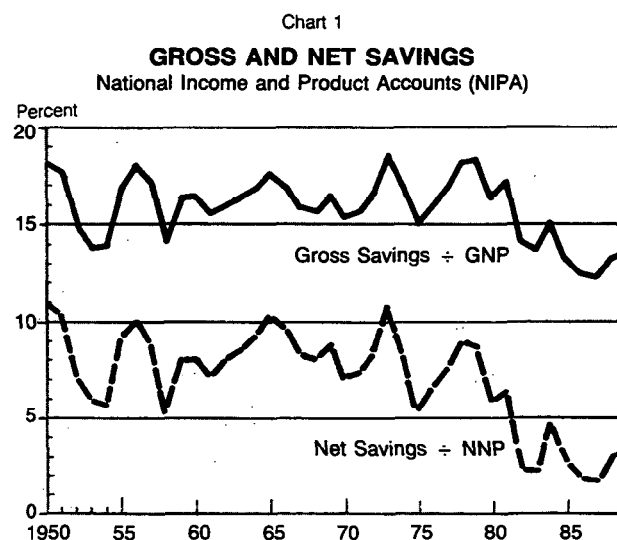
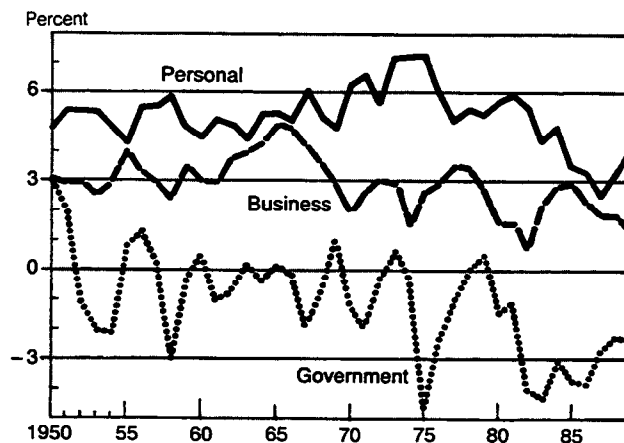


Chart 2 shows net personal, business, and government saving as percentages of NNP. Net business savings averaged 3.1 percent of NNP in 1960-1981, 1.9 percent in 1982-1984, and 2.0 percent in 1985-1989. Net personal saving averaged 5.6 percent of NNP in 1960-1981, 4.9 percent in 1982-84, and 3.4 percent in 1985-89. Net government saving (dissaving actually), on the other hand, fell from -0.7 percent of NNP in 1960-81 to -3.8 percent in 1982-84, recovering to -2.9 percent in 1985-89.

Federal, state, and local governments ran combined deficits that averaged 2.2 percentage points more of NNP in 1985-89 than in 1960-81. The culprit in government saving was the Federal government, however, because state and local governments ran larger surpluses in 1982-89 than in 1960-81. The Federal government deficit, by contrast, averaged 1.2 percent of NNP over 1960-81, 5.4 percent over 1982-84, and 4.3 percent in 1985-89.

Are saving and investment in the national accounts measured correctly, and if not, is mismeasurement or misinterpretation responsible for the U.S. "savings crisis?" Several economists have constructed alternative measures of national investment and saving. Many of these alternative systems of national accounts, particularly those that include nonmarket activities and/or human capital investment, yield estimates of saving and investment that are strikingly different from the NIPA estimates. The paragraphs below review these reconstructions and the arguments put forward by their proponents.

Chart 2  
**DISAGGREGATED NET SAVING**  
(as Percent of NNP)



#### IV. ALTERNATIVES OR COMPLEMENTS TO THE NIPA

A number of attempts are being made to provide measures of economic welfare that are legitimate alternatives to the BEA's National Income and Product Accounts. This article discusses five of these.

##### United Nations System of National Accounts (UNSNA)

This system of accounts is used for cross-country comparisons in all United Nations and OECD publications. It is fairly similar to the NIPA except in its treatment of government investment, where the UNSNA defines nonmilitary government construction and equipment purchases as investment while the NIPA does not. The U.S. provides national economic data to the UN and the OECD in UNSNA form, so the information is readily available to interested parties.

##### The Flow-of-Funds Accounts (FFA)

Flow-of-funds estimates are published quarterly by the Federal Reserve Board. The FFA measure saving differently from the way it is calculated for the NIPA, thus providing a readily available alternative source of estimates of national saving. The FFA system also differs from the NIPA in that net purchases of consumer durables are considered to be investment and the funds used to purchase them to be saving.

Saving in the FFA is figured in the following way. Individuals' saving is defined as the sum of individuals' increases in financial assets<sup>6</sup> and tangible assets<sup>7</sup> less their net increase in debt,<sup>8</sup> both terms excluding the effects of asset revaluation. Saving so measured differs in concept from NIPA personal saving mainly because it includes: (1) Government insurance

<sup>6</sup> Financial assets in this context include checkable deposits, time and savings deposits, money market fund shares, U.S. Treasury securities, U.S. Government agency securities, tax-exempt obligations, corporate and foreign bonds, open-market paper, mutual fund shares, other corporate equities, private life insurance reserves, private insured pension reserves, private noninsured pension reserves, Government insurance and pension reserves, and miscellaneous financial assets.

<sup>7</sup> Tangible assets include owner-occupied homes, other fixed assets (including corporate farms), consumer durables, and inventories (also includes corporate farms).

<sup>8</sup> Individuals' debt includes mortgage debt on nonfarm houses, other mortgage debt (includes corporate farm), consumer credit, security credit, policy loans, and other debt (includes corporate farms).

and pension reserves, (2) net investment in consumer durables, (3) capital gains dividends from mutual funds, and (4) net saving by farm corporations. In addition, the two measures of saving differ because of measurement differences, by an amount that is called the "household discrepancy."<sup>9</sup>

### Hendershott-Peek Adjustments

Patric Hendershott and Joe Peek [10] adjusted the NIPA accounts to move the measurement of U.S. private saving closer to the concept of saving as a change in real wealth. Such a concept viewed saving as the difference between end- and beginning-of-period net worth (revalued to current prices). So defined, saving is equal to the change in real resources available for future consumption.

The Hendershott-Peek concept of saving is similar to that used in the FFA accounts. Indeed, Hendershott and Peek utilize FFA accounts quite liberally in making their adjustments to NIPA savings and investment. Beginning with the NIPA estimates of personal saving and investment, Hendershott and Peek, consistent with the FFA accounts, added net purchases of durable goods by consumers, sole proprietorships, and partnerships as well as net purchases of government life insurance and pension reserves.<sup>10</sup> They also added OASI contributions, which are not defined as saving in the FFA.<sup>11</sup>

Defining social security contributions as part of personal saving is controversial. The debate centers on whether social security "contributions" differ from ordinary taxes.<sup>12</sup> The answer depends upon whether the expectation of receiving future social security benefits affects current consumption spending. If, for example, individuals discount future social security benefits as illusory and therefore continue to save whatever amount they would have saved anyway,

<sup>9</sup> See Wilson, Freund, Yohn, and Lederer [22] for a detailed analysis of the "household discrepancy."

<sup>10</sup> A dollar of income put into a private retirement plan is considered to be a dollar of income saved, and a dollar of interest earned on those private retirement funds and not consumed is also considered to be a dollar saved.

<sup>11</sup> Hendershott and Peek froze the amount of the social security contribution to be added in 1981-85 at the 1980 real level. They argued that the promised rate of return on social security began to fall short of the market rate in the early eighties, so individuals would not have increased their contributions voluntarily after that time.

<sup>12</sup> They are treated as ordinary taxes in the NIPA.

social security payments should not be defined as saving.<sup>13</sup>

Hendershott and Peek also adjust saving to remove the inflation premium from interest income. This adjustment also makes sense theoretically; from the change-in-net-worth approach to saving, it is clear that a portion of interest payments in inflationary periods merely compensate for a decline in the real value of dollar-denominated assets. The mechanics of HP's actual adjustment procedure was criticized severely by de Leeuw,<sup>14</sup> however, and it needs rethinking.

In any event, despite de Leeuw's criticisms, the Hendershott-Peek adjustments deserve serious consideration both as criticisms of the conventional accounts and as proposals for future change in the NIPA.

### The Total Incomes System of Accounts (TISA)

Robert Eisner [6] has developed an extended system of accounts that he calls the Total Incomes System of Accounts (TISA). His system is based upon the assumption that there is a need for "... better measures of economic activity contributing to social welfare, more inclusive and relevant measures of capital formation and other factors of economic growth, and better and/or additional data to fit concepts of consumption, investment and production." [6, p.2] Eisner's system retains the NIPA's central focus on the measurement of final product, but TISA defines final product differently than the NIPA.

The TISA system is designed to "... include the income corresponding to all consumption and capital

<sup>13</sup> The specific HP adjustments for social security have been criticized. Frank de Leeuw, in a commentary, argued as follows: "It would seem . . . that adjusting the present [NIPA] estimates to a change-in-wealth approach would require adding contributions to personal saving and subtracting benefit payments. . . . HP's adjustments do add contributions . . . but they do not subtract benefit payments. . . . This procedure has the peculiar consequence that, if contributions and benefits rise by identical amounts . . . personal saving rises." [10, pp. 224-25] The de Leeuw criticism of the HP social security adjustment seems appropriate. One can, however, accept the argument that social security contributions are saving and easily make the straightforward adjustment suggested by de Leeuw of including social security contributions in personal saving and excluding benefits. This adjustment may be made to NIPA personal saving simply by adding the social security surplus, because NIPA personal saving already includes social security benefit payments.

<sup>14</sup> Particularly their assumption that the average real interest rate was constant (equal to the nominal rate in 1950) from 1950 through 1980.

accumulation, market or nonmarket, in all sectors of the economy." [6, p. 21] Eisner's TISA accounts thus include items of nonmarket product such as "... the services of government, household capital, unpaid household labor, and the opportunity costs of students' time." [6, p. 21]

Eisner classifies national defense, roads, and police services as intermediate product, while redefining a portion of commercial television, radio, newspaper, and magazine services as final product. He also subtracts expenses related to work from income and product and adds the value of employee training and human capital formation to income and product. Also, business product is reduced by the amount of intermediate product deemed to be received by government.

The Total Incomes System of Accounts also includes as output the value of government subsidies, the deficits of government enterprises, the services of volunteer labor, and the "... differences between opportunity costs of military conscripts and jurors and what they are paid." [6, p.21]

The TISA measure of capital accumulation includes NIPA's gross private domestic investment, plus (1) governmental acquisitions of structures and equipment and additions to inventory (\$125 billion in 1981), (2) household acquisitions of durable goods and additions to inventory (\$351 billion in 1981), and (3) investment in intangible capital in the form of research and development, education and training, and health (\$850 billion in 1981). As a result of these changes, the TISA gross national product was estimated to have been 54.4 percent larger than NIPA GNP in 1981, while TISA saving and investment measures were over three times larger than the NIPA measures.

TISA also provides estimates, as a supplement to conventional capital accumulation, of net revaluations of tangible assets<sup>15</sup> (\$ - 153.7 billion in 1981). TISA thus equates current dollar net investment to the current dollar value of the real change in net worth, whether due to acquisition of newly produced capital or to changes in the value of existing capital.

### Jorgenson-Fraumeni, Full National Product

Dale Jorgenson and Barbara Fraumeni [11] have developed a system of national accounting that in-

cludes investment in human and nonhuman capital, and consumption of market and nonmarket goods and services. According to Jorgenson and Fraumeni (JF), the NIPA understates the amount of economic activity in the U.S. by a very substantial amount, primarily because nonmarket activities are excluded.

The JF measure of capital formation puts investment in human capital at least four times the magnitude of investment in nonhuman capital. Thus, the JF national accounts assign a much larger relative importance to investment than the NIPA. "Full" investment in the JF system, where both human and nonhuman capital are included, constitutes around half of "full" product. "Full" consumption makes up the other half. The value of full product equals the value of outlays on the services of human and nonhuman capital, which take the form of both market and nonmarket labor and property compensation.

Labor compensation is about 90 percent of the total factor outlay, and nonmarket labor compensation, which includes investment in education, household production, and leisure time, accounts for more than 80 percent of labor compensation. The JF system assumes that both labor and property compensation are measured after taxes are deducted and subsidies accruing to individuals are added.

Consistent with the inclusion of gross human capital in the JF accounts, JF estimate the depreciation of human capital. Depreciation of human capital is defined as the sum of changes in lifetime labor incomes that occur with age for all individuals who remain in the population, and lifetime labor incomes of all individuals who die or emigrate. Depreciation of nonhuman capital is the sum of changes, in the current year, of asset values for all investment goods remaining in the capital stock and the asset values of all investment goods that are retired from the capital stock.

As a result of all of these adjustments, JF's "full" investment is substantially larger than Gross Private Domestic Investment as reported in the NIPA. In 1984, for example, JF estimated "full" investment to be \$6.15 trillion, of which \$5.12 trillion was human investment and \$1.03 trillion was nonhuman investment. NIPA gross private domestic investment was estimated to be \$0.66 trillion. As in the NIPA, Jorgenson-Fraumeni full investment equals JF full saving, except for statistical discrepancy. Also, full human capital equals full human saving.

<sup>15</sup> Net revaluations measure the changes in the nominal values of tangible assets less changes attributable to general price movements.



## V. COMPARISON OF SYSTEMS OF NATIONAL ACCOUNTS: THE HISTORICAL RECORD

### UNSNA Versus NIPA

Chart 3 shows UNSNA gross and net savings rates<sup>16</sup> in comparison to NIPA gross and net saving rates. As the chart shows, UNSNA savings rates were consistently larger than NIPA rates, which is to be expected because saving in the UNSNA system includes funds to be used for government capital spending. UNSNA *net* saving does show a downward trend after 1973, but its downward movement is considerably more moderate than the trend in NIPA net saving. UNSNA net saving averaged 7.9 percent of net domestic product in the 1970-83 period and 6.6 percent of NDP in 1984-88. NIPA net saving, in contrast, averaged 8.0 percent of net national product in 1970-83 and 2.6 percent of NNP in 1984-88.

### Flow-of-Funds Versus NIPA

Chart 4 shows individuals' saving from the flow-of-funds accounts (FFA) and the reconciliation of the FFA and NIPA personal saving rates over the 1952-89 time period. All three are plotted as percentages of NNP. The comparison shows, first, that FFA personal savings rates, even after reconciliation,

<sup>16</sup> As percentages of gross domestic product (GDP) and net domestic product (NDP). GDP is the market value of output produced by factors of production *located* in a country, while GNP is the market value of output produced by factors of production *owned* by citizens of a country.

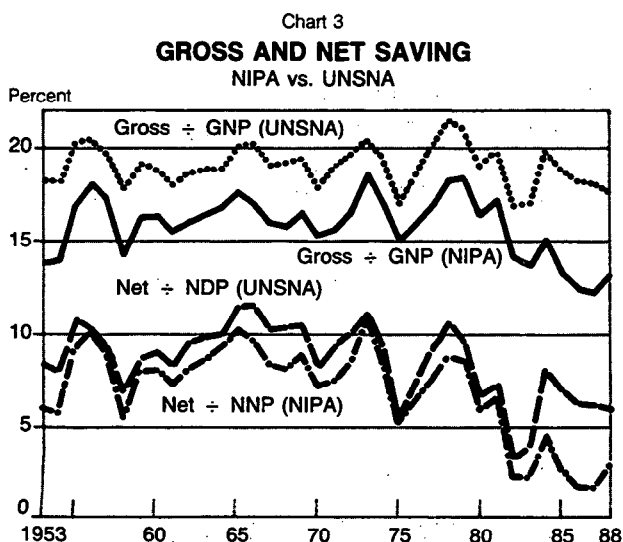
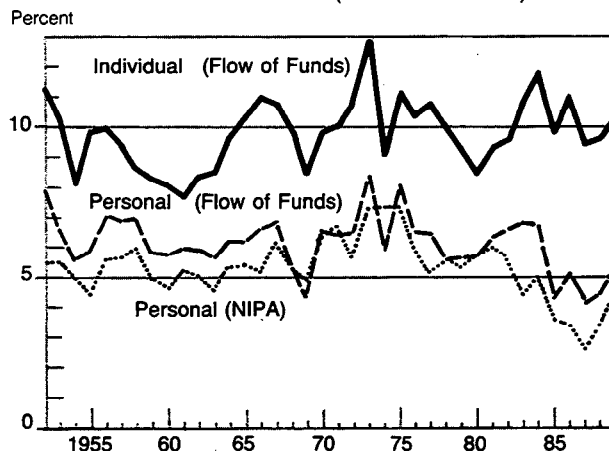


Chart 4  
**PERSONAL AND INDIVIDUAL SAVINGS ACCOUNTS**  
NIPA vs. Flow of Funds (as Percent of NNP)



remain generally higher than NIPA personal savings rates, and second, that FFA individuals' savings rates have shown no downward trend in recent years.

The differences between individuals' savings rates and personal savings rates<sup>17</sup> are quite striking. Thus, although the point is valid that U.S. savings rates as measured by the National Income and Product Accounts have declined in recent years, individuals' savings rates, as derived from the flow-of-funds accounts, do not show similar declines.

### The Hendershott-Peek Adjustments Versus NIPA

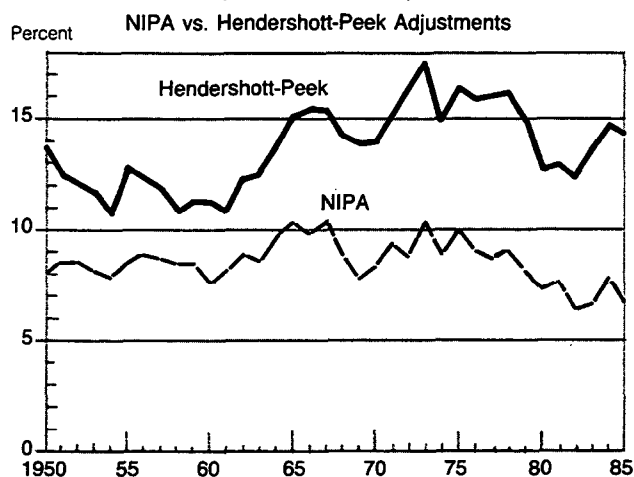
The estimates of net private saving rates as adjusted by Hendershott and Peek (with minor modifications<sup>18</sup>) are shown in Chart 5 in comparison to NIPA net private savings. Both rates are percentages of Net National Product. As the chart shows, the HP saving rate is almost twice as large as the NIPA rate. In the 1960-81 period, for example, the HP rate averaged 14.2 percent of NNP, while the NIPA rate averaged only 8.7 percent.

<sup>17</sup> The major differences between individuals' saving and personal saving are that the former includes net investment in consumer durables and government insurance and pension reserves. NIPA Personal Income and FFA Personal Income differ by the amount of the household discrepancy. See discussion above, Section IV.

<sup>18</sup> Because of de Leeuw's criticism, HP's adjustment for the inflation premium in interest income was not made. Also because of de Leeuw, the actual HP adjustment for social security contributions was modified. Following his suggestion (see footnote 13), the social security modification was made by adding the social security surplus to personal saving.

Chart 5

### NET PRIVATE SAVINGS (as Percent of NNP)



During the 1982-85 period, the HP rate averaged 13.5 percent while the NIPA rate averaged 6.7 percent.

The decline of private saving in recent years is considerably less severe when saving is measured with the HP adjustments. While the average NIPA saving rate fell 2.0 percentage points between the 1960-81 and the 1982-85 periods, the average HP saving rate fell only 0.7 percentage points. The major reason for the more moderate decline in the HP savings rate is that HP personal saving includes the social security surplus.

### TISA Versus NIPA

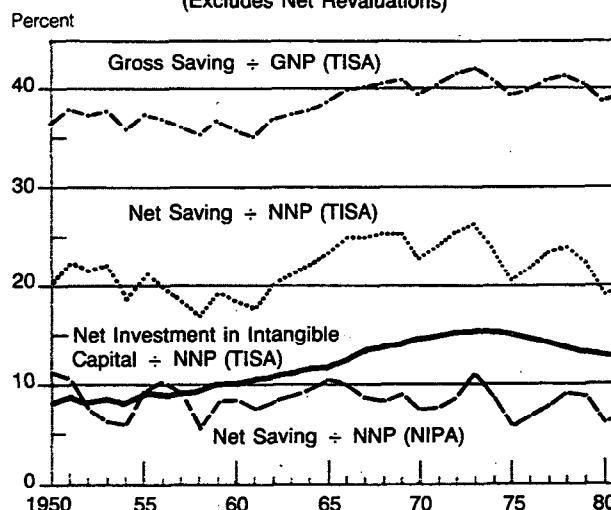
Chart 6 shows TISA gross and net saving as percents of TISA GNP and NNP as well as net investment in intangible capital as a percent of TISA net national product over the 1950-1980 period. NIPA net saving as a percent of NNP is shown for comparison. As the chart illustrates, TISA savings rates substantially exceed NIPA savings rates. In fact, in 1981, TISA net investment in intangible capital alone (as a percent of TISA NNP) was more than twice as large as NIPA net investment (as a percent of NIPA NNP). Moreover, TISA saving over the 1950-80 period shows no obvious overall downward trend. Net investment in intangibles seems to have peaked in 1972 and has since moved downward, but its 1981 level was well above the levels of the fifties.

### Jorgenson-Fraumeni Versus NIPA

Chart 7 shows Jorgenson and Fraumeni's full gross and net investment as percentages of the corre-

Chart 6

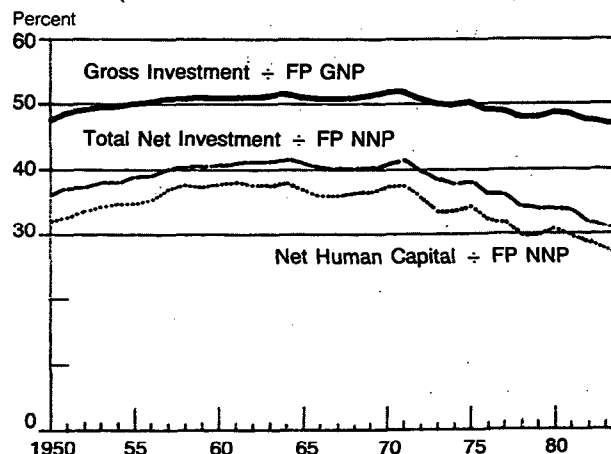
### DOMESTIC INVESTMENT (Percent of TISA GNP or NNP) (Excludes Net Revaluations)



sponding estimates of full private GNP and NNP. Net human capital investment is also plotted as a percentage of full private NNP. The chart shows that full gross investment declined only about five percentage points from its 1970 peak to 1984. Full net investment, on the other hand, fell almost ten percentage points. The difference, which is depreciation, is mainly in the depreciation of human capital, as is shown in Chart 8.

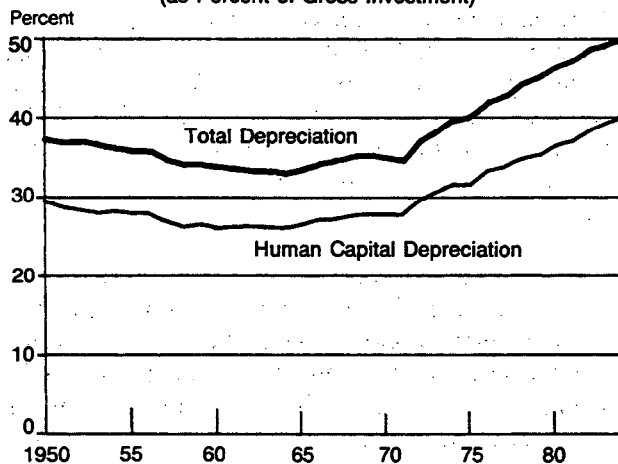
Chart 7

### PRIVATE DOMESTIC INVESTMENT JORGENSEN-FRAUMENI SYSTEM (as Percent of Full Private GNP and NNP)



Source: Jorgenson and Fraumeni, "Lifetime Income and Human Capital," unpublished preliminary manuscript, August 1988.

Chart 8  
**ESTIMATED DEPRECIATION  
JORGENSEN-FRAUMENI SYSTEM**  
(as Percent of Gross Investment)



Source: See Chart 6.

## All Systems Compared

Chart 9 shows a comparison of net savings rates calculated from the NIPA, Jorgenson and Fraumeni, TISA, and Hendershott and Peek. As the chart shows clearly, the JF savings rates tower over the other rates. The TISA rates are next largest, followed by the Hendershott-Peek and flow-of-funds estimates. Lowest, and substantially below the flow-of-funds estimates, comes the NIPA.

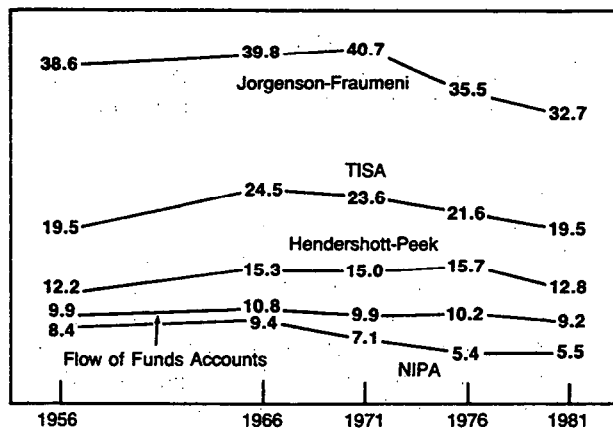
## VI. INTERIM CONCLUSIONS AND OBSERVATIONS

Which system is best? Strong cases can be made for all of them. It seems especially clear, however, that if one is using the rate of saving as an indicator of the future rate of national economic growth (as do Feldstein and Rukeyser), it is not appropriate to exclude from saving funds used to finance investments in human capital, research and development, and the public infrastructure.

Moses Abramovitz believes investments in infrastructure and human capital to be key factors in explaining cross-country differences in economic growth. As he puts it:

Social capability is what separates less developed from advanced countries today and which, in the past, separated the late-comers among the countries that are now industrialized from the early entrants into what Kuznets called 'modern economic growth.' . . . [S]ocial capability . . . refers to a country's political institutions, its political

Chart 9  
**NET SAVINGS RATES COMPARED**  
(selected years)  
(as Percent of Relevant NNP Estimate)



integration and the effective consensus in favor of development. These [attributes affect] . . . (1) the ranking of economic activity and of material welfare in the scale of social values, (2) the social sanctions that protect earnings, property and honest trade, and (3) the willingness and capacity of governments to create the physical infrastructure for private activity. Next, there is a country's technical competence for which, at least among Western countries, years of schooling may be a good proxy. [1, p.3]

Of the five alternative systems of national accounts, the saving and investment estimates from the UNSNA, flow-of-funds accounts, and the Hendershott-Peek system depart the least from the U.S. national income and product accounts. Do they indicate a savings slowdown?

The UNSNA-based saving rate had only a moderate decline between 1970-83 and 1984-88. Individuals' saving as measured by the flow-of-funds accounts showed no observable trend toward lower savings rates. Consistently, the HP-adjusted accounts indicated considerably higher saving and considerably less of a decline in the savings rate since the mid-seventies than did the NIPA. The least controversial systems, therefore, provide no evidence that the U.S. is in a "saving crisis."

Only the Jorgenson-Fraumeni estimates of *net* investment seem to be consistent with the existence of some sort of a U.S. saving crisis. But the post-1971 decline in the JF net investment rate is attributable to a declining rate of *human* capital spending, and that in turn is attributable to a rapid rise in human depreciation since 1971. If the JF data describe the

long-lamented U.S. saving crisis,<sup>19</sup> the crisis is quite different in character from that envisioned by Rukeyser and Feldstein, *et al.*

## VII. U.S. SAVING RELATIVE TO SAVING IN OTHER INDUSTRIAL COUNTRIES<sup>20</sup>

This section of the article will review five different analyses of U.S. savings rates compared to savings rates in other advanced countries. Robert Lipsey and Irving Kravis [12, 13] have argued persuasively that although the United States currently is not a leader in saving among the major industrialized countries, much of the concern that the country is improvident is based upon a misinterpretation of the data. Mincer and Higuchi's study of on-the-job training in the United States and Japan [15], however, raises questions about Lipsey and Kravis's favorable conclusions, at least those relating to the relative levels of human capital investment in the United States and Japan. Fumio Hayashi [8, 9], on the other hand, reaches the conclusion that the difference between the U.S. and the Japanese savings rate is substantially overstated because of noncomparabilities in the definition of the national income and product accounts in the two countries.

Robert McCauley and Steven Zimmer [14] examine differences in investment spending in the United States, Britain, Japan, and Germany. They conclude that the cost of capital in Japan and Germany was lower than in the United States and the United Kingdom, and then argue that this higher cost of capital may explain the consistently lagging investment spending in the latter two countries.

David Aschauer [2] argues that a relatively low rate of public (governmental) investment spending in the United States can also explain some of its lagging investment and slower productivity growth.

### Is the U.S. a Spendthrift Nation?

Lipsey and Kravis discuss the items that should be included in saving and investment<sup>21</sup> and develop

<sup>19</sup> As the rise in human depreciation after 1971 stemmed from the use of the life-cycle approach to estimating depreciation combined with the baby boom's effects on the age distribution of the population, the decline in JF net investment may be more of a measurement anomaly than a piece of reliable evidence of a saving crisis.

<sup>20</sup> Particularly the "Group of Seven" countries, which include Canada, France, West Germany, Italy, Japan, the United Kingdom, and the United States.

<sup>21</sup> Lipsey and Kravis use gross saving and investment throughout because they are skeptical of cross-country comparisons of capital consumption measures.

a set of adjustments to incorporate spending for consumer durables, education, and research and development into the investment accounts. The effects of these adjustments on cross-country savings rates are given in Table I. As is shown in the table, when all of the adjustments are made, the difference between the U.S. rate of capital formation and that of the average of the rest of the Group of Seven countries is reduced from 4.7 percentage points to 3.3 percentage points.<sup>22</sup>

Lipsey and Kravis discussed further adjustments that would be desirable if they were not precluded by data unavailability. One particularly important additional adjustment would have been to include in saving and investment the foregone earnings of students. As Lipsey and Kravis state, "As the proportion of working-age students attending institutions of higher education is higher in the United States than in all or most of the other countries, the inclusion of their foregone earnings in the form of investment would raise the U.S. investment rate and bring it closer to the average." [13, p. 73]

<sup>22</sup> Lipsey and Kravis also make an adjustment for differences in military capital formation, which further reduces the differential to about 3.1 percentage points.

Table I  
**Gross Fixed Capital Formation**  
as a percent of Gross Domestic Product  
average of individual year ratios, 1970-1984

	Conventional Measure	+ Education	+ Research & Development	+ Consumer Durables
United States	18.1	24.2	26.2	30.1
Canada	22.0	30.9	31.9	37.2
Japan	31.9	36.1	38.0 <sup>a</sup>	39.9 <sup>a</sup>
France	22.2	25.9	27.5	32.4
Germany	22.1	26.0 <sup>a</sup>	27.9 <sup>a</sup>	NA
Italy	19.8	24.9 <sup>b</sup>	25.7 <sup>b</sup>	29.0 <sup>b</sup>
United Kingdom	18.5	23.0	24.9 <sup>a</sup>	28.4 <sup>a</sup>
Average-US excluded	22.8	27.8	29.3	33.4

<sup>a</sup> 1970-1983

<sup>b</sup> 1970-1982

Source: Lipsey and Kravis, [12, pp. 47-50]  
United Nations System of National Accounts

Lipsey and Kravis also argued that capital goods are cheaper relative to other goods in the U.S. than they are in many other countries. As a result, even with higher savings rates, investors in those other countries can not purchase as many investment goods as can investors in the United States.

Finally, Lipsey and Kravis consider a criticism that the U.S. funnels excessively large shares of its saving into residential construction and consumer durables, while other countries channel their saving into more productive forms of investment, such as machinery and equipment. They conclude that "... the share of capital formation going into residential building has not been exceptionally high in the United States.<sup>23</sup> ... [Also], the share of producer durables ... in conventional capital formation was above average in the U.S." [13, pp. 41-2] This view is shared by Tatom [20], who has argued that U.S. investment in equipment in the eighties was quite strong, especially in the first half of the decade.

### Can On-the-Job Training be Ignored?

Lipsey and Kravis's conclusion about the narrowing of the differential between the U.S. and the Japanese savings rates after adjustment for human capital investment might well have been reversed if their study had included on-the-job training. Jacob Mincer and Yoshio Higuchi [15] recently reported the results of a massive study of differences in training in Japan and the United States that used microdata from the Panel Studies of Income Dynamics for the United States, and microdata from the "Employment Structure Survey" for Japan.

The Mincer and Higuchi study began with two observations: (1) that workers in Japanese firms have lower turnover rates than workers in U.S. firms and (2) that wages of workers in Japanese firms tended to rise more rapidly with years of tenure than did wages of workers in U.S. firms. They then showed that lower worker turnover rates were not cultural traits peculiar to Japanese workers, noting that the very low turnover rates in Japan are postwar phenomena, and that turnover rates and wage profiles for American workers in Japanese plants located in the United States were similar to those of Japanese workers in Japan. Both the lower turnover rates and the higher wage profiles, they argued, stemmed from Japanese firms' on-the-job training programs.

<sup>23</sup> Seven of fourteen countries studied (Belgium, Denmark, Finland, France, Germany, and Italy) had higher shares over 1960-1984.

Mincer and Higuchi then argued persuasively that the more intensive formation of human capital on the job in Japanese firms resulted from those firms being forced to cope with rapid technological change in the post-World War II period. They reached that conclusion for the following reasons:

- (i) There were strong reductions in turnover during the 1950s, when economic growth accelerated. ... (ii) There was a lack of deceleration in the wage profile of mature workers relative to younger workers in Japan—suggesting continuous training and retraining processes characteristic of rapid technological change. (iii) There were larger declines in wages of workers in Japan who interrupted their labor force participation for several year periods than in the wages of comparable U.S. workers. [15, p. 124]

Finally, they observed that research using U.S. data also suggested that the more rapid the productivity growth in an industry, the greater the demand for education and training.

The Mincer-Higuchi study, therefore, has rather disturbing implications about the future prospects of the U.S. economy relative to those of the Japanese economy. Even if Lipsey and Kravis are correct in arguing that the U.S. invests more of its GNP in education than does Japan, the Mincer-Higuchi study implies that the U.S. expenditures may not be as efficient in forming usable human capital and promoting productivity growth.

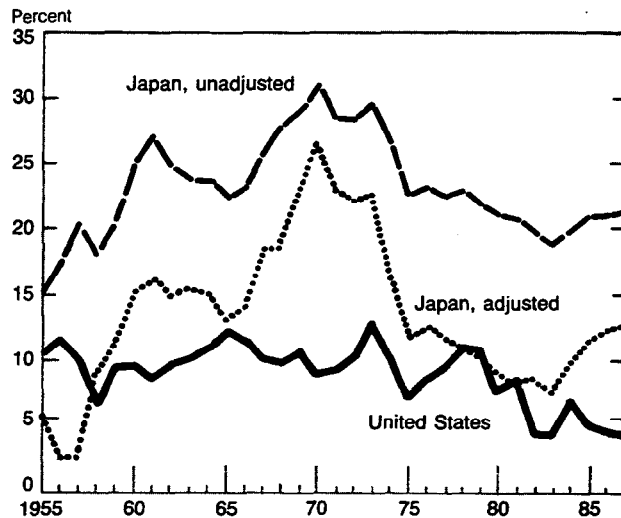
### Is Japan's Savings Rate High?

Fumio Hayashi shows that the Japanese national accounts value depreciation at historical cost, while it is valued at replacement cost in the U.S. national accounts. Relative to the U.S., therefore, Japanese saving is overstated by the amount of the difference between depreciation at historical cost and depreciation at replacement cost. He also notes that the U.S. national income accounts fail to recognize government capital formation, while the Japanese accounts, following the UNSNA, do.

Hayashi reconciles the U.S. and Japanese accounts by changing the Japanese depreciation data to a replacement cost basis and by making Japanese government saving correspond to the NIPA definition of U.S. government saving. These adjustments make a very large difference in the Japanese saving rate.

Chart 10, which is taken directly from Hayashi's article, illustrates the difference in the unadjusted and adjusted savings rates for Japan. It shows that, adjusted for accounting differences, the national saving rate in Japan rose substantially from 1955 to

Chart 10  
**NATIONAL SAVING RATES**  
 (as Percent of Net National Product)



Note: Reprinted from NBER Working Paper No. 3205, p. 27, Fumio Hayashi.

1970 but after that time it began to decline, finally converging with the U.S. rate by the late 1970s. As Hayashi states:

To people unaware of the differences in national income accounting, the discrepancy between Japan's unadjusted saving rate and the U.S. rate appears quite substantial—even ominous. But by now it should be clear that most of the apparent discrepancy is due to accounting differences between the two countries. [8, p. 5]

Hayashi concluded that “the phenomenon of high Japanese saving rate is limited to the period of 1965-1975” [9, p. 7]. Japan's relatively high savings rates in that ten-year period presumably came about in response to Japan's efforts to reconstruct its capital stock, which had been severely damaged in World War II.

As the chart shows clearly, however, after 1980 the adjusted savings rate for Japan began to rise again while the U.S. saving rate continued to fall. Hayashi discounts the divergence in the rates since 1980, however, arguing that since Japan's reconstruction was completed in the early 1980s, the Japanese and U.S. savings rates should converge in the future.<sup>24</sup> This prediction is debatable.

<sup>24</sup> To explain the divergence in savings rates since 1983, Hayashi offers two competing explanations. The first is that, owing to the U.S. dollar's post-1983 depreciation against the Yen, the Japanese have been saving more to offset capital losses and diminished rates of return on their holdings of U.S. bonds. This explanation assumes that the Japanese wish to maintain a constant wealth-to-income ratio. The second explanation is that the divergence stems from differences in the two countries' budget policies.

Lawrence Christiano [4] examined the analysis underlying the Hayashi “reconstruction” hypothesis in an article immediately following Hayashi's in the Federal Reserve Bank of Minneapolis's *Quarterly Review*. He concluded that the Hayashi hypothesis, with its implications about the future convergence of savings rates in the U.S. and Japan, was not implausible, but he argued that further verification would be required before it could be accepted.

### Costs of Capital as Determinants of Investment Spending

McCauley and Zimmer, as noted earlier, found that the cost of capital was lower in Japan and Germany than it was in the United States and the United Kingdom. They investigated, and subsequently rejected, differences in income tax structures as important determinants of the relatively low cost of capital in Japan and Germany. Rather, they attributed the “cost of capital gap” to two basic factors: (1) Japanese and German households are thriftier; and (2) the Japanese and German economies face lower risk from economic instability. These two factors will be examined in turn.

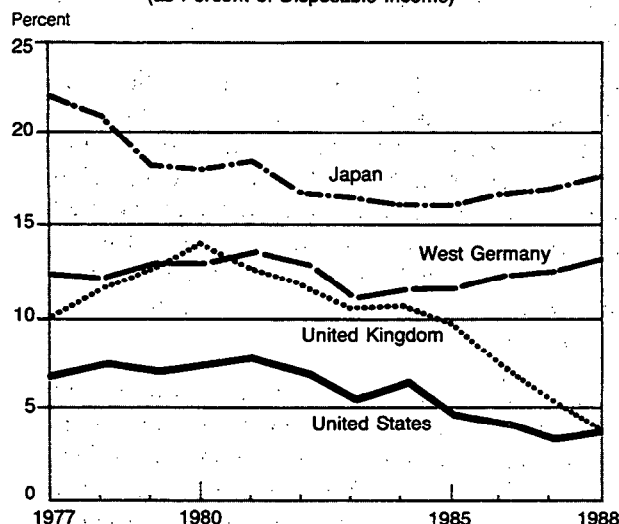
Chart 11 demonstrates the differences in thriftiness. Household saving amounted to about 17 percent of disposable income in Japan and 13 percent in Germany in 1988, but only about 4 percent of disposable income in the U.S. McCauley and Zimmer attribute much of the cross-country difference in thriftiness to cross-country differences in the availability of consumer credit.

Chart 12 demonstrates the differences in household debt as a share of disposable income across the four countries. This chart shows a much higher (though narrowing) use of credit in the U.S. and U.K. than in Japan and Germany. McCauley and Zimmer cite a report by the President's Commission on Industrial Competitiveness that “. . . juxtaposed ‘low interest rates on business debt’ in Japan with a two-tier, regulated rate structure in which interest rates are far higher on consumer loans than on business loans.” [14, p. 18] They conclude that “. . . the Japanese and German financial systems formerly did not pump much credit to consumers but now circulate credit more evenly, though American and British consumers may still enjoy a stronger flow.” [14, p. 18]

McCauley and Zimmer also attribute the lower cost of capital in Japan and Germany to more stable rates of GNP growth (particularly in Japan) and lower rates of inflation. They argue that as a result of this

Chart 11

### HOUSEHOLD SAVING RATES COMPARED (as Percent of Disposable Income)

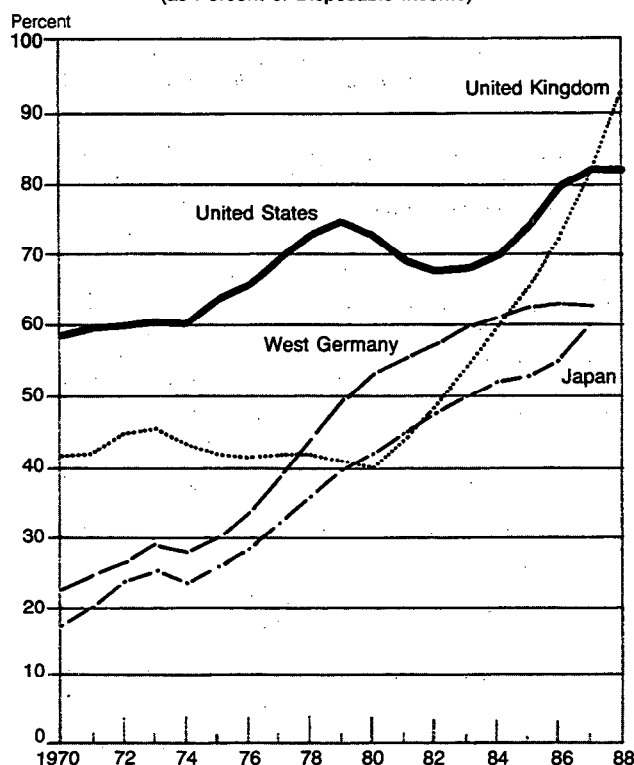


Source: Organization for Economic Cooperation and Development.

Note: Reprinted from Robert N. McCauley and Steven A. Zimmer, "Explaining International Differences in the Cost of Capital," *Federal Reserve Bank of New York Quarterly Review*/Summer 1989, p. 17.

Chart 12

### HOUSEHOLD DEBT (as Percent of Disposable Income)



Source: Organization for Economic Cooperation and Development.

Note: Reprinted from McCauley and Zimmer, (see Chart 10), p. 18.

economic stability, and relatively close relations between nonfinancial corporations and banks, Japanese and German firms are able to use less expensive shorter-term floating-rate debt, while U.S. firms must regularly issue long-term fixed-rate debt to insure against inflation-caused rises in short rates.

### Public Investment Spending in the Group of Seven

David Aschauer [2] points out that while private savings and investment levels are important determinants of economic growth, another determinant exists—the share of government spending devoted to public investment.

Aschauer follows the U.N. System of National Accounts in distinguishing between public investment and public consumption. He therefore treats public purchases of nonmilitary investment-type goods as public investment. Public investment thus defined includes such things as roads, highways, dams, water and sewer systems, mass transit, airport facilities, port facilities, etc. Aschauer argues persuasively that these kinds of expenditures have “positive direct and indirect effects on private sector output and productivity growth.” [2, p.17]

Aschauer finds that the United States used a far smaller percentage of its gross domestic product for public net (of depreciation)<sup>25</sup> investment in the 1967-85 period than any other of the Group of Seven industrialized countries. The differential between Japan and the U.S. is especially striking. Japan used 5.1 percent of its GDP for public net investment over the 1967-85 time period, while the U.S. used less than one percent.

## VIII. CONCLUSIONS

Abramovitz argues that the slower rate of productivity growth in the U.S. is an understandable implication “. . . of a process of international productivity catch-up and convergence that is, in certain conditions, natural and foreseeable and, in the long-run sense, desirable. Desirable not only for the countries that are catching up, . . . but also desirable for the . . . United States.” [1, p. 1]

In the same vein, Lipsey and Kravis argue that the U.S. savings rate, while not stellar, is not too bad, and they conclude that “. . . Americans are not

<sup>25</sup> Aschauer does not adjust for cross-country differences in definitions of depreciation.

significantly less forward-looking than people in other countries." Hayashi also concludes that after adjustment, net savings rates in Japan and the U.S. are not too different.

Mincer and Higuchi, on the other hand, show that Japanese firms use managerial policies that promote better human development and more rapid worker acceptance of technological advances. They argue, furthermore, that the Japanese firms adopted these policies out of necessity after World War II, and that U.S. firms are not likely to change their policies toward human investment unless they are forced to do so for one reason or another.

McCauley and Zimmer and Aschauer also reach gloomy conclusions. McCauley and Zimmer conclude that "... a considerable gap in the cost of capital between the United States and Great Britain, on the one hand, and Japan and Germany, on the other, is likely to remain open." [14, p. 25] Aschauer concludes that too much of U.S. governmental spending goes into public consumption. He expects the United States to continue to have relatively slow growth unless the government increases its public investment expenditures.

Abramovitz and others have pointed out that investment in human capital and expenditures for research and development may well be the key to the future economic growth of the U.S. relative to that of other countries. Investment in human capital is difficult to measure, however, even within one country over time.

Many economists (including Abramovitz and Lipsey and Kravis) use either years of education or educational expenditures as proxies for investment in human capital, but real monetary expenditures for education or years of schooling may not capture the quality of education provided. For example, countries that have relatively minor problems with drugs and violence in the schools may provide the same levels of education more efficiently than countries with major drug and violence problems. Also, as Mincer and Higuchi show, on-the-job training may do more than traditional forms of educational expenditure to increase human capital in times of rapid technological change.

Given these alternative interpretations, what can one conclude about the U.S. rate of saving and investment? Is the savings crisis a "chimera," as Paul Craig Roberts writes in *Business Week*, or is it real, calling for a national nonpartisan effort, as Louis Rukeyser argues? No categorical answer emerges, but

there is probably an element of truth in some of the lamentations about the outlook for future economic growth in the U.S. relative to that of its stronger rivals.

On the other hand, as was shown in the first part of this paper, virtually all of the debate about the existence or extent of a saving shortage in the United States is based upon NIPA data, and the so-called shortage does not show up in savings rates derived from alternative national accounting systems. Eisner, Roberts, and Samuelson are thus also correct in pointing out that the concern about the savings crisis is overblown.

In any event, the remedy for slow economic growth in the United States is clearly not as simple as raising the conventionally measured savings rate. In fact, a number of endeavors that would increase future economic growth, such as directing more government spending toward infrastructure items and toward human capital (improving the education and training system and promoting public health and safety), actually would *lower* the conventionally measured savings rate.

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