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GOLD: A FORWARD STRATEGY

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DEPARTMENT OF ECONOMICS

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Princeton, New Jersey

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## GOLD: A FORWARD STRATEGY

It is difficult to imagine many men becoming emotionally excited over the "virtues" of an element, such as sulphur, lead, or nitrogen. Yet, element 79, gold, has aroused the passions of mankind for quite some time, leading many prominent men to now famous exclamations over the virtues and vices of this noble metal. Pliny the Elder (23-79 A.D.) wrote: "Would that gold could have been banished forever from the earth, accused by universal report, as some of the most celebrated writers have expressed themselves, reviled by the reproaches of the best of men, and looked upon as discovered only for the ruin of mankind." Much later, in the heated political debate over bimetallism at the end of the 19th century, William Jennings Bryan injected the oft quoted words: "You shall not crucify mankind upon a cross of gold." More recently, in 1968 and on the opposite side of the coin, the President of France, General Charles de Gaulle, proclaimed: "A monetary system based on the foundation of gold, which is alone in having the character of immutability, impartiality, and universality, should therefore be applied."

If the monetary experts, theoreticians, and politicians who have been intimately associated with the international monetary crisis over the past few years were to express candidly their pent-up feelings on the topic of gold, it is a good bet that many would privately support the nearly 2,000-year-old position of Pliny. The question is whether, at the present juncture, gold is a blessing, a nuisance, a combination of both, or neither. Even more important, is there a forward strategy that could be implemented to provide a sound solution of the current problems associated with gold? This essay represents an attempt at a fresh and independent analysis of this controversial issue. First, we shall examine the market for gold, both the demand for gold and the production and supply of gold. Second, we shall point to some of the unique characteristics of gold in the international monetary system. Finally, we shall suggest certain principles of reform and submit a concrete proposal for consideration.

### THE DEMAND, PRODUCTION, AND SUPPLY OF GOLD

#### THE DEMAND FOR GOLD

In an analysis of the demand for gold one should distinguish between gold demanded for consumption and gold demanded for stockpiling. Gold bought for stockpiling can later return to the market, gold consumed cannot. The bulk of gold consumed, probably more than 75 per

cent, is for the manufacture of jewelry and for similar applications in art. The remainder of the consumption of gold is nearly equally divided between dentistry and industrial applications such as electronics, physics, and chemistry. Gold which is stockpiled can be divided into private stockpiling and official stockpiling for monetary reserves. Finally, the gold which is privately stockpiled could be subdivided further, according to intentions of the buyers, into short-term speculation, long-term speculation, hoarding for safekeeping, and hoarding for traditional reasons.

Purchases of gold, as well as the production of gold, will be measured here in physical terms—that is, in fine ounces per year—although some prefer to use the monetary value of the demand, which would be the physical quantities multiplied by the applicable price. The breakdown of the demand for gold is summarized as follows:

- (1) Consumption of gold
  - (a) Jewelry and art (approximately three-fourths of total consumption)
  - (b) Dentistry (approximately one-eighth of total consumption)
  - (c) Industry (approximately one-eighth of total consumption)
- (2) Stockpiling of gold
  - (a) Private
    - (i) Short-term speculation
    - (ii) Long-term speculation
    - (iii) Hoarding for safekeeping
    - (iv) Hoarding for traditional reasons
  - (b) Official for monetary reserves

The price elasticity of the demand for gold for use in jewelry may turn out to be positive. This is an anomaly; most commodities have negative price elasticities of demand. The demand for gold to be privately stockpiled fluctuates widely, partly because of the unusually large supply of gold available relative to consumption levels, which makes gold extremely vulnerable to speculative runs as expectations vacillate. The demand for monetary gold is artificial, in the sense that it depends upon political institutions, that is, the set of rules and practices in use among monetary authorities. Thus, the demand for gold turns out to be unique compared with other commodities and must be examined in greater detail before the role of demand in the market for gold can be properly assessed.

#### *Demand for Gold for Consumption*

In order to study the demand for gold that is consumed as a function of its price, each of the three major components must be analyzed sepa-

rately. First, consider the demand for gold currently used for jewelry and art, which accounts for somewhat more than 75 per cent of all gold consumed. That gold (rather than other substitutes such as plastics, other metals, and alloys) is used for artistic purposes, is due more to the prestige of gold than to its intrinsic physical properties. In the first few months of the two-tier system, with higher prices for gold on the private market and the resulting higher prices for gold jewelry, the first indications show that the quantity of gold demanded for jewelry may have gone *up*, reflecting the increased prestige of gold. It is interesting to note that the increased attention focused upon gold in this period seems to have had a stronger effect in increasing the demand for gem stones, and diamonds in particular (speculation and hoarding included), than for gold consumed for jewelry (speculation and hoarding largely excluded). Without this prestige effect, without the free publicity that gold has received, and without expectations of further price increases, the opposite result would have been expected.

It is also interesting to consider the possibility of a major drop in the price of gold, say to \$25 per ounce. The prices for gold jewelry would decrease only for the portion involving the gold content—the labor content is usually substantial—but the prestige of gold would suffer heavily so that an appreciable decline in the quantity demanded could be expected. Recent experience suggests that a relatively short time-lag exists for the psychological reaction of buyers of jewelry to respond to sudden changes in the price of gold. This behavior of the demand for gold jewelry can be described by stating that the price elasticity of demand for gold jewelry may be positive—that is, the quantity demanded may increase as the price rises and decrease as it falls—at least for price changes not too far from \$35 per ounce.

The responsiveness of the quantity of gold demanded for utilization in dentistry to changes in the price of gold is more difficult to assess. As in the case of jewelry, the gold content in the final price to the consumer is relatively low, with the labor content more significant. Why is gold preferred over other substitutes as a filling material for teeth? If gold is considered to be superior because of its physical properties, such as a more permanent filling or as causing less discoloration to filled teeth, then its price elasticity of demand should be relatively inelastic (that is, slightly negative corresponding to a less than proportionate decrease in the quantity of gold demanded for a small increase in the price of gold). On the other hand, if gold is preferred because gold-filled teeth have a prestige advantage over, say, completely white teeth that are filled with ceramic—a “cheaper” process—then a slight positive elasticity could be expected, the same as in the case for jewelry. Since both of these con-

siderations actually play a role in the preference for gold, the two weak effects could be expected at least partially to cancel each other out, leading to an almost completely inelastic demand (that is, with the price elasticity of the demand for dentistry nearly equal to zero, corresponding to practically no influence whatsoever upon the quantity demanded by small changes in the price of gold).

The other industrial applications of gold, such as for electrical contacts, chemical containers, etc., are normally for highly specialized uses where the cost of the raw material is relatively unimportant and comparable substitutes are not readily available. Therefore, this demand could be expected to be relatively inelastic—that is, with a conventional negative elasticity of a small magnitude.

The demand for gold to be consumed can also be analyzed in terms of income and substitution effects. Generally, as incomes and affluence increase from year to year, the demand for gold jewelry in particular increases (with other factors held constant). This means that the whole demand curve, as a function of price, is moving to the right with higher incomes. The income effects upon the demand for industry and other industrial applications are less marked and are actually determined more strongly by technological changes and innovations than by income effects.

The substitution of gold for competitive materials such as silver—or vice versa—in the manufacture of jewelry should be only weakly dependent upon changes in the prices of the competing materials but strongly dependent upon changes in the price of gold itself. Small changes in the price of silver would not be expected to influence greatly the substitution between gold and silver for the manufacture of jewelry for two reasons. First, the competitive position of gold is determined to a large extent by its decisive lead in prestige over silver and other materials rather than its physical characteristics, and this prestige advantage would not be influenced by small changes in the price of silver. Second, the raw-material component in the final price for silver jewelry is less dominant than for gold in gold jewelry (the labor costs are roughly the same) so that a small change in the price of silver would not change the margin between the price of gold and silver jewelry as much as the same per-cent change in the price of gold would. This hypothesis seems to have been supported by the events of the past year, where silver has seen a major price increase without appearing to have lost a measurable amount of its market to gold.

In the opposite direction, substitution for gold should be more substantial with changes in the price of gold, particularly in the downward direction, because the prestige of gold would be directly involved. In fact, as mentioned above, a drop in the price of gold could lead to a



*decrease* in the quantity of gold demanded for the manufacture of jewelry. However, if the price of gold were to drop sufficiently, gold would become competitive again in its own right, owing to its physical properties rather than to its artificial prestige, and the quantity of gold demanded would *rise* again.

### *Demand for Gold for Speculation and Hoarding*

The demand and the price elasticity of demand for gold for private stockpiling are difficult to analyze. Even if it may be impossible to distinguish exactly which purchases on the private market are for speculation and which for quasi-permanent hoarding, it is essential to distinguish between the two in any analysis of the demand for gold for private stockpiling.

The massive speculation in gold which we have observed recently has exhibited very unstable characteristics. The source of this instability in the gold market can be discerned when a distinction is drawn between the types of information which speculators and hoarders use as a basis for their decisions. One should differentiate between internal information, which consists of data on the behavior of the gold market itself, and external information about the underlying factors, primarily objective in nature but including also subjective expectations by the parties concerned. The unstable influence of speculation can be traced to the increased reliance of speculators upon internal rather than external information in their decision-making. The resulting instability of the composite market for gold can be traced to the additional factor of the increasing role of speculation (with its destabilizing influence), owing to the larger amounts of fluid international capital available for speculation.

This type of phenomenon can be described as being the result of excessive feedback. It is analogous to the result of placing a microphone too close to its loudspeaker. The microphone picks up not only the external signal but also the background noise and amplified signal from the speaker as well, which is amplified and put out by the speaker again even louder, only to be picked up again and reamplified. When a critical condition is reached where the feedback from the speaker dominates the external signal, the system is unstable; a relatively small external signal will initiate a loud roar, with an intensity which is quite independent of the external signal and which is determined rather by the energy-handling capacity of the system composed of microphone, amplifier, and speaker.

The criteria for judging whether a market is internally stable or unstable as a result of the effects of speculation are twofold. A qualitative criterion is based upon the ratio of speculators' reliance on external infor-

mation to their reliance on feedback or internal information about the market behavior. The nature of this criterion was perceived by Keynes in his distinction between *enterprise* and *speculation*, using the former for "the activity of forecasting the prospective yield of assets over their entire life" (external information), and the latter for "the activity of forecasting the psychology of the market" (internal information). Another, quantitative, criterion is based upon the ratio of the volume of transactions by speculators to the total volume of transactions on the market; this ratio is useful in measuring the ability of the market to absorb a destabilizing influence from speculation without becoming unstable itself.

A market may be thought of as an integrating mechanism that combines, through the interacting decisions of buyers and sellers, the evaluations by participants in the market of all external information together with the evaluations by speculators of the feedback of internal information from the behavior of the market. In this context, such general techniques as the one of "chart reading" are fundamentally dangerous, since they turn emphasis inwards—upon a feedback of information from the market itself. In a very simple version, the strategy of "buying when the price is rising on large volume or falling on small volume, and selling when the price is falling on large volume or rising on small volume" may make sense as a guideline for the individual speculator; however, when a significant fraction of market transactions are based upon similar criteria derived from the feedback of internal information from the market, the result will be an unstable market.

The gold market in London before March 1968 showed signs of instability of this type. Since the price was artificially supported, the volume of transactions played the primary feedback role of influencing bullish versus bearish expectations. After the creation of the two-tier system in March 1968, movements of both price and volume have become important components in the feedback of internal information from the market, as would be the case for most other markets. One symptom of the presence of instability of this type is that once the market is perturbed by external information—such as rumors of South African sales of gold, of potential Russian sales of gold, or of decisions by central bankers—the result is a sustained market movement out of proportion to that which could be justified from an objective accommodation to the external changes of conditions. The market for gold tends to amplify any perturbation originating externally as well as any random internal fluctuation.

In a market of this type, it is difficult to apply the concept of price elasticity of demand. Even going back one step further to the dynamic

concept of the "elasticity of expectations," one finds that this elasticity is also unstable. The problem lies in the fact that the demand for gold from speculation is not particularly dependent upon the price of gold in the market in the static sense, but rather upon the price trend in the dynamic sense. For example, a *higher* price for gold in the private market would not be likely to encourage significant buying or selling by speculators, whereas a *rising* price would be likely to generate expectations of a change in official monetary policy on gold, which would be favorable to a bullish position (whether justified by external factors or not) or at least a continuation of the trend, which would encourage increased buying. One concludes that dynamic models of adaptive processes would be most suited for quantitative as well as qualitative analyses of this problem.

Speculation can serve a useful function when it reduces the risks of future price changes for consumers and producers by smoothing the transitions in a changing market situation. Speculation assumes a disruptive role in a market when it becomes dynamically unstable through excessive feedback. Speculation in gold can be justified to the extent that it is based upon the expectation that the price of gold will have to change as a result of external factors, such as the international monetary situation. However, it cannot be justified to the extent that it has been based upon such expectations for a change in the price of gold as were derived from the internal information resulting from the effects of speculation itself upon the market.

Hoarding of gold is fundamentally different from speculation in gold. Hoarding for *safekeeping* involves the holding of part of one's personal wealth in the form of gold, independently of price expectations other than for at least a reasonably stable price. The motivations are diverse, such as the convenience from the concentration of considerable wealth (which makes it easier to hide and transport secretly), more often with the purpose of avoiding taxation or confiscation than for prevention of loss or theft.

Hoarding of gold, silver, other precious metals, and gems for *traditional reasons* reflects a way of life in the Near, Middle, and Far East. The predominant factor seems to be the lack of readily available alternatives for storing one's wealth, such as local bank accounts, access to foreign bank accounts, and local securities markets. Even as new opportunities for investment do become available, tradition may slow the transition to these new forms. Traditions such as inheritance laws and the right of a woman to own and hold precious metals and gems (separate from her husband's property) often play a major role. Local customs and social prestige often place emphasis upon visible wealth in the

form of ornate to very crude jewelry, with less prestige being associated with less visible forms of wealth such as bank deposits, stocks, and bonds.

It is generally presumed that both types of hoarding are relatively insensitive to either the price of gold (static) or to changes in the price of gold (dynamic) in contrast to speculation, which is very sensitive to actual and expected changes in the price of gold. Hoarding seems to be influenced primarily by factors outside the gold market, so that the rate of hoarding or dishoarding is relatively independent of the price in the gold market.

Hoarding of gold for purposes of safekeeping rests on the fact that a large value in terms of money is contained in a small physical volume and therefore can be more easily hidden or guarded from burglars and confiscators. Still, there must also be an assumption that gold will not drastically depreciate and thus will satisfactorily serve the function as a "store of value." Hence, expectations about the future of gold are tacitly presupposed even on the part of hoarders for the purpose of safekeeping. Expectations for a highly unstable and possibly lower price for gold would significantly reduce this category of gold-hoarding by encouraging the hoarding of substitutes with more attractive prospects. Other metals may qualify, and also gems, which however have the disadvantage of having a less sharply defined market value for quick convertibility. In view of the constant dollar-conversion value of gold since 1934—which means that the conversion value of gold with respect to other commodities has been falling steadily with the inflation of the dollar—hoarding gold would not seem to be a rational course of action for most people in the economically advanced countries of the world today. Even for such aims as tax evasion, there are undoubtedly more profitable and equally liquid ways of holding wealth, such as in numbered bank accounts and foreign securities. The rationality or irrationality of gold-hoarding depends on two diametrically opposed possibilities: that gold will be demonetized and its price will fall and, the opposite, that more gold will be bought by monetary authorities at a drastically increased price. It is difficult to say which of the two developments is more probable in the long run.

The demand for gold to be hoarded for traditional reasons is also changing. This demand may turn out to be more sensitive to the price of gold (static), with a conventional negative price elasticity of demand, than has been generally presumed. For example, with the significant increase in the world price for silver in the past two years, an unexpectedly high rate of dishoarding from countries such as India was stimulated, which moderated the increase in the price of silver. It is likewise conceivable that a significant increase in the price of gold in the private

market could stimulate substantial dishoarding of gold from the Near, Middle, and Far East, since the traditional motivations for hoarding in the region are quite similar for gold and silver.

More important than the price of gold in the private market, social and economic change in this region can be expected to influence the rate of hoarding or dishoarding. With the growing international interest in the development of this underdeveloped region, increased attention has been brought to bear upon the problem of capital formation. One of the standard problems is that whatever savings have been accumulated locally are normally applied either to hoarding of precious metals and gems or to investments abroad rather than to productive investment at home. The wealthier class seems to view American and European investments as being more profitable, more prestigious, and safer than local investments. It has become apparent that considerable amounts of domestic savings must be used for domestic development if a reasonable rate of economic growth is to be achieved.

Two examples can be cited of positive actions which have recently been taken to correct this situation. First, the Lebanese government ordered a six-month study in March 1968 to find ways of revitalizing the stock exchange in Beirut. Two of their relevant goals are to increase the number of local securities listed (from 46 in 1965 to a much larger fraction of the approximately 1,250 registered corporations in Lebanon) and to increase the prestige of local investment possibilities. If this initiative is even partially successful, it should set a precedent for initiating a diversion of local capital from the hoarding of gold for traditional reasons into socially and economically productive outlets. As a second example, the World Bank has just set an interesting precedent with a \$42 million bond issue floated in Kuwait in August 1968. This bond issue establishes a precedent for allowing people in developing countries, who are unwilling to invest directly in their local development, to invest in an international body which in turn can reinvest locally, providing by means of financial intermediation an indirect channel of local investment for these people. With measures of this type, one sees a tendency of both local governments and the international community to put pressures upon the traditional hoarders to put their capital to more productive uses. Such measures may be expected to reduce the hoarding of gold in this region, quite independent of the price of gold in the private market for gold.

It is, of course, difficult to separate transactions in gold in the private market by motivation into those due to speculation and those due to hoarding. In particular, it would be most interesting to know, in the period since March 1968 when gold consumption has been met almost exclusively by sales from private stockpiles, whether dishoarding has

played a significant role or whether these sales have been primarily by speculators. In comparing the demand for gold for private stockpiling with the demand for gold for consumption, it must be remembered that the former fluctuates over an appreciably greater range than the latter. Consumption of gold is relatively stable, growing at a steady rate attributable to increasing affluence. In a period of only six months (from October 1967 through March 1968) it has been estimated, approximately 86 million fine ounces (\$3 billion, at \$35 per ounce) were purchased by speculators and hoarders, and it is estimated that approximately 570 million fine ounces (\$20 billion, at \$35 per ounce) are privately held. This compares with current industrial consumption of only 17 million fine ounces (\$600 million, at \$35 per ounce) in 1967.

### *Demand for Gold for Monetary Use*

Transactions in gold between monetary authorities and the other participants in the market for gold are artificially determined according to the particular rules in force at a given time. A few models will be discussed briefly to illustrate how the demand for monetary gold as a function of price can be influenced by official policy and monetary agreements.

*Model 1: The market from 1961 until March 1968.* During this period, the price of gold was supported rigidly at \$35 per ounce. It is often said that the demand for monetary gold is infinitely elastic with a fixed price. Actually, the quantity purchased by monetary authorities was exactly equal to the finite amount left over after the private demand had been satisfied from the supply of new gold; occasionally, and particularly between November 1967 and March 1968, the demand by monetary authorities was not effective at all and monetary gold was sold as private demand exceeded the supply of new gold.

This system had the advantage of providing the maximum conceivable stabilization for the price of gold, but it was subject to two major criticisms. First, it was vulnerable to bullish speculation on a price increase. When the amount of international "hot money" that was available for speculation became larger than the amount of the monetary gold that central banks were willing to sell to keep the price of gold from rising, speculators were in a position to break the system in a bull market. In the other direction, as long as the central banks were willing to buy all of the privately held gold at \$35 per ounce offered to them, which still seemed to have been the case through March 1968, the system was still stable against a bear run.

The second objection raised was that monetary authorities had no control over the total amount of gold available for international monetary purposes. If gold really played a useful function as a currency