

IMF WORKING PAPER

© 1991 International Monetary Fund

This is a working paper and the author would welcome any comments on the present text. Citations should refer to an unpublished manuscript, mentioning the author and the date of issuance by the International Monetary Fund. The views expressed are those of the author and do not necessarily represent those of the Fund.

WP/91/120

INTERNATIONAL MONETARY FUND

Treasurer's Department

The Structure and Operation of the World Gold Market

Prepared by Gary O'Callaghan 1/

Authorized for Distribution by Orlando Roncevalles

December 1991

Abstract

This paper describes the structure of the world gold market, its sources of supply and demand, and how it functions. The market has three principal functions in three major locations: the New York futures market speculates on spot prices, which are largely determined in London, whereas physical gold is in large part shipped through Zurich. The market is dominated by large suppliers and gold holders, including monetary authorities. Some unique characteristics of the gold market ensure confidentiality, and as a result, there are gaps in existing knowledge and data. The paper identifies and attempts to fill these gaps.

JEL Classification Numbers:

G29, L72, N50

1/ The author is grateful to Samir Fawzi, Simon Nocera, Orlando Roncevalles, George Tavlas, Subhash Thakur, David Williams, Günter Wittich, and other current and past members of the Financial Relations Division for many useful comments and suggestions. In addition, a number of gold market analysts provided useful information and advice on individual points, but none should be held responsible for remaining errors and omissions. These include: Jeffrey Christian, Timothy Green, Philip Klapwijk, George Milling-Stanley, and Richard Scott-Ram. The painstaking editorial assistance of Mrs. Ella Wright is greatly appreciated. The opinions expressed are the sole responsibility of the author and do not necessarily reflect those of the International Monetary Fund.

<u>Contents</u>	<u>Page</u>
Summary	iv
I. Introduction	1
II. Market Agents and Instruments	2
1. Agents and instruments of the physical gold market	2
2. Paper gold instruments	5
a. Gold futures	6
b. Gold options	6
c. Gold warrants	7
d. Gold leverage contracts	8
e. Other forms of spot paper gold	8
III. Physical Stocks and Flows	9
1. Annual demand and supply	9
2. Composition of existing stocks	13
3. Annual supply to bullion markets	17
IV. Bullion Markets, Trading, and Price Setting	21
1. The London bullion market and gold fixings	26
2. Zurich Gold Pool and gold price	26
3. Hong Kong bullion market and price fixing	28
a. Loco-Hong Kong fixing	29
b. Loco-London pricing	29
4. New York bullion market	30
5. Singapore bullion market	30
6. Other bullion markets	31
a. Continental Europe	31
b. The Middle East	32
c. India and the Far East	33
d. Other American markets	33
7. Markets in derivative physical instruments	33
a. Gold loans	33
b. Gold swaps and forward sales	35
V. Paper Markets and Prices	36
1. Futures and options exchanges	36
a. COMEX	37
b. Other Exchanges	40
2. Over-the-Counter options and "exchange for physical" transactions	40
VI. Summary and Concluding Remarks	42

<u>Contents</u>	<u>Page</u>
Appendix I: Conversion Factors and Purity Standards for Gold	44
Appendix II: Note on the Official Reporting of Gold Flows	45
1. Fund practice and recommendations	45
2. Reporting gold flows through Switzerland	45
3. Reporting gold flows through the United Kingdom	46
References	49
Text Tables	
1. Annual Bullion Supply and Demand, 1985-89	12
2. Distribution of Holdings of Cumulative World Gold Production, December 31, 1989	14
3. Estimated Composition of Supply and Demand in World Bullion Markets, 1989	18
4. Financial Gold Flows Through the United Kingdom, 1960-89	23
5. Gold Flows Through Switzerland, 1968-89	24
6. Active Gold Futures and Options Contracts in 1989	38
7. Tick Sizes and Contracts Traded on Paper Gold Exchanges	41
Charts	
1. Gold Prices, 1968-90	2a
2. Gold Bullion: Supply and Demand, 1968-89	12a

I. Introduction

In spite of gold's historical monetary significance, a freely functioning world market for gold has just recently come of age. The gold market had functioned more as a distribution mechanism than as a price-setting device when the price of gold was maintained by monetary authorities at a predetermined level. However, market forces assumed a driving role on March 15, 1968, when a two-tier market for gold was established. For a time, central banks refrained from dealing in gold on the new free market, but agreed to transact in gold among themselves at the then official price of \$35 per fine ounce. However, the two-tier market came to an end when the U.S. dollar's convertibility into gold was formally suspended in August 1971, and this effectively took away gold's pivotal role in the international monetary system. Since then, a global market for gold as an asset in its own right has developed, remaining open around the clock and using a full range of derivative paper instruments. In this market, the price of gold has been very volatile, having risen to a high of \$850 an ounce in January 1980 and fallen below \$285 an ounce in February 1985, and since then trading in a range above \$350 an ounce (see Chart 1).

As an instrument for private investment, gold has generally been viewed as a hedge against currency inflation or devaluation and as an object of "safe-haven" investment. Although some analysts periodically doubt the importance of gold in this regard, 1/ the prominence given to the gold market in the financial press, where daily price movements are generally reported prominently, suggests that gold remains an asset whose price and investment performance is widely monitored. Moreover, despite the fact that gold's historical significance as a monetary anchor has passed away, it retains its importance as an official reserve asset, with some 40 percent of the world's monetary reserves (at market valuation) still held in the form of gold. 2/

There is a wealth of published information available on different aspects of the gold market, including numerous studies on its efficiency. 3/ This paper attempts to integrate the available information on the working of the market, thereby identifying gaps in the availability of data, and delineating the complementary roles played by the

1/ For example, see Gulley (1991), Kuhn (1990), P. Moore (1990). For a contradictory opinion, see Conger (1990), Chua, Sick, and Woodward (1990), G. Moore (1990), and Temple (1990).

2/ Several proposals have been made to return to some form of a gold standard. The most recent proposal in September 1987 came from James A. Baker, then Secretary of the U.S. Treasury. Chairman Alan Greenspan of the Board of Governors of the U.S. Federal Reserve System, supported the usefulness of the price of gold in a broad-based commodity index. See McNamee (1987), Baker (1987), and Greenspan (1988).

3/ Recent studies by Followill and Helms (1990), Melvin and Sultan (1990), Ogden (1990), and Poitras (1990) indicate that there may be some inefficiencies on paper markets. Aggarwal and Soenen (1988) find that the London Bullion Market operates efficiently.

various submarkets. In this regard, the gold market has some unique characteristics. For example, the Zurich Gold Pool operates at a set daily price at which it may have excess demand or supply. Any such excess will then be transmitted to the London fixing. This mechanism serves to disguise the magnitude of physical flows through Switzerland, which is the major entrepôt for physical gold. In such a context, the paper provides a framework that could be of use in filling gaps in information, and thereby also provide a basis for further research. The paper deals with questions that often arise as to what are the relative sizes of physical and paper trading centers, what influences the flow of physical gold, where it is stocked, who now holds it, and how much is there.

The paper is organized as follows. The market participants and their instruments are described in Section II. The composition and origin of physical stocks and flows, with their market destinations, are outlined in Section III. Sections IV and V describe the operation of bullion and paper gold markets, respectively, and Section VI contains a summary and some concluding remarks.

II. Market Agents and Instruments

The market for gold consists of (1) a physical gold market, in which gold bullion or coin is transferred between market agents, and (2) a paper gold market, which involves trading in claims to physical stocks rather than in the stocks themselves. 1/ Both markets are closely linked by arbitrage and the possibility of participants being forced to satisfy the claims of paper gold physically, and paper gold prices are keenly affected by developments in the market for physical gold, where unanticipated changes in fundamental demand and supply are first detected.

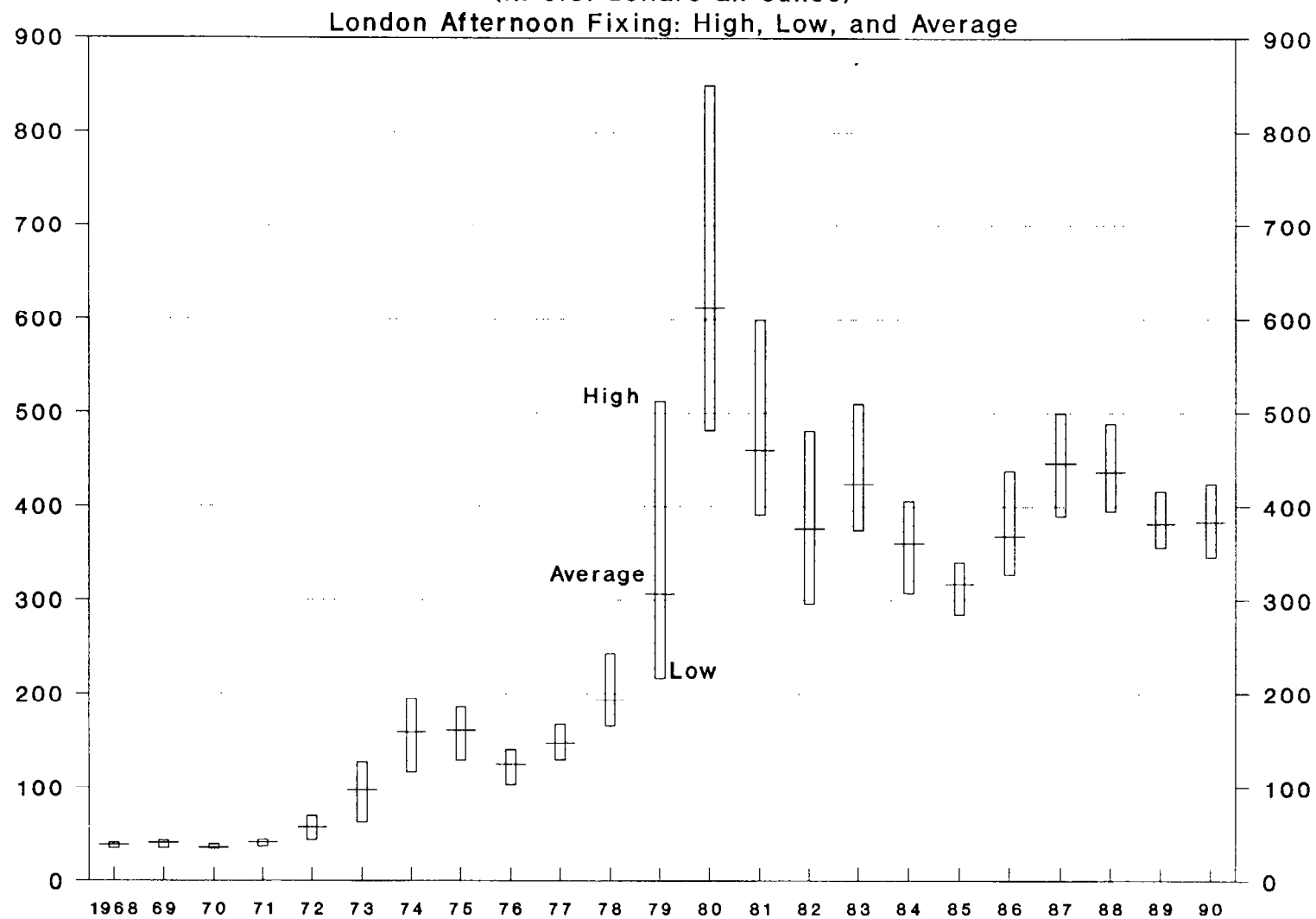
1. Agents and instruments of the physical gold market

Physical gold is principally traded in the form of bullion, but official and imitation gold coins, medallions, and jewelry (especially that of low fabrication quality but of high gold content) are also actively traded. However, because gold must first be formed into bullion, and must later be transformed for these other markets, this study is concerned purely with the market for gold bullion. 2/ Gold bullion is assumed to refer

1/ Forward sales in the physical market, while they involve a future claim on bullion, are agreed between two principals and as such are not tradable.

2/ The markets for coins and other physical forms of gold are important in the sense that demand is closely linked to bullion prices, and their supply is just one step away from becoming a supply of bullion; accordingly, their existing stocks are included in this paper with bullion stocks. However, when considering market flows, inclusion of flow supply and demand in the coin market would necessarily involve double counting.

Chart 1
GOLD PRICES 1968-90
(In U.S. dollars an ounce)



Source: Data provided by the World Gold Council.

to gold that has been formed into bars, either in crude doré form (80 percent fine) as treated at the mine site, or as defined by weight and greater fineness and authenticated by the stamp of a recognized refinery. Each of the major markets defines an acceptable measure of weight and fineness for "good delivery" in that market, with some variations. Weights range from 1 kilogram (32.151 troy ounces) to 400 ounces. When refined, gold bars generally consist of between 995 and 999 parts of gold per thousand (i.e., between 99.5 and 99.9 percent fine). 1/

Bullion markets generally serve as a conduit between large gold suppliers (such as producers, refiners, and central banks) and smaller investors and fabricators. 2/ The physical gold market is essentially a spot market, but it is complemented by the use of forward trading for the hedging of physical positions. 3/ Trading is interoffice (or off-the-floor), with prices quoted by individual traders (except in the case of a fixing, when agents come together to agree on a price). Market participants comprise bullion dealers, who act as principals, adopting open positions in the market; brokers, who close their positions by either matching transactions for a commission or simultaneously buying and selling on a spread; and bullion bankers, who finance these transactions. However, many gold houses combine these functions. Also, dealers generally either have their own refining capacity or have it available to them.

Bullion dealers usually put a floor on the price offered to their suppliers from the mining industry, whether it is the spot price or some mutually agreed forward price, with the funds being made available to the mining company as refined gold is issued to the dealer's account. These positions are normally hedged by the dealer through forward sales near the spot price or by short sales on the futures market, depending on the floor

1/ One carat is 41.667 parts of gold per thousand parts of alloy, so that refined bullion is close to 24 carats. See Appendix I on gold market conventions.

2/ Much of what follows is adapted from Kettell (1982, Chap.6) and Sarnoff (1987, Chap.5).

3/ The essential difference between forwards in physical gold and paper futures contracts is that the counterparties to forward transactions are principal-to-principal, while transactions in futures contracts are cleared centrally through an exchange (see section 2.a below). This makes for greater flexibility in forward transactions: Forwards have flexible delivery dates, while futures have one delivery date for each contract; forwards are financed by credit lines that allow for easier administration than those in the highly-gearred margin financing of futures contracts. Forwards are also confidential, while disclosure requirements are set by futures exchanges. Futures contracts are, however, very liquid. For these reasons, the futures market is dominated by speculative trading, while the forward market is used by large operators to hedge their positions in physical gold. For these and further details, see Shearson Lehman Hutton (1990, p.103 ff.).

price offered. Forward sales, in turn, guarantee a price ceiling for the dealer's customer, and the dealer may require that a margin be paid if the gold price drops prior to delivery. However, dealers and bullion banks also provide gold to their customers in the wholesale jewelry industry on consignment, whereby the jeweler buys the bullion content of the finished goods only when the goods are received from the fabricator and priced to retailers, rather than prior to fabrication. This allows jewelry wholesalers to avoid tying up capital during fabrication and to hedge their bullion transactions while guaranteeing a value added in fabrication.

Two of the main disadvantages of investing in and holding gold (as opposed to a financial instrument) are the significant storage and security costs involved and the fact that holding gold does not bear interest. For these reasons, many large-scale gold holders who do not wish to liquidate their stocks, but do want to make better financial use of them, arrange to relinquish them temporarily. In the interim, these erstwhile gold holders can use the funds secured in parting with their gold to acquire and hold interest-bearing instruments. One obvious method for accomplishing this is to sell gold on the spot market and then buy gold back on the same market at some time in the future. However, as such a strategy would be open to the possibility of an interim increase in the gold price, it is usually regarded as being too risky. Another strategy that can be undertaken in the physical gold market is to hedge against adverse price movements by making a spot sale and forward purchase simultaneously. In this case, the difference is that although one is protected from the possibility of a price rise prior to repurchase, one will not reap a windfall gain if prices fall.

Each of the strategies outlined above has the disadvantage that it involves relinquishing the ownership of gold stocks, albeit with the intention of replacing them. For those holders of gold, principally central banks, who may be constrained in their latitude to sell reserves but want to utilize their gold stocks without relinquishing ownership, a market in gold loans has developed since the mid-1980s. These loans involve a transfer of bullion to the borrower and earn a relatively low rate of interest for the lender, who is repaid in physical stocks over time at a predetermined maturity (usually of 4-6 years, with an initial grace period of 1-2 years). The borrowers in this market are typically gold producers who immediately sell the gold they have acquired on the spot market and thereby gain the cash to finance production at a relatively low rate of interest while securing a natural hedge against any future reduction in gold prices. Producers have greater access to capital in this form because their ability to repay a loan denominated in terms of units of gold will not be diminished by adverse movements in the price of gold. Central banks and other lending institutions, which have a primary interest in having gold stocks returned and do not want to adopt an open position in the market, feel more secure in the knowledge that the quality of their physical loans is not affected by price movements in the spot market. This is because the bullion banks, which act as intermediaries in this market, take exactly offsetting long and

short positions in terms of physical gold. ^{1/} There is also a market in short-term loans in which bullion dealers sometimes obtain loans from bullion banks in order to cover the time interval between delivery to a market and an expected inflow from another source.

Some large-volume holders of gold, who have an interest in utilizing some of their stocks but whose direct participation in the spot market could have an adverse effect on prices, have chosen instead to engage in gold swaps. This type of transaction applies in particular to the U.S.S.R. and the South African Reserve Bank. Gold swaps involve the transfer of bullion to a dealer in exchange for currency, with an agreed forward price at which the gold will be repurchased when the swap comes due (usually 12-13 months). At that time, the swap can either be renewed or terminated (in which case the bullion is returned to the original owner) or the gold can be transferred to the bullion dealer and either added to the dealer's reserve or sold on the spot market. While the net effect of this transaction is similar to a simultaneous spot sale and forward purchase of gold, the difference is that the counterparties on each side are the same, so that an inter-dealer market transaction is avoided, with no direct effect on the market. An implicit interest rate is charged because of the difference between the agreed spot and forward rates, but for this the gold holder is able to acquire cash against gold collateral.

The term "gold swap" has become synonymous with the type of transaction described above, but it may also be used to describe swaps of gold of different fineness or at a different location between dealers and others engaged in the market. Such swaps are relatively easy to effect, and they reduce significantly the transaction costs involved in meeting the different needs of customers and the requirements of markets. In particular, loco-swaps allow gold that is physically situated in one market to be sold on another, with "delivery" being accomplished through a swap.

2. Paper gold instruments

Paper gold instruments represent claims to a specified quantity and fineness of gold. Transactions in these instruments are generally performed for speculative and hedging purposes, and they rarely involve the actual transfer of physical gold. On the New York Commodity Exchange (COMEX), for example, 8.4 million futures contracts of 100 ounces each were traded in 1986, but only 1.2 percent of the gold involved actually changed

^{1/} It is worth noting in this regard that prior to 1990, the central banks which took part in this market did not usually secure their loans. See The Economist (1990). Also, when a number of gold loans were subject to default in 1990 (as described in Section IV.7a below), the financial institution involved went bankrupt because of loans it had made to a parent company and not because of its involvement in the market for gold loans.

hands. ^{1/} Nevertheless, these transactions represent an integral part of the gold market, especially because of gold's role as an investment instrument.

a. Gold futures

Gold futures contracts represent commitments to deliver, on the one hand, and to accept and purchase on the other, a specified amount of gold at some time during the month for which the contract is defined. Contracts are defined by the relevant exchange. They are usually traded by open outcry, with members of the exchange representing the ultimate buyers (who have assumed long positions) and sellers (who have short positions). Performance is guaranteed by an exchange clearing house, which registers the names of the buyer and seller and assumes the opposite side of the trade for both. The clearing house receives margin payments from both parties to the contract in order to assure compliance; an original margin is supplemented by a maintenance margin if the price moves against the trader's position. However, both buyer and seller can liquidate their contracts on the exchange at any time up to the delivery date (and usually do so, at least prior to the expiration of the contract at the end of the quoted month). The current month for which a futures contract is quoted is called the spot month.

A trader can close out (or exit) a position by making an opposite transaction for the same delivery month, and by instructing the broker to offset the earlier contract (through the clearing house). Any contracts that are not liquidated by either party in such a manner are still open, and the total of such contracts is the open interest (i.e., the equal number of longs and shorts). Should one of the parties close out a position (for example, the long), but the other (the short) does not close out, the contract is traded, with another (long) counterparty being obtained and registered so that the open interest is unchanged. Market participants regard measures of open interest as an important indication of market conditions. Proponents of technical trading consider that if open interest is increasing, there is still room for the price to continue to move in the same direction in which it has been moving; if open interest is falling on the other hand, the current trend is viewed as likely to end.

b. Gold options

Gold options differ from futures contracts in that the buyer receives the right to exercise the option rather than incurring an obligation to perform--that is, a right to sell or buy physical gold (or a gold futures contract) at a specified price called the strike price (or exercise price). An option is a unilateral contingent contract, however, with the writer (or seller) obliged to perform on demand of the holder. The holder of a call

^{1/} See Sarnoff (1987, Chap.7). See also Sarnoff (1980), on which much of this section is based. Other descriptions of derivative gold instruments can be found in Brody (1988), Gold (1990), Inoue (1990), and McGanty (1990).

option has the right to purchase gold from the option writer, while the holder of a put option has the right to sell gold. On a European-style option, the right can be exercised at the maturity date--i.e., the date on which the contract is terminated; on an American-style option, the right can be exercised either at the maturity date or at any time prior to that date. Recent innovations in options include (1) the average option, on which a settlement payment is made if the average price over the life of the option exceeds the strike price (for a call) or is less than the strike price (for a put) and (2) the look-back option, which sets the strike price at expiration as the optimal price that occurred over the life of the contract (i.e., the lowest for a call and the highest for a put).

The buyer of an option pays a premium to the dealer, as well as a commission, and his risk is limited to this amount. The writer, on the other hand, is exposed to the risk that the option will be exercised at a spot market price above the strike price in the case of a put, or below it for a call. The loss is measured by the extent of this difference, minus the premium. Options on physical gold may be offered by individual dealers (a dealer or over-the-counter option), in which case a premium is agreed and any subsequent sale of the option must be performed through that dealer. Alternatively, options are traded on a commodity exchange as cash contracts, with a specified strike price and a clearinghouse system similar to that described above for futures contracts. Options on futures contracts are traded through the relevant futures exchange for specified months. When an option has been defined for a particular strike price and date, the premium is the quoted price which will change so as to clear the market. Contracts for a range of strike prices for any given month are normally offered, with the strike prices being determined on the basis of prevailing spot prices and the differentials above and below the rounded spot price being determined by the exchange. ^{1/} The option premium (the "price" of the option) can be broken down into the option's intrinsic value and its time value, where the intrinsic value is the amount that can be realized on the physical gold or futures contract if the option were exercised immediately. The time value is then the residual, reflecting the probability that the option will be exercised, the length of time remaining to expiration, the riskless rate of interest, and market volatility and risk.

c. Gold warrants

A gold warrant is essentially a gold option (usually a call option) that is secured by the existence or promise of gold stocks and that can be exercised by the holder in a manner similar to a regular option. Warrants, as usually issued, are attached to a share or bond issue by mining companies that want to attract investment. The warrant specifies an amount of gold that the holder is entitled to purchase or sell at maturity, usually five

^{1/} For example, on April 24, 1991, the spot price of gold was about \$356 an ounce in New York, and COMEX offered contracts on strike prices ranging from \$330 to \$390 in increments of \$10.

years hence. A naked warrant is backed by a gold stock, but it is issued without attachment to another financial instrument. Although warrants are traded on some stock exchanges, they are not permitted on U.S. exchanges.

d. Gold leverage contracts

A gold leverage contract is similar to a long position on a futures contract, but the customer can take delivery of the gold at any time up to the contract expiration date. Payment of an initial margin secures title to the gold, but the contracting firm holds a lien against it until payment is made in full at the spot rate quoted on the initial contract date. The contracting firm effectively loans the balance outstanding on the contract to the customer, who pays interest and storage charges on the unpaid balance. If the spot price rises, the margin is considered to have increased, but if the price drops, a maintenance margin must be paid. The contract can be terminated by the customer at the spot price on any date, at which time any outstanding balances are settled. This instrument allows investors to assume a highly leveraged long position in gold, whereby an initial investment can quickly be multiplied (or wiped out).

e. Other forms of spot paper gold

Investors in bullion (and coin) often do not want to take delivery of their gold because of the risks and costs involved in transportation and storage. Accordingly, most dealers and brokers undertake to store the bullion and issue a gold certificate, which is a warehouse receipt evidencing ownership of a specific amount of bullion. The gold is receivable on demand, or the investor may cash in the certificate for current market value or sell it by endorsing the back. The Montreal Exchange now trades gold certificates in U.S. dollars, with a minimum of five ounces, for good delivery within the time limits, weight, and standards of Canadian gold. In addition to being liquid, these are free of the issuer costs usually payable on certificates. Depository orders (or delivery orders) are similar to gold certificates, except that they are issued as claims to gold held in a depository not controlled by the issuer, usually in some tax haven.

Most large gold banks (in particular, in Switzerland) offer bullion accounts, which operate as bank accounts denominated in ounces of gold but usually have a much higher minimum transaction size than certificates. In this case, also, the bank physically holds the bullion in a pool or on consignment for the depositor and reflects it in the account's balance. Gold accumulation accounts allow smaller investors to acquire gold over time, but deposits are made in monetary units instead of units of gold. The amount of the monetary deposit is then translated into a gold deposit at the prevailing spot price.

III. Physical Stocks and Flows

Gold has extraordinary durability and is never "consumed" in the sense that another good might be. In fact, most gold that has ever been brought above ground has remained there, and analysts believe that at least 80 percent of all gold that has been mined can be accounted for. 1/ This quality has greatly enhanced gold's attraction as a store of wealth, but it also means that an enormous stock of gold exists that can potentially return to the market and add substantially to annual supplies from new production, if prices increase sufficiently. This is particularly true of gold bars hoarded for investment or held to back physical gold accounts, as well as jewelry in India, the Middle East, and the Far East that is usually of poor fabrication quality but of high gold content and held for investment purposes. 2/

Given the magnitude of these potential gold flows from existing stocks, it is clearly not sufficient to consider only the current supply of new gold in the structure of the gold market. Some attempts to incorporate the impact of stocks on the annual gold supply and to quantify the composition of existing stocks are made in subsections 1 and 2 below. Subsection 3 attempts to estimate the relative magnitudes of the bullion markets involved.

1. Annual demand and supply

In theory, the annual supply to bullion markets should be equal to turnover and demand, but in practice it is impossible to estimate turnover and far less possible to estimate all of its sources of supply. For this reason, analysts have confined themselves to estimating sources of supply of new gold (conventionally measured as western world mine production and net sales from socialist countries) and have augmented this figure with estimates of major changes in the composition of existing gold stocks. The major estimable sources of stocks that have been retired from a prior use and returned to the free market in bullion form are sales of scrap metal and net sales from official gold holders. These figures have therefore been included in estimates of what will be termed net annual market supply.

1/ See Green (1981).

2/ In fact, gold stocks seem to be a far more important source of potential supply, in response to an increase in gold prices, than the traditionally cited increase in mine output. Following the substantial price increase of late 1979 and 1980, mine output in the western world began to increase, but it took until 1984 for production to increase by 20 percent. The increase in supply from "dormant" gold stocks on the other hand, in particular from scrapped jewelry, was immediate and appears to have had a significant effect in restraining further price increases. This response is described in Section III.2 below.

The annual supply of new gold bullion from mining and net socialist sales has risen steadily during the 1980s. It is estimated to have averaged 1,718 tons per year in 1985-89. 1/ South Africa still dominates gold production, and supplied an average of 37 percent of new gold in 1985-89. The U.S.S.R. is estimated to have been the second largest producer, supplying 18 percent, 2/ and the United States supplied 9.5 percent. The inclusion of net official sales by central banks and other official institutions, which actually absorbed an average of 82 tons a year in 1985-89, and the supply of gold scrap from the melting of coins and jewelry, which averaged 363 tons a year, 3/ brought the total net bullion supply to the private sector during 1985-89 to an average of 2,000 tons a year. 4/

Net market demand is even more difficult to estimate. Of the 2,000 tons supplied, 1,770 tons are estimated to have been absorbed in fabrication during 1985-89, 5/ and the remainder represents implied net private bar hoarding of 230 tons. Information on these residual flows for hoarding

1/ Unless otherwise indicated, data cited have been obtained from Gold Fields Mineral Services Ltd. (also known as Consolidated Gold Fields Ltd.) in its annual publication, Gold. Tons are metric tons.

2/ Of which 90 percent was mined over that period, and the rest represented a dishoarding of stocks. The largest gold mine in the world, with an estimated average annual production of over 80 tons, is believed to be the Muruntau gold mine in the U.S.S.R. By 1991, annual production in the U.S.S.R. was estimated to have fallen to about 200 tons (or by about one third) due to severe production difficulties. See Salomon Brothers (1991).

3/ Estimates of gold scrap are available only beginning in 1980.

4/ The Bank for International Settlements (BIS), in estimating market sources and uses of gold, measures supply as western world production, socialist sales, and changes in official gold stocks. Changes in the reserves of the South African Reserve Bank are excluded, however, as they are generally believed to represent the execution or unwinding of gold swaps with commercial banks in other countries, and such swaps do not appear on the market. Total supply from these sources is assumed to be equal to annual "nonmonetary absorption" of gold, averaging 1,753 tons for 1985-89. (See Bank for International Settlements, Annual Report, 1989, pp.197-201.) The BIS estimate therefore essentially ignores the supply from gold swaps.

5/ Fabrication includes the use of gold in electronics and dentistry, and the manufacture of jewelry, medals, and coins. Of total fabrication demand, jewelry accounts for an average of 76 percent, on the basis of 1985-89 data. Italy has the world's largest gold fabrication industry, accounting for over 15 percent of the total.

purposes is the most elusive. Estimates must rely on observed cross-border movements, but even these are generally not available for Europe and North America, 1/ and market stocks in London and Zurich are not revealed. 2/ Therefore, estimates of the geographical distribution of hoarding are limited to countries outside Europe and North America, with the residual assumed to have been hoarded in Europe or North America. During 1985-89, identified bar hoarding in the Far East averaged 273 tons a year; on the Indian subcontinent, 11 tons a year; in the Middle East, 24 tons a year; and in Latin America, 43 tons a year. This implies that an average of 121 tons a year were dishoarded from Europe and North America over the period.

The breakdown of net market demand and supply given here is used by market analysts to project likely developments in market fundamentals and prices. 3/ However, behind this estimated breakdown of net market demand and supply from the different categories, there are a multitude of gross flows that have been netted out, in particular with regard to net private hoarding and dishoarding and net official transfers, and these must obviously have had an effect on day-to-day transactions in the market. Although it is not possible to estimate these transactions, it is possible to reclassify some of the component net gold flows outlined above in order to come closer to an estimate of gross flows and to illustrate better their effect on the market. Since 1989, Consolidated Gold Fields has estimated "gross annual bullion supply and demand" according to whether net investment flows have been negative or positive. This leads to a larger estimate of supply and demand because, for example, net official purchases (if they occur) will be added to demand rather than being subtracted from supply, while net official sales (if they occur) will still be added to supply. More precisely, the approach is to reclassify net flows to or from a particular category as either supply or demand in each year, depending on whether they constituted a net supply to, or demand from, the market. While the resulting figures are still broad estimates, their recategorization makes for a better representation of the positions adopted by certain sets of market participants in each year. On the basis of such a representation of the structure of the market, annual market demand and supply averaged 2,305 tons in 1985-89 (instead of 2,000 tons, according to the earlier definition). These gross estimates are illustrated in Chart 2 for the period 1968-89, and Table 1 details these estimates of market supply and demand for the period 1985-89.

1/ The Fund's Balance of Payments Statistics Yearbook does report "nonmonetary gold" flows, as variously defined, for the United States, Canada, Austria, France, Italy, Sweden, and Switzerland. See also Appendix II.

2/ Imports and exports for the United Kingdom and Switzerland are available, however, and are presented in Tables 4 and 5.

3/ See, for example, Milling-Stanley (1991).

Table 1. Annual Bullion Supply and Demand, 1985-89

(In metric tons)

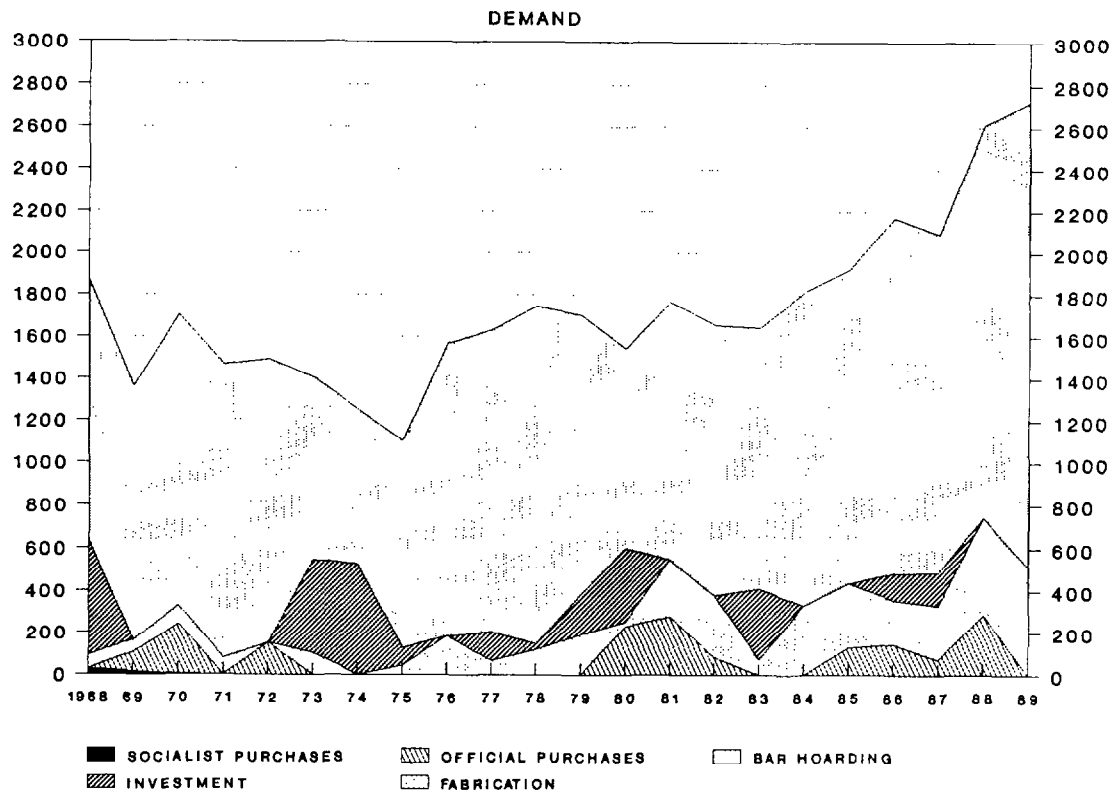
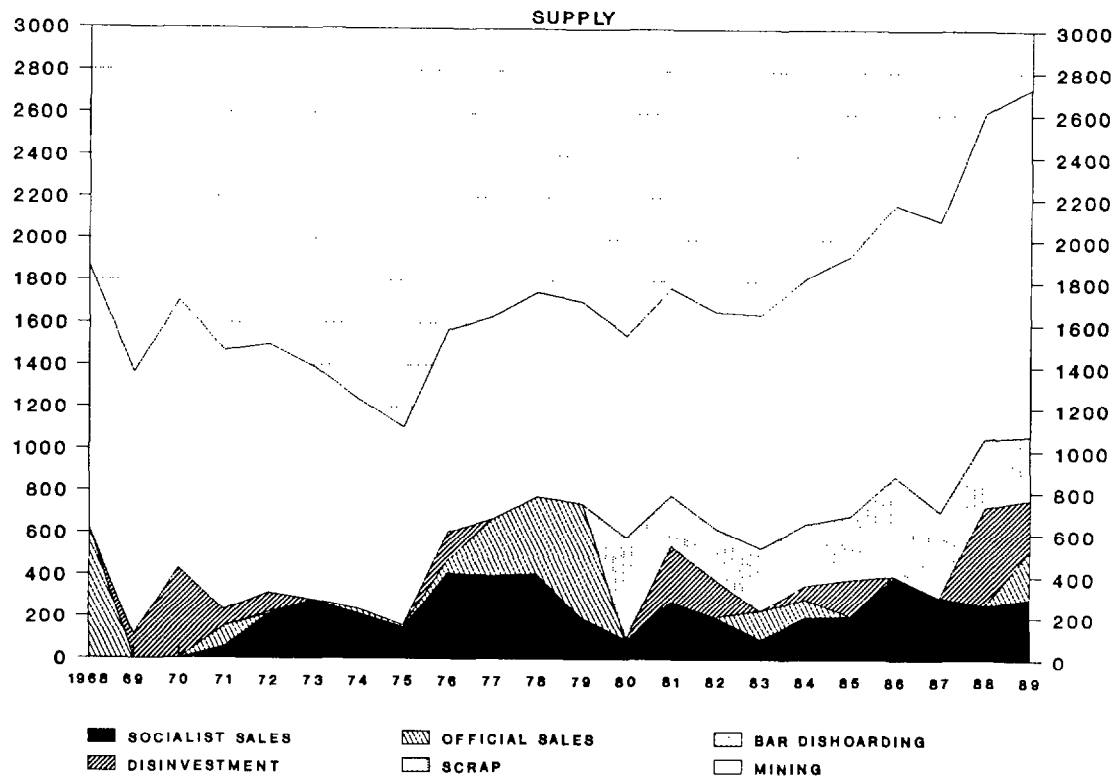
	1985	1986	1987	1988	1989
Supply					
New mine production	1,236	1,296	1,383	1,551	1,653
Scrap	304	474	407	328	304
Socialist sales	210	402	303	263	296
Official sales	--	--	--	--	225
Bar dishoarding <u>1/</u>	--	--	--	--	--
Residual disinvestment <u>2/</u>	175	--	--	468	246
Demand					
Fabrication	1,487	1,687	1,606	1,866	2,207
Socialist purchases	--	--	--	--	--
Official purchases	132	145	72	285	--
Bar hoarding <u>1/</u>	306	214	258	459	516
Residual investment <u>2/</u>	--	126	157	--	--
Total supply or demand	1,925	2,172	2,093	2,610	2,723

Source: Gold Fields Mineral Services Ltd., Gold (1990).

1/ Outside Europe and North America.

2/ Assumed to represent Europe and North America.

Chart 2
GOLD BULLION: SUPPLY AND DEMAND, 1968 - 90
(In metric tons)



SOURCE: Gold Fields Mineral Services Ltd., Gold (various years).

2. Composition of existing stocks

In 1800, some 4,200 tons of gold were thought to have been above ground, and this stock is estimated to have quadrupled by 1941. By 1968, the stock had risen to almost 70,000 tons, of which 36,192 tons (or 52 percent) belonged to official monetary institutions, and at the end of 1989 estimated cumulative gold production was over 100,000 tons. 1/ Of this total, over one third is still held by central banks and other official institutions (see Table 2). Similar (but smaller) proportions are attributable to jewelry and private holdings of bars and coins. At the end of 1989, the gold stock (excluding that lost or used in industry) was almost 50 times the annual supply of new gold from mines.

Most official gold is stored in the United States, with some 10,000 tons placed at the Federal Reserve Bank of New York by foreign and international institutions. The U.S. gold reserves of 8,147 tons are stored at Fort Knox in Kentucky and West Point in New York. At a market price of \$350 per ounce, total official gold holdings would be worth \$400 billion, but about half of these institutions value their gold holdings at some historic price far below the market price. 2/ Central bank holdings alone would be worth some \$330 billion at \$350 per ounce, and, even though the official role of gold in the world's monetary system has ended, gold reserves are still an important component of international reserves. At the end of 1989, gold reserves at market prices accounted for 33 percent of the value of total central bank reserves, and this proportion had actually increased slightly since 1971 (when it was 32 percent), having reached an interim peak of 58 percent at the end of 1980. 3/ Clearly, central banks still have a large role to play in the gold market, even if it is a passive one.

The U.S.S.R. has long maintained absolute secrecy regarding its annual gold production, stocks, and sales to the West. 4/ In 1935, the Soviet Government announced that gold output for the year totaled 150 tons and that reserves amounted to 745 tons. 5/ The next official announcement was

1/ See CPM Group (1987, pp.2-16) and The Economist (1989).

2/ Of the countries listed in Table 2, only France, Italy, and the Netherlands value gold at near market prices.

3/ Prior to the formation of the central bank gold pool in 1961, gold accounted for some 64 percent of total central bank reserves.

4/ For descriptions of U.S.S.R. activity in gold production and sales, see Green (1985, Chap.3) and (1987, Chap.9), Euromoney (January 1987, Suppl., p.12), Mining Journal (April 22, 1988, p.334), and Craig (1982, Chap.6).

5/ Euromoney (January 1987, suppl., p.12).

Table 2. Distribution of Holdings of Cumulative World Gold Production, December 31, 1989

Gold holdings	Metric tons	Percent of total
Central bank holdings	<u>29,204</u>	<u>28.0</u>
United States	8,147	
Germany, Federal Republic of	2,960	
Switzerland	2,590	
France	2,546	
Italy	2,074	
Netherlands	1,367	
Belgium	941	
Japan	754	
Austria	640	
United Kingdom	591	
Other industrial countries	2,207	
Developing countries	4,387	
Other official stocks	<u>6,335</u>	<u>6.1</u>
International Monetary Fund	3,217	
European Monetary Cooperation Fund	2,912	
Bank for International Settlements	206	
U.S.S.R. gold reserves	<u>2,300</u>	<u>2.2</u>
Jewelry and decorative gold	<u>29,550</u>	<u>28.3</u>
Private stocks	<u>24,660</u>	<u>23.6</u>
Post-1968 coins	3,574	
<u>Post-1968 bar hoarding</u>		
Latin America	272	
Middle East	385	
India	155	
Far East	2,740	
Europe and United States	675	
Other	32	
<u>Pre-1968 bar hoarding</u>		
France	5,000	
Other	11,827	
Industrial or lost gold	<u>12,300</u>	<u>11.8</u>
Total	104,350	100.00

Sources: CPM Group, Precious Metals: Gold (1990, pp. 38-39); Green (1981); IMF, International Financial Statistics, November 1990; and Gold Fields Mineral Services Ltd., Gold (various years).

Note: Figures are subject to revision if official data (e.g., U.S.S.R. reserves) become available or are revised.

made on February 22, 1991, when it was revealed that the U.S.S.R. placed 234 tons of gold on the market in 1990 to pay for food imports. 1/ Precious Metals: Gold (CPM Groups, 1990) provides estimates of Soviet production, sales, and implied reserve accumulation since 1950, and it is on the basis of such estimates that reserves at the end of 1989 were placed at some 2,300 tons. This estimate appears to have been generally acceptable to industry analysts, but the range (including possible error) was put at 2,000-2,500 tons. It is likely that a large part of the total was held outside Gosbank. These estimates may be compared with recent unofficial information from the U.S.S.R. Soviet economist Grigory Yavlinsky has maintained that the U.S.S.R. had a total of 390 tons of gold in October 1991, of which 150 tons had been swapped. He has also said that 700 tons had been exported since the end of 1989. 2/ Former Prime Minister Nikolai Ryzhkov has stated that the gold reserve was 784 tons at the end of 1989, and sold 250 tons during 1990, 3/ and a current Gosbank official, Alexander Doumnov, has stated that Gosbank had 375 tons in reserve in mid-1991. 4/ It is not clear whether Yavlinsky was referring to total stocks, or to a second reserve held outside Gosbank, perhaps at the Finance Ministry. Because these recent announcements have not been sufficiently clear as regards gold held outside Gosbank, a number of market analysts now believe that total U.S.S.R. reserves as of mid-1991 are in the range of 1,000-2,000 tons. 5/

Bar hoarding since 1968 has been estimated by Gold Fields Mineral Services 6/ but it is advisable to bear in mind that European and North American accumulation has been compiled as the residual demand in each year and may not be very accurate. Bar hoarding prior to 1968 is not very well identified, but French individuals are generally considered to have accumulated 5,000 tons in the inter-war years and immediately after. Altogether, some 50 percent of the gold stock is in private hands and (at least theoretically) is available to enter the market in response to price changes. It is, however, difficult to provide a systematic analysis of the manner in which stocks respond to price increases because, as noted earlier, many gold movements are netted out in the data. Timothy Green (1981) of Gold Fields Mineral Services cites a number of instances in which dishoarding has occurred, including the time when a sterling devaluation of

1/ See Gooding (February 22, 1991). In January 1988, apparently inadvertently, the Bank for Foreign Economic Affairs in Moscow revealed production figures for six of the years between 1970 and 1985 (Mining Journal, April 22, 1988). These figures, and those revealed in 1991, have largely conformed to prior estimates by market analysts. For these estimates, see Gold Fields Mineral Services (1990) and, in particular, CPM Group (1990).

2/ Reported by Reuters on October 16, 1991.

3/ Reuters, October 21, 1991.

4/ Reported by AP-DJ on September 24, 1991.

5/ See Salmon Brothers (1991).

6/ See Gold Fields Mineral Services Ltd., Gold (various years).

50 percent in 1932 initiated dishoarding from India that was equal to total South African production for that year. The most recent episode occurred in response to the price increases of late 1979 and 1980. The doubling in the average annual price of gold at that time ostensibly caused a reduction in hoarding outside of Europe and North America by 168 tons from 1978, while hoarding in Europe and North America increased by 154 tons. This effect indicates the market forces that prevailed, with speculative demand in the major markets attracting external stocks, but the implied net aggregate dishoarding of only 14 tons completely disguises the extent of the shifts in existing stocks. To a large extent, aggregate stock equilibrium was adjusted through the redirection of annual supply.

Gold use from all sources in the fabrication of carat jewelry fell sharply in 1980, falling to 128 tons from 728 tons in 1979 (and 1,004 tons in 1978). Total fabrication demand in the noncommunist world fell by 780 tons to 540 tons, but this drop in demand was more than offset by a fall in supply caused by both a reduction in net socialist sales and a switch to net official purchases amounting to 883 tons. However, there was a large increase in the supply of gold from scrap. Although exact data are not available, the flow of gold from jewelry to speculative holdings through the scrap market has been vividly described by Green (1981), after prices peaked on January 19, 1980. Initially, the loco-London price gained a substantial premium (in some cases, 40 percent) over small local markets (principally in the Middle East and Far East). Then, according to Green (1981, page 28), "within a very few days a wave of reselling of jewelry and coin on an unprecedented scale developed." Green continues (page 29):

The scale of individual dishoarding was often substantial. I was in the Kuwait souk the day gold hit \$850. The street of gold shops was under siege. Perhaps two or three thousand people milled around, fighting their way into the overcrowded shops with cigar boxes and biscuit tins crammed with bangles and necklaces. The goldsmiths weighed the ornaments--often two or three kilos from one woman [worth \$50,000-\$75,000]--and paid cash. Those ornaments were melted down in a nearby basement and the rough gold bars air-freighted to London and Zurich the same night.

Green also estimates that some 200 tons of gold returned to the main markets (London and Zurich) in early 1980, while an additional 100 tons returned to subsidiary markets (such as Hong Kong) and eliminated the need for buying from Europe to meet investment demand there. ^{1/} The main impediments to further flows, on the other hand, were a cash shortage in the subsidiary markets and constraints on the capacity to refine scrap to loco-Europe quality once it had arrived there. By late March 1980 the price of gold had fallen to \$474 an ounce.

^{1/} Green (1981, p.29). Total new gold supply from Western world mining and net socialist sales in 1980 was 1,036 tons. See Gold Fields Mineral Services, Gold (1982).

3. Annual supply to bullion markets

As a rule, the organizers of the physical gold markets do not reveal information on turnover or on the volume that moves through the market on an annual basis, in order to protect the confidentiality of transactions by individual customers. However, some information can be gleaned from the trade figures of the countries involved. Although all physical gold flows through a particular country are not actually transacted on local markets, 1/ such an assumption seems a reasonable approximation. In fact, the reluctance on the part of Switzerland and the United Kingdom to provide detailed trade figures may be an indication that these statistics would be of use in determining the flows of gold to the market.

Table 3 provides estimates of the size of physical gold flows from the gross annual gold supply through the various physical gold markets in 1989. The figures on new gold and scrap are very reliable 2/ and these have been combined with estimates of official sales and residual disinvestment in Europe and North America in order to conform to the definition of supply offered in subsection 1 above (and used in Table 1). The estimated breakdown of residual disinvestment has been based on rough calculations of total demand in the United Kingdom, the United States, and Switzerland, 3/ with "Other Europe" treated as the ultimate residual. An attempt is then made to trace the total supply (2,723 tons) through the various bullion markets and ultimately to total demand which, in accordance with section 1 above, comprises fabrication demand and identified bar hoarding outside Europe and North America. Table 3, in particular cols. (3) and (11), has been constructed by attempting to make estimates of unknown flows conform to the available information, and by filling any remaining gaps on the basis of anecdotal evidence on flow trends or available proxies. Thus, it should be regarded as reflecting some errors and omissions. 4/ The general approach has been to leave as few residual values as possible and to estimate these on the basis that the total in the relevant column must either conform to the total in another (as with cols. (4 and 5) and (6 and 7)) or sum to zero (as in cols. (10 and 11)). There is often more than one residual for a particular row or column, but because the data must be consistent for the rows as well as the columns, it was possible to reduce their number significantly. For example, if an item is one of two unknowns in a particular column, but is the only unknown for a row, its identification from the row will also identify the other unknown in the column.

1/ As pointed out by Schriber (1981).

2/ From Gold Fields Mineral Services, Gold (1990).

3/ See Montagu and Co. (1990).

4/ The problems encountered are somewhat similar to the problem of asymmetry in the world current account, which should, in theory, be zero but is not.

Table 3. Estimated Composition of Supply and Demand in World Bullion Markets, 1989

(In metric tons)

Region	New gold 1/ (1)	Scrap gold (2)	Residual disinvest- ment (3)	Unrefined 2/ In Out		Loco-London 3/ In Out		Official sales (8)	Market supply 4/ Primary Secondary		Net imports 5/ (11)	Local supply equal to local demand (12)	Fabrica- tion demand (13)	Bar hoarding 6/ (14)
				(4)	(5)	(6)	(7)		(9)	(10)				
South Africa	608	--	--	--	--	--	608	--	--	--	13	13	13	6-
Other Africa	67	4	--	--	71	--	--	--	--	--	31	31	31	--
U.S.S.R.	280	--	--	--	--	--	280	--	--	--	--	--	--	--
Other socialist countries	16	--	--	--	--	--	16	--	--	--	--	--	--	--
Switzerland	--	2	108	230	200	782	--	--	922	-247	-633	42	42	--
United Kingdom	1	4	-4	12	203	621	--	225	656	-237	-378	41	41	--
Other Europe	20	23	129	--	23	--	129	--	20	10	533	563	563	--
United States	259	42	13	160	--	29	55	--	448	-63	-184	201	201	--
Canada	158	5	--	61	--	--	177	--	47	--	--	47	47	--
Latin America	229	35	--	--	164	--	--	--	100	--	55	155	61	94
Australia	197	--	--	7	5	--	167	--	32	--	-17	15	15	--
Other Oceania	43	--	--	--	43	--	--	--	--	--	--	--	--	--
Japan	11	13	--	100	--	--	--	--	124	51	142	317	198	119
Hong Kong	--	3	--	203	--	--	--	--	206	220	-330	96	66	30
Singapore	--	3	--	100	--	--	--	--	103	127	-202	28	23	5
Other Asia	60	26	--	--	80	--	--	--	6	20	569	595	379	216
Indian sub- continent	--	59	--	--	--	--	--	--	59	10	201	270	261	9
Middle East	--	84	--	--	84	--	--	--	--	109	200	309	265	44
Total	1,949	303	246	873	873	1,432	1,432	225	2,723	0	0	2,723	2,206	517

Sources for columns:

(1-2) Gold Fields Mineral Services, Gold (1990).(3) The aggregate figure is a residual, representing implied disinvestments in Gold Fields Mineral Services, Gold (1990). The breakdown is based on U.K. and Swiss trade data, as supplemented by estimates in Montagu (1990), with "Other Europe" demand as the residual.(4) For the United Kingdom, see Table 4. Switzerland is assumed to accept residual Latin American supplies (after the United States and Canada), and most of other Africa, Europe, Asia, Oceania, and the Middle East. All Australian figures are from CPM Group, Precious Metals: Gold (1990). Estimates for the Far East assume that supplies from the United Kingdom and Switzerland (col. 5) are equal and distributed according to local market size.

(5) United Kingdom (see Table 4) is assumed to be destined for Far East, and Switzerland is assumed to be equal to that for the United Kingdom; Latin America is assumed to export, for refining, everything but local Brazilian demand. Others have limited refining capacity and export indigenous supplies.

(6) For United Kingdom, see Table 4; Switzerland is the residual import figure (from Table 5) after the entry in col. (4).

(7) South Africa and the socialist countries export gold in well-refined form; Canada and the United States are residual estimates. For Australia, see col. (4) sources.

(8) Gold Fields Mineral Services (1990). Net official sales of all countries are here assumed to have been carried out in London.

(9) Derived as cols. 1+2+3+4+6+8-5-7.

(10-11) Hong Kong and Singapore are residuals but conform to net flows, in Montagu and Company (1990). Other figures are estimated, so that, when combined with col. (9), they conform to local market demand.

(12) Equal to cols. 9+10+11; also equal to cols. 13+14.

(13-14) Gold Fields Mineral Services, Gold (1990).

1/ New gold is defined as newly mined gold and net sales from the U.S.S.R. and other socialist countries.

2/ Unrefined gold is here defined as gold not conforming to Loco-London standards of fineness or bar weight.

3/ Loco-London weight and fineness; may be transformed at destination.

4/ Primary market supply signifies gold that has first come to market; secondary market supply signifies gold that is resold on a secondary market.

5/ Net imports differ from secondary market supplies because they are not resold at destination.

6/ Identified bar hoarding, except in Europe and North America where it is assumed to be the residual supply (in col. 3).

The breakdown of supply has been supplemented with a distinction between refined and unrefined gold (cols. 4-7). "Refined gold" is taken to be gold conforming to loco-London delivery standards of fineness and weight, with "unrefined gold" referring to gold in other forms. The estimates have been derived to conform to official import data for the United Kingdom in particular, but in most cases they reflect the extent to which gold is thought to have been exported in mine-treated form (80 percent fine) or refined (above 999 fine) by the producer countries. However, the estimates should not be taken as an indication of the extent of refining operations in recipient countries because imports of refined gold can be further smelted at their destinations. 1/ This tenuous distinction is made simply as an aid in tracing overall bullion flows. The distinction between the primary and the secondary market supply should also be treated with caution, as some gold flows to more than two markets, while other flows between markets are netted out. Again, however, this distinction provides a valuable check on the aggregate figures, because some information is available on the extent to which individual secondary markets are supplied by the primary markets. In assessing the total size of the flows through the various markets, the sum of the positive figures in cols. 9 and 10 should be used. Thus, for example, U.S. markets are estimated to have handled 448 tons (from col. 9), while "other European" markets handled 30 tons (the sum of cols. 9 and 10). Of course, combined market supply (3,270 tons), which double counts (547 tons of) gold that was sold through two different markets before reaching its final destination, will be greater than ultimate demand and supply (2,723 tons). "Net imports" are differentiated from secondary market supply in that they are assumed not to be resold at their destination but are imported directly by the ultimate buyer from a market abroad.

It is likely that the majority of South African gold exports still arrive in Switzerland, with the remainder going to the United Kingdom. Some 50 percent went to the United Kingdom in 1976 and 1977, the last years for which detailed import figures are available for that country, but this proportion is probably somewhat lower now. The remaining gold imports into the United Kingdom probably originated in large part from other African countries, China, the United States, Canada, and Latin America. Switzerland probably shared imports from Latin America (as well as from South Africa and other African countries), but it is thought to have received most sales from the U.S.S.R. Prior to 1965, gold sales from the U.S.S.R. were channeled through the Moscow Narodny Bank in London and, to a lesser extent, the Banque Commerciale pour l'Europe du Nord in Paris. 2/ The Wozchod Handelsbank was established as a dealer in Zurich in 1966. Reflecting the increasing sophistication of its gold policy, this bank both bought and sold

1/ Switzerland is estimated to have an annual refining capacity of 600-700 tons, and the United Kingdom also has substantial refining facilities.

2/ See Green (1985, Chap.3, and 1987, Chap.9), Euromoney (January 1987, suppl. p.12), Mining Journal (April 22, 1988, p.334), and Craig (1982, Chap.6).

gold on behalf of the Soviet Government throughout the 1970s and early 1980s. However, the bank failed in 1985, with forward trading losses estimated at Sw F 400 million to Sw F 700 million, and its gold trading operations reverted to the Bank for Foreign Trade in Moscow. Switzerland is still thought to be the destination of most gold sales from the U.S.S.R., although data on these flows are not available. ^{1/} The Bank for Foreign Trade is well known to practice sophisticated marketing techniques. It both buys and sells (in order to camouflage its net position) and has also been involved in forward selling and other hedging techniques. It has been very active in the market for gold swaps in particular, because this practice allows it to temporarily accumulate foreign currency without causing large quantities of gold to come to market and thus depress prices.

It is difficult to estimate the relative importance of various gold trading and conversion activities in the primary markets, but of the estimated 922 tons that flowed through Switzerland in 1989, some 330 tons are estimated by market analysts to have been refined there, whereas 43 tons are known to have been used in fabrication. Of the remaining 550 tons, some 350 tons are considered to have been subject to some form of upgrading, even if this only amounted to recasting and stamping. Thus, about 60 percent of gold imports eventually moved out of Switzerland unchanged or slightly upgraded, while 35 percent of gold imports were refined in Switzerland. Estimates of the value added from refining range from 0.25 percent to 0.50 percent of the total value of the gold involved, depending on the extent of refining and the price of gold. An estimated 50 percent of gold flows through the United Kingdom are upgraded or recast. Switzerland is thought to provide about 40 percent of the supplies to the secondary markets of the Middle East and Far East, while the United Kingdom is estimated to supply 25 percent. Estimates of market size in these regions are based on import and export figures.

Based on this approach to estimating market flows, the combined market supply was 3,270 tons in 1989. ^{2/} Of this total, Zurich accounted for 922 tons and 656 tons moved through London. New York (448 tons) and Hong Kong (426 tons) were the next largest markets, with Singapore (230 tons) and Tokyo (175 tons) also playing a significant role. The remaining 413 tons were shared among the regional markets. The relative significance of these markets is to some extent an artifact of their historical evolution but increasingly results from their geographical significance and the manner

^{1/} In 1980, Swiss customs figures on Soviet gold exports to Switzerland over a 20-month period were published by the Financial Times (see Kettell, 1982, p.214). This may have caused Soviet officials to redirect some of their sales to London. However, the Swiss authorities have reportedly been very vigilant in order to avoid a repetition of this situation. More recently, the U.S.S.R. is thought by market analysts to have sold some gold directly in Middle Eastern markets.

^{2/} This figure is equal to the total of col. (9) plus the positive figures in col. (10) of Table 3.

in which they operate. The evolution of the world gold market is described in Section IV, which also describes in detail the operation and function of each market. This description should aid in understanding the underlying structure of Table 3.

IV. Bullion Markets, Trading, and Price Setting

Insofar as a market for gold existed prior to the 1970s it was essentially focused in the London bullion market, whose history can be described in terms of the activities of the five London bullion houses that are still the only participants in the London price fixings. 1/ Mocatta & Goldsmid were exclusive brokers to the Bank of England until 1840 and thereafter shared the tasks of channeling gold from suppliers (largely colonial) to central banks and of acting on behalf of the Bank of England to preserve the U.K. gold standard. With the outbreak of World War I and the collapse of the gold standard, 2/ N.M. Rothschild & Sons acted as brokers for the South African mining houses, which dominated world production. The other four dealers were invited to Rothschild's offices to participate in one of the first price fixings when the market reopened in 1919. The fixing is still conducted at, and chaired by, Rothschild & Sons, even though the South African Reserve Bank took over the marketing of South African gold a few years later and used the Bank of England as its selling agent to channel gold to the London fix. The other three bullion houses are Mase Westpac (formerly Johnson Matthey), Samuel Montagu & Co. (which sold most of the U.S.S.R. gold at the fixing prior to 1968), and Sharps Pixley.

In 1939 the London market was closed by the outbreak of World War II, and it did not reopen until 1954. By that time, the Bretton Woods system was in place and the Bank of England, as agent for the South African Reserve Bank and operating through the five bullion houses, was able to maintain the price of gold at £12.50 an ounce, which was equivalent to \$35 an ounce. After the price of gold rose to \$41 an ounce in late 1960, the U.S. Treasury put its stock of gold at the disposal of the Bank of England. When this amount proved insufficient to maintain the gold price at \$35 an ounce, six other countries joined in the formation of a gold pool of the major central banks in 1961. The Bank of England acted on behalf of the pool on a direct line to the fix, buying and selling on the pool's account, which totaled some 24,000 tons of gold, whenever the price deviated from \$35 per ounce. The pool was put under increasing pressure over the years of the Viet Nam conflict, particularly following the Tet offensive of 1968. Between March 8

1/ Section IV draws heavily on Green (1985, chap.9), Kettell (1982, pp.203-208), and Roethenmund (1987). For articles describing developments in the gold market from 1968 to 1980, see Williams (1972) and Martin (1978 and 1980).

2/ The United Kingdom was forced to abandon its gold standard by the huge debts it incurred in the operation of the war. The gold standard was re-established in 1919.

and March 15 of 1968, 1,000 tons of gold are estimated to have been moved from Fort Knox to London. 1/ As this amount proved insufficient to alleviate the emerging market pressure to increase prices, the London market was closed on March 15.

After the London market was closed for two weeks, it reopened to a changed world of gold. The Washington Agreement had instituted a two-tier market for gold, permitting a free market for private individuals, while central banks could trade only with one another and only at the official price of \$35 per ounce. As the London fix would now be free of the intervention of the Bank of England, an afternoon fixing was introduced in an effort to attract investors from the United States, with both fixings conducted in terms of U.S. dollars for the same reason. However, while the London market was closed, it lost its largest supplier. The three major Swiss banks--Credit Suisse, Union Bank of Switzerland, and Swiss Bank Corporation--formed the Zurich Gold Pool and approached the South African Reserve Bank to market its gold through them. Their proposal was accepted on a trial basis, because (1) they had already been buying most of South Africa's gold through London for some years, 2/ (2) they could provide secrecy for future transactions, 3/ and (3) they offered a price floor of \$40 an ounce. 4/ In November 1968, a regular agreement was reached between the South African Reserve Bank and the Zurich Gold Pool.

Tables 4 and 5 detail gold flows through the United Kingdom and Switzerland for the years 1960-89 and 1968-89, respectively. These tables show that Switzerland, in addition to becoming the largest entrepôt for new gold, has also become the world's largest storage center for new gold. In the period since 1968, an average of some 15 percent of its annual imports of gold have remained in Switzerland, and imports have averaged almost 65 percent of the world's new gold supply. This implies that, on average,

1/ As Green (1985, p.130) relates, the floor of the Bank of England's weighing room actually collapsed.

2/ During and immediately following World War II, while the London market was closed, the major banks in Zurich had established Zurich as the major world retail trading center for gold and were well connected to subsidiary markets worldwide. At the first London fixing in 1954, the Swiss banks immediately became the biggest buyers, and they maintained their dominance in retail trading while London acted as a wholesale center.

3/ Secrecy was assured through both the lack of any official intervention and the method of operation of the Gold Pool, which provided anonymity. See subsection 2 below.

4/ The provision of a price floor proved very costly for the Swiss banks in the short run. See Green (1985, pp.143-144).

Table 4. Financial Gold Flows Through the
United Kingdom; 1960-89

(In metric tons)

Year	Refined in Bars		Other Forms		Net	Stocks
	Imports	Exports	Imports	Exports	imports	accumulated
1960	776.0	526.8	48.8	127.8	170.2	170.2
1961	1,531.8	572.9	47.9	192.4	814.5	984.7
1962	1,006.3	710.4	53.7	190.5	159.1	1,143.8
1963	1,014.2	410.1	52.6	180.4	476.4	1,620.1
1964	1,222.1	344.9	48.5	202.3	723.4	2,343.5
1965	1,177.3	2,078.7	47.5	301.3	-1,155.1	1,188.4
1966	802.7	865.3	24.8	284.0	-321.8	866.6
1967	1,047.4	1,579.1	27.4	302.1	-806.5	60.1
1968	1,385.4	1,428.1	27.8	281.8	-296.7	-236.6
1969	395.9	184.4	28.4	164.6	75.3	-161.4
1970	911.1	313.0	36.1	261.4	372.8	211.4
1971	969.0	490.9	32.4	140.1	370.4	581.8
1972	585.9	398.8	19.5	58.6	148.0	729.8
1973	667.7	475.2	16.0	52.0	156.5	886.3
1974	548.6	626.4	12.6	44.6	-109.8	776.5
1975	477.4	440.8	9.5	68.4	-22.3	754.2
1976	599.9	440.8	8.2	136.9	30.4	784.6
1977	625.8	537.6	22.6	122.3	-11.5	773.1
1978	508.3	516.2	5.1	124.4	-127.2	645.9
1979	775.4	381.8	21.5	110.4	304.7	950.6
1980	516.4	286.4	95.3	48.9	276.4	1,227.0
1981	553.0	479.4	38.2	190.5	-78.7	1,148.3
1982	512.6	370.7	18.8	216.0	-55.3	1,093.0
1983	482.5	602.2	6.5	118.6	-231.8	861.2
1984	431.7	311.8	4.5	209.9	-85.5	775.7
1985	345.2	242.9	2.6	182.3	-77.4	698.3
1986	458.2	364.5	3.6	105.0	-7.7	690.6
1987	348.1	286.4	26.1	81.1	6.7	697.3
1988	582.2	462.4	13.4	159.0	-25.8	671.5
1989	621.4	615.5	11.9	203.0	-185.2	486.3
Average	729.3	578.1	27.1	162.0	16.2	--

Sources: Overseas Trade Statistics of the United Kingdom (various years), as reported by Samuel Montagu & Co. in Annual Bullion Review (various years). See also Appendix II on the official reporting of gold flows.

Table 5. Gold Flows Through Switzerland, 1968-89

(In metric tons)

Year	Imports	Exports	Net imports	Stocks accumulated	Imports as percent of global new mine production and socialist sales
1968	773.1	295.4	477.7	477.7	63.6
1969	904.5	666.0	238.5	716.2	73.1
1970	786.4	843.0	-56.6	659.6	61.9
1971	634.3	776.3	-142.0	517.6	49.3
1972	655.0	801.0	-146.0	371.6	47.1
1973	958.9	591.1	367.8	739.4	69.2
1974	1,076.4	462.7	613.7	1,353.1	88.5
1975	926.7	584.7	342.0	1,695.1	94.6
1976	1,151.0	895.6	255.4	1,950.5	83.6
1977	1,053.0	738.6	314.4	2,264.9	77.3
1978	1,190.3	822.2	368.1	2,633.0	86.1
1979	955.4	686.2	269.2	2,902.2	82.5
1980	593.1	603.3	-10.2	2,892.0	56.4
1981	806.0	840.1	-34.1	2,857.9	63.7
1982	901.8	781.4	120.4	2,978.3	73.1
1983	774.5	582.9	191.6	3,169.9	94.1
1984	747.3	884.7	-137.4	3,032.5	54.5
1985	836.4	921.1	-84.7	2,947.8	57.8
1986	1,094.4	905.5	188.9	3,136.7	64.4
1987	758.3	666.5	91.8	3,228.5	45.0
1988	846.0	823.8	22.2	3,250.7	46.6
1989	1,011.8	1,080.4	-68.6	3,182.1	51.9
Average	883.4	738.8	144.6	--	64.6

Sources: Swiss Federal Bureau of Statistics, Annuaire Statistique de la Suisse (various years), and staff calculations. See also Appendix II on the official reporting of gold flows.

some 9 percent of the world's annual supply of new gold has flowed into vaults in Switzerland for storage and fiduciary purposes. ^{1/} Net imports for the United Kingdom, on the other hand, have averaged 0.5 percent of annual imports over the same period.

Zurich has also been the dominant entrepôt for physical gold since 1968. The U.S.S.R. had begun to channel its gold through Zurich in 1966, following its formation of the Wozchod Handelsbank there as a conduit, and the Zurich Gold Pool is still thought to handle most new gold sold on the world market from South Africa and the U.S.S.R. (some 970 tons combined in 1989). Hong Kong now rivals New York as the third largest trading center for physical gold by virtue of the growing importance of the Far East as a destination for gold. Singapore has also grown as a trading center for this reason. New York remains an important primary market, with large supplies both produced and demanded domestically in the United States. Also, as described in Section V, New York dominates the market in paper gold instruments.

In determining the spot gold price, however, London is still considered the most liquid and influential market by virtue of its twice-daily fixings. Smith (1981, page 77) sums it up thus:

Because of its format and the expertise of its members, and the communications from London, I believe that the fixings are truly-- the truly--genuine open outcry market, where real volume can be moved at one price--a price at which anyone in the world can participate in directly, or through someone else, and it is a price that is published for all people to see.

Price setting in Zurich, on the other hand, is sometimes regarded as being dominated by the three major Swiss banks, which are members of a Gold Pool, and in any event, there is no fixing. The fact that the majority of the world's supply of new gold passes through Zurich is not a major disadvantage to London as a price-setting center, because gold which is held in Zurich can still be sold loco-London (with a loco-swap achieving "delivery," if required). It is evident from indicators of market activity that a far larger volume of gold is actually traded in London. It is more significant for London that the holding accounts of all the major traders in the world are located there, making the London price the most influential price in the world market. Almost every other market will quote a loco-London price in addition to its own local market price.

^{1/} Because of Switzerland's stable monetary history, the Swiss people have not had a tradition of investing in gold. The French, the Italians, and (to a lesser extent) the Germans do invest in gold, however, and they often place it in Switzerland.

1. London bullion market and gold fixings

There are 14 market making members (i.e., dealers) on the London bullion market, which is the largest number in any one trading center for physical gold, and these include the five dealers participating at the twice-daily fixing. 1/ The market has been supervised since 1986 by the Bank of England, in consultation with the London Bullion Market Association (LBMA) which was formed in 1987 and has 52 ordinary members (brokers and bankers) in addition to the market makers. The Physical Committee of the LBMA maintains a list of acceptable melters and assayers (i.e., refiners) whose stamp must appear on any bar that is considered "good delivery" in London. Good delivery bars must be at least 995 fine and must weigh 400 ounces. Spot quotations are for loco-London good delivery, but the bars are often delivered to, and stored in, the vault of a Swiss bank. Delivery and payment must be made within two working days.

Official London market hours are 9 a.m. to 5 p.m., but dealers will usually trade informally from 7:15 a.m. to 7:15 p.m. Of course, dealers and brokers constantly monitor one another's bid and offer prices, so that deviations in price are quickly arbitrated away, but the market is actually cleared at a single price at the price fixings. 2/ Representatives from each of the five London bullion houses meet in closed session at Rothschild's Fixing Room at 10:30 a.m. and 3 p.m. each day. Rothchild's representative chairs the meeting and begins by suggesting a starting price. Each of the participants is linked to his trading room by telephone, over which he is advised as to whether the firm is a net buyer or seller at that price. The decision is communicated to the chairman, who tries to match the positions. The price is altered until each dealer is satisfied (and has signaled this by lowering a small British flag on his desk), and the fix is then declared. It is worth noting that because each of the dealers communicates a net position, the volume of gold transacted at the fix is impossible to determine. However, it is well known that a large proportion of the London market's daily volume (estimated at 100-200 tons) is transacted at the fix and that the London fix provides the world's most liquid environment in which to place large orders.

2. Zurich gold pool and gold price

Even though Switzerland has no indigenous gold supplies, it has retained its dominance in trading of physical gold by providing specialized banking and ancillary gold services in an essentially unregulated and

1/ For descriptions of the London gold market, on which much of the following is based, see Smith (1981), Green (1985, Chap.9), Kettell (1982, pp.203-209); Roethenmund (1987), and Craig (1982, pp.19-24).

2/ The actual fix price is for the sale of at least 2,000 ounces in London good delivery bars of 400 ounces. Purchasers pay the fix price, plus one quarter of one percent as commission.

confidential environment. 1/ The members of the Zurich Gold Pool dominate the market by providing virtually all of its supplies of new gold and by operating large refineries, but many smaller banks and finance houses are also engaged in the refinement, upgrading, transportation, and brokering of gold from producer to investor or consumer. Refined gold may be returned to the producer or forwarded to a specified market without transfer of ownership to the finance house, or it may be bought for later sale to consumers or investors. Most of the contracts written in Zurich are for actual delivery, but finance houses also provide gold storage facilities for investors who do not wish to receive the physical gold. In addition, the Swiss banks operate two types of gold bullion accounts: (1) custodial accounts offering title to the account holder, in which case the gold is beyond the reach of creditors if the bank fails, and (2) claim accounts, which are the only accounts offered by the members of the Zurich Gold Pool, that never transfer title. The loco-Zurich bullion specification is the same as for the London market, and this allows gold which is situated in Zurich to be quoted loco-London, and vice versa. Delivery and payment are made within two working days, and hours are bankers' hours (9:30 a.m. to noon and 2 p.m. to 4 p.m.).

The Zurich gold market has no formal organizational structure. Except for the members of the Gold Pool, dealers quote bid and ask positions independently from one another (but in close competition). Prices are usually quoted in U.S. dollars, but they are quoted in most other currencies on request. The Gold Pool exists on the basis of an informal agreement among the three large banks (still the original members) and is free of official regulation. Each participant in the Pool trades independently from its own stock of gold. 2/ Although the Pool consists of a combination of these stocks, no gold is vested in the Pool itself. Instead, the Pool operates as a mix between a consortium of dealers and a clearing system. Each member combines its external dealings into lots of 250 kilos (0.25 tons) and offsets them through an opposite transaction between it and the Pool. External sales are bought from the Pool; external purchases are sold to the Pool. In effect, the members "commit themselves to go long or short for the Pool's account, subject to certain (undisclosed) limits." 3/ The positions of the individual banks are not disclosed to one another, thereby keeping secret the source of any large order, and a joint clearing system totals the anonymous positions of the banks and sets a price each day "according to changes in these positions." 4/ This jointly fixed price

1/ For descriptions of the Zurich gold market, on which much of the following is based, see Schriber (1981), Green (1985, Chap.10), Kettell (1982, pp.209-212), Roethermund (1987), Craig (1982, pp.24-26), and Swiss Bank Corporation (1985, pp.50-55).

2/ The banks act as principals and issue their own contracts, which means that they maintain their own dealing positions in gold. Traders regard the individual banks as their counterparties.

3/ Green (1985, pp. 145-46).

4/ Schriber (1981, p.82).

is regarded as the official Zurich price and is binding for Pool members. It also provides a guideline for the other banks that are active in the market. A net excess demand by (supply from) the market is then met (absorbed) in equal proportions from (into) the members' own stocks. In 1982, the Gold Pool established PREMEX AG as a high-technology market intermediary that acts on behalf of other dealers on a commission basis.

The Swiss authorities do not publish statistics on the sources and destinations of gold flows through Switzerland. However, the principal export destinations for loco-Zurich gold are thought to be the Italian jewelry industry which used 360 tons in 1989, and other fabrication centers in Europe (excluding the United Kingdom) which used 200 tons and in the Middle East and Far East, where Switzerland supplied some 38 percent (350 tons) of total demand in 1989.

3. Hong Kong bullion market and price fixing

The Hong Kong gold market began operation informally in 1910 and has expanded rapidly since January 1974, when government restrictions on the importation of bullion were lifted. 1/ It is now the principal distribution and clearing center for the Far East. Furthermore, when the New York market has closed and the London and Zurich markets have not yet opened, Hong Kong is the only significant physical gold market available to Middle Eastern and Far Eastern traders. Accordingly, Europe's opening quotations are based on Hong Kong prices. Hong Kong is estimated to have imported 430 tons of gold in 1989, of which 330 tons were re-exported to other countries in the region in bullion form and 65 tons were used in the fabrication of jewelry destined for mainland China. 2/ The main export destination is thought to have been Taiwan, which is estimated to have absorbed 240 tons from all sources in 1989, but Thailand, China, and the Indian subcontinent are also substantial customers.

Trading is between principals and takes place at the Kam Dgan, which is the Chinese Gold and Silver Society, at 1218 Mercer Street, Hong Kong. The exchange has a fixed number of 195 members, all of whom must be Chinese, and it also includes a "bullion group" of 33 members who smelt and manufacture standard bars. Trading hours are 9:30 a.m. to 12:30 p.m. and 2 p.m. to 4 p.m. on weekdays, and 10:30 a.m. to noon on Saturday. 3/ There are two types of contracts traded on the Hong Kong spot market: loco-Hong Kong and loco-London. Both operate as undated futures contracts, with all trades made for an unspecified forward date (i.e., contracts are open ended). Neither party is under obligation to settle the contract (i.e., to make or take delivery) on any particular date, and traders may roll the contracts over indefinitely, on a daily basis,

1/ Most of the information contained in this section was obtained from Roethenmund (1987, p.77), Green (1985, Chap.12), or Tan (1981, Chap.7).

2/ See Montagu & Co. (1990, p.12).

3/ Hong Kong is the only gold market open on Saturday.

subject to provision and maintenance of a margin requirement, which is assessed with respect to market conditions. ^{1/} Although some loco-Hong Kong contracts are actually completed, most positions (and all loco-London contracts) are eventually canceled by an equal offsetting transaction between the parties involved.

a. Loco-Hong Kong fixing

Spot prices are quoted in units of one Hong Kong dollar per tael (the Chinese measure of weight, which is equivalent to about 1.1914 ounces), and the lot size is 100 taels. Gold bars weigh 5 taels each and are of not less than 99 percent fineness (i.e., slightly inferior to those in other loco-markets). A unique daily fixing is conducted at 11:30 a.m. on weekdays and an hour earlier on Saturdays, and trading stops temporarily while this process is carried out. First, those who wish to make and take delivery are listed on opposite sides of a blackboard. Then, supply and demand are matched--not by altering the spot price, but by the variation of a daily interest factor, which is expressed in terms of Hong Kong dollars per 10 taels of gold a day, and which is actually a financing charge or premium on open positions maintained until the next day. The charge may be positive or negative, depending on the positions to be squared. When the shorts are originally in excess, the interest factor is positive and the shorts make payment to the longs; when the longs are in excess, the interest factor is negative, and the longs make payment to the shorts. This unique procedure allows the market to clear without requiring that the (undated) contracts be fulfilled. If there is an excess of long positions (for example), this is equivalent to excess demand at the prevailing spot price, and the "price" rises by imposing a cost on the longs for maintaining their long positions. The shorts, on the other hand, also maintain their positions, but receive a payment to do so.

b. Loco-London pricing

Loco-London contracts are also undated and are rolled over indefinitely until a position is closed by an equal opposite transaction. The market is purely speculative, with no delivery effected. Price quotations are based on spot rates for standard good delivery bars in London, and trading is performed on the basis of the payment of a margin. A daily interest charge based on the LIBOR (London interbank offered rate) is levied on any open positions financed by the broker or is credited to the accounts of those in profit.

^{1/} See Gehr (1988) for a description of how these undated futures contracts operate.

4. New York bullion market

The physical gold market in New York developed after the lifting of U.S. restrictions on holding gold in 1975. 1/ Investors and speculators became interested principally in trading in coins (especially South African Krugerrands) and derivative gold instruments. Except for some interest in the South and West, bullion never became a major target of investment funds. However, the United States was considered in 1989 to be the third largest producer of mined gold in the world, having produced 259 tons in that year, and the New York bullion market serves as a conduit between this mined gold and the U.S. gold fabrication industry, which is also the third largest in the world (after Italy and India). The U.S. fabrication industry used 201 tons of gold in 1989, including an estimated 35 tons of scrap. In total, some 220 tons of new gold, including coins, are estimated to have been demanded in the United States in 1989. 2/

The New York bullion market has no formal structure and no open-outcry meeting place. It consists of a number of market makers who operate an over-the-counter bullion trade. 3/ Any quantity can be traded, but most transactions are in multiples of 100 ounces and the most common units are 400-ounce and 100-ounce bars of 999 fine (i.e., American gold). Trading is not restricted to any exchange hours, and delivery can be made on any date mutually agreed upon, with payment due on receipt.

5. Singapore bullion market

The Singapore bullion market serves principally as an entrepôt between London and other countries in the Far East (in particular, Indonesia). 4/ Of the 227 tons imported by Singapore in 1989, it is estimated that only 28 tons were retained to satisfy domestic

1/ For a discussion of the New York bullion market, on which the following is based, see Kettell (1982, pp.212-14), Roethenmund (1987), and Green (1987, pp.151-52).

2/ See Montagu & Co. (1990, p.12).

3/ The principal market makers are J. Aron & Co. (which is allied with Goldman Sachs), Mocatta Metals Corporation (which is connected to Mocatta & Goldsmid of London), Philipp Brothers (a division of Philbro Corp.), the Republic National Bank of New York, and Sharps Pixley. Morgan Guaranty Bank is a powerful market force because it has a large number of central bank and institutional investor clients, and Drexel Trading also had an important market niche with institutional investors and central banks before it went bankrupt along with its parent company, the Drexel Burnham Lambert Group, in 1990.

4/ Other countries include Malaysia, Thailand, Viet Nam, Taiwan, and India. For further information on the Singapore market, and as a source for much of the following text, see Roethenmund (1987), Green (1985, Chap.13), Tan (1981, Chap.8), and Hok (1981).

demand. 1/ The market, which was formed in 1969, has no formal organizational structure and no open-outcry meeting place. It is primarily made up of brokers who charge an over-the-counter premium on the price quoted (on an overnight basis) by their European consignors. However, some of the larger bullion houses do act as principals, taking positions on their own account, and most of the large overseas gold houses are well represented. 2/

Gold bars of many sizes are traded, but the most popular unit is the kilobar (32.151 ounces) of 999 fineness, and all physical gold is traded loco-Singapore and in Singapore dollars. Settlement is effected by full payment of cash on delivery, which is usually within a week of the date of contract. An undated futures market also operates in Singapore, trading loco-London and loco-Hong Kong paper gold on a rollover basis, and this procedure permits margin speculation on overseas spot prices, with interest on outstanding balances being charged daily on the basis of LIBOR. Banks have also developed gold certificates and gold savings passbook programs that are denominated and accumulated in units as small as a gram.

6. Other bullion markets

a. Continental Europe

Investors in France have long had an affinity toward investment in gold. It is estimated that they had accumulated some 5,000 tons of gold for this purpose prior to 1968. Analysts speculate that this is still the largest stock of unreported gold in the western world. 3/ Since 1968, the French have preferred to make and hold their gold investments in Switzerland, and the Paris gold market (the Matif) is used predominantly for domestic transactions in gold for fabrication purposes. France consumed about 30 tons of new gold in its fabrication industry in 1989, and the importation and exportation of gold for other purposes is largely prohibited. Paris has both a midday and afternoon fixing, at which prices are set in French francs per kilobar.

Because of its reputation as a liberal international financial center, Luxembourg has become increasingly important as an international gold trading center. Gold movements are not restricted, and no tax is imposed on transactions. Since March 1981 there has been an official gold fixing at 10:30 a.m. on weekdays, under the auspices of the Luxembourg Stock Exchange,

1/ See Montagu & Co. (1990, p.12).

2/ The market leaders have been the local representatives of Rothschild & Sons, the Republic National Bank of New York, and Credit Suisse, as well as the bullion divisions of some local banks: the United Overseas Bank, the Overseas Chinese Banking Corporation, and the Overseas Union Bank.

3/ Roethenmund (1987) and Green (1981).

and this is the first official quotation in Europe each day. 1/ Prices are fixed in terms of Luxembourg francs per kilobar (999 fine), and U.S. dollars an ounce for a standard (995 fine) 400 ounce bar. The fixing is open to members of the stock exchange, who act as principals for their own account. Settlement is loco-Luxembourg through a clearing intermediary that maintains a central depository at the State Bank of Luxembourg and is effected within two working days.

Brussels, which was traditionally a free market and served as an outlet for newly mined gold from Zaïre, lost much of its trade in 1981 when the Belgian government imposed a 6 percent value-added tax, which was later reduced to 1 percent. Germany has a rather small gold market in Frankfurt, but most of the Federal Republic of Germany's estimated net demand of 65 tons in 1989 was met in Zurich and Luxembourg. The Frankfurt market has been unrestricted since 1959, but transactions are subject to a 12 percent value-added tax. The kilobar is the basic unit of trading. 2/

b. The Middle East

Egypt prohibits the importation and exportation of gold, but it has two local free markets in Cairo and Alexandria. Much of the supply to these relatively active markets is reportedly smuggled into the country. Israel also severely restricts gold trading, and investment must be made through authorized dealers who retain the gold in storage. Beirut rivaled Zurich as the world's largest trading center for gold before the London market reopened in 1954, and for many years it maintained its important role as an investment center and entrepôt for gold flows to the Middle East. The market in Beirut is still free of restriction, but it was almost closed by the civil war that began in 1975. Most of its business has shifted to Kuwait and, especially, Dubai. 3/

Net Middle Eastern offtake in 1989 is estimated to have reached 370 tons, of which it is estimated that some 190 tons had been imported into the region through Kuwait and Dubai. Of this, most flowed through Dubai, including an entrepôt trade to India estimated at some 160 tons. Dubai's extensive coastline, with a direct route to the Indian subcontinent, has made it one of the main sources of gold (in smuggled tola bars) into that region. The remainder of trade was for net regional investment purposes, and gold remains very popular with small investors who acquire low quality jewelry and other stocks of physical gold through the souks (local markets) in most Middle Eastern countries.

1/ See Golddealers Luxembourg (1988).

2/ See Roethenmund (1987).

3/ See Roethenmund (1987), Green (1985, Chap.14), and Montagu & Co. (1990, p.14) for much of the information contained in this section.

Ankara opened an official market in 1989, and stockbuilding for this has combined with local fabrication demand to produce Turkey's estimated imports of 95 tons, virtually the remainder of Middle Eastern inflows after accounting for Kuwait and Dubai. The Central Bank of Turkey operates as the broker in the market.

c. India and the Far East

Restrictions on the importation of gold into India, coupled with a high demand for investment and fabrication, have produced an active trade in gold smuggled into India and gold usually trades at a substantial local price premium over the London price. ^{1/} The unit of measurement is a tola (0.375 ounces), with bars of 1, 5, and 10 tolas being commonplace in the main local trading centers of Bombay, Madras, and Calcutta. India is estimated to have absorbed some 227 tons of new gold in 1989.

Tokyo has grown significantly as a trading center for gold since restrictions on imports were lifted in 1973, and the Tokyo market is estimated to turn over 20-30 tons a day. Kobe, Osaka, and Yokohama also have gold markets. Prices are quoted in yen per nomme (3.75 grams). Japan imported some 284 tons in 1989, of which some 200 tons were for fabrication purposes. Manila and Sydney also have active, but relatively small, markets in physical gold.

d. Other American markets

In Brazil and Mexico, residents are allowed to hold gold for investment purposes, but exports are restricted and there is reputed to be a great deal of smuggling. Nevertheless, São Paulo is probably the largest market in South America, with Rio de Janeiro and Mexico City also being prominent. Canada has gold markets allied with the commodity exchanges of Montreal and Winnipeg.

7. Markets in derivative physical instruments

a. Gold loans

Gold loans are a phenomenon of the 1980s. The market for gold loans developed quickly in 1987, when the October stock market crash left many mining companies with reduced access to new capital. The market is typified by large (usually syndicated) loans to mining companies that want to finance excavation and further exploration and at the same time obtain a hedge against adverse price movements. The lending banks obtain gold either by borrowing from large investors and central banks or by buying on the spot market and simultaneously selling gold forward. By the end of 1986, only

^{1/} See Roethenmund (1987), Green (1985, Chap.15), and Montagu & Co. (1990, p.14) for much of the information contained in this section.

38 loans, representing some 60 tons, had been negotiated; but by the end of 1989, an additional 159 contracts were in place and loans representing some 320 tons were outstanding. 1/

Prior to 1990, lending rates for gold never exceeded 3 percent (of the physical stock involved) on an annualized basis and were normally well below 2 percent, providing a cheap source of finance for mining companies. Banks could simultaneously compensate the central banks that had long held barren gold assets, 2/ even if they included a substantial profit margin, and this generated a rapidly growing market. In 1988, however, after the Bank of England issued a public warning about banks that lacked expertise in the market, many participants withdrew, leaving a somewhat compressed market in the hands of the major bullion banks. 3/ Then, in 1990, the Drexel Burnham Lambert financial services group collapsed, with large outstanding gold liabilities to many central banks. 4/ As a consequence of the increased wariness after the collapse, the market supply of loans from central banks has been substantially reduced.

Nevertheless, there is still a substantial demand for gold loans from mining houses, and the market has been enhanced by the development of an informal, yet sophisticated, global interbank system that permits dealers to borrow gold on a short-term basis in order to fulfill delivery requirements. Since December 1990, the Financial Times has reported inter-dealer London mean lending rates for gold (denominated in U.S. dollars) for maturities of 1-12 months, and this has become known as the "gold LIBOR". Lending rates for gold rose to just over five percent on an annualized basis

1/ See Euromoney (1990). The largest single loan was to American Barrick Resources of Toronto for 1.05 million ounces (32.66 tons). The loan was led by the Union Bank of Switzerland, Westpac, and the Royal Bank of Canada, representing a syndicate of 10 banks, and has a maturity of eight years (extendable to 11 years), with a 42-month grace period. The coupon is for 1 percent over a base rate that is adjusted every 3 months by the three banks--representing a market shift toward floating rate rather than fixed rates.

2/ In all, some 30 central banks are estimated to have engaged in gold loans. See Gooding (December 4, 1990).

3/ The major arrangers and providers of gold loans have been the Chase Manhattan Bank, the Bank of Nova Scotia, the Union Bank of Switzerland, Westpac, the Reserve Bank of Australia, Barclays Bank, the Kleinwort Benson Bank, and the Bank of New York.

4/ According to market sources, the central banks most affected were the Bank of Portugal (which is estimated to have lost almost 9 tons of gold worth US\$100 million), the Bank of Yugoslavia (which is estimated to have lost gold worth over US\$70 million), the Bank Negara Malaysia (with losses over US\$40 million), and the Narodowy Bank Polski (with losses over US\$10 million). The State Savings Bank of Warsaw is also estimated to have lost almost US\$5 million. These loans were normally unsecured. See, for example, The Economist (1990) and Nathans (1990).

in December 1990, representing a substantial premium over an implicit cost of providing such a loan. According to market analysts, 1/ this rate reflects an increased tightness in the market after the loss of central bank suppliers. For example, on May 21, 1991, the six-month Libor was 6.25 percent, but the contango (or return) on a spot purchase and six-month forward sale of gold was 3.42 percent. 2/ This leaves the implicit net cost of borrowing for a hedged purchase of gold at 2.83 percent, compared with a gold lending rate of 5.16 percent. By comparison, on December 1, 1989, the LIBOR was 8.25 percent and the contango was 7.69 percent, yielding a hedged borrowing rate of 0.56 percent, which was close to the prevailing gold lending rate of about 0.7 percent.

b. Gold swaps and forward sales

Gold swaps and forward sales by producers have become an increasingly prevalent aspect of the gold market in recent years, and forward sales were cited as a particularly important determinant of gold prices in 1990. 3/ Market analysts estimate that some 240 tons were sold forward by producers in 1990, compared with western mining production of 1,734 tons and equivalent sales of 65 tons in 1989. 4/ In the third quarter alone, 159 tons were thought to have been sold after the price of gold rose to \$400 an ounce following Iraq's invasion of Kuwait. 5/ In total, almost 10 percent of known gold reserves in the ground in South Africa, Australia, and North America were estimated to have been hedged (either through gold loans or forward sales) at the end of 1990--representing some 70 percent of their anticipated 1991 production.

The U.S.S.R. and the South African Reserve Bank are the major providers of gold swaps, which are attractive because they do not directly depress gold prices. However, swaps can provide liquidity to the market for gold loans if they are converted into loans by the dealers concerned, and they can subsequently affect supply to bullion markets if the loans are drawn down and sold by producers. The U.S.S.R., for example, is estimated to have swapped some 300 tons for foreign currency in the first half of 1990, 6/ providing temporary liquidity to the market for gold loans when interest rates fell to 0.5 percent (annualized). These swaps were

1/ See Gooding (December 4, 1990).

2/ The contango is the positive difference between the future and spot prices (a negative difference is called backwardation), which in this case were \$363.3 an ounce (on the COMEX October contract) and \$357.1 an ounce, respectively. The contango can be expressed as a percentage of the spot price. In this case, it is 1.71 percent, or 3.42 percent on an annualized basis.

3/ Gooding (January 24, 1991).

4/ Gold Fields Mineral Services, Gold 1991.

5/ Estimate by Barclay de Zote Wedd financial services group, quoted in Gooding (January 4, 1991).

6/ See Gooding (December 4, 1990).

thought to have been unwound when the gold price reached \$400 in August, however, and the gold sold directly onto the market, with a consequent reduction in gold prices and an increase in the gold lending rate.

V. Paper Markets and Prices

1. Futures and options exchanges

The first gold futures contract was launched at the Winnipeg Commodity Exchange in 1972. Soon after, when the 33-year-old ban on the purchase and holding of gold by U.S. residents was lifted on December 31, 1974, five exchanges (two in New York and three in Chicago) began to trade gold futures in the United States. ^{1/} The Commodity Exchange of New York (COMEX) has since come to dominate the market in gold futures almost completely (see Table 6). Trading in gold futures reached a climax in 1981, with volume equivalent to 46,000 tons (almost 44 times the supply of new gold in that year), but this figure has since been reduced to about 34,000 tons annually (17 times the supply of new gold in 1989). Futures exchanges have been opened in many other countries, including the United Kingdom and Switzerland, but few are still active. A notable exception to this is the Tokyo Commodity Exchange for Industry (TOCOM), which began trading in 1982 and has had a steady growth in volume since then. The only other active contracts are at the Chicago Board of Trade (CBOT), the Mid-America Commodity Exchange, and the Hong Kong Futures Exchange.

The first gold options contract was also launched by the Winnipeg Commodity Exchange. Once again, it was surpassed by COMEX when it launched its own options contract in October 1982. The only other large volume options contract since 1986 has traded in São Paulo, Brazil. The volume of options trading (at COMEX and São Paulo) has increased over the years, with the equivalent of 4,460 tons in 1984 and a record 6,790 tons in 1989. The only other active options contract is traded on the Mid-America Commodity Exchange.

When combined, futures and options contracts traded on the exchanges were equivalent to a total of 40,836 tons in 1989 (21 times the supply of new gold), with COMEX accounting for almost 90 percent (see Table 6). This is equivalent to a world volume of about 160 tons per trading day. While this appears to be a large volume and is probably somewhat comparable to daily physical volume in London, less than 1 percent of the contracts are delivered. Year-end stocks in registered warehouses of COMEX and TOCOM at the end of 1989 held only 10 percent of the open interest contracts and

^{1/} Of the original five exchanges, the New York Mercantile Exchange (NYMEX) contract became inactive in 1981 (NYMEX is now planning to merge with COMEX), and the International Monetary Market (IMM) contract in Chicago, having originally performed better than most, became inactive in 1986. The other three are still active (see Table 6).

0.25 percent of the annual volume (see Table 6). The importance of paper gold does not derive from the volume of physical gold turned over, however, but from the highly leveraged manner in which speculators can hold substantial positions.

a. COMEX

The New York Commodity Exchange (COMEX) dominates futures and options trading in gold. 1/ Trading is conducted from 9 a.m. to 2:30 p.m. at the World Trade Center in New York. Both futures and options contracts are quoted in U.S. dollars an ounce, with a contract size of 100 ounces (995 fineness), and a tick size of \$0.1 an ounce (or \$10 a contract). Futures and options trade for delivery in the current month, the succeeding two months, and even numbered months up to 22 months. Actual delivery consists of the transfer of a COMEX warehouse receipt at the end of the month (and delivery of physical gold can then be executed, if desired). Warehouse receipts describe the relevant gold in detail and, when properly signed by a registered depository, represent a negotiable instrument. Warehouse stocks also include eligible gold for which a warehouse receipt has not yet been issued.

The membership of the Commodity Exchange falls into three categories: (1) floor members who trade for other members as agents; (2) market-makers (or "locals") who trade for themselves as principals; and (3) commission houses that execute trades for the public. In practice, however, each category can sometimes perform as a market-maker. According to Sarnoff, another "important distinction is made between clearing and nonclearing members. Floor members who are not also clearing members must "give up" their transactions at the end of each trading session to a larger, and better financed, clearing member which carries the account on its books... By the end of the day, the clearing house-computer has assigned each order to the clearing member responsible for the trade. In cases where trades are disputed the matter is adjudicated on by one of the exchange committees." 2/

The operation of the Commodity Exchange is very well described by David Potts of Consolidated Gold Fields Ltd. (1980, page 64):

Customer orders can and do originate anywhere in the world, but to be executed they must be transmitted to the floor of the Exchange. By law, no USA futures transaction can occur outside the designated confines or business hours of the Exchange. Every member firm has either telephone or other electronic equipment on the floor of the Exchange to which its futures business is transmitted.

1/ This section is largely based on Kettell (1982, pp.214-19), Sarnoff (1987, Chap.7), Green (1987, Chap.11), and Tan (1981, Chap.6).

2/ Sarnoff (1987, p.85).

Table 6. Active Gold Futures and Options Contracts in 1989

I. Exchange and contract size	Number of contracts traded	Gold volume	Open interest	Warehouse stocks
		(In metric tons)		
New York Commodity Exchange		<u>36,118</u>	469	70
Futures: 100 ounces	9,988,577	31,068	...	...
Including Sydney	225	1	...	...
Options: 100 ounces	1,623,207	5,049	...	...
Chicago Board of Trade		<u>256</u>	2	2
Futures: 1 kilogram	27,994	28	...	...
100 ounces	73,362	228	...	...
Mid-America Commodity Exchange		<u>32</u>	--	--
Futures: 100 ounces	9,698	30	...	...
Options: 33.2 ounces	1,631	2	...	...
Tokyo Commodity Exchange				
Futures: 1 kilogram	2,686,684	2,687	410	18
Hong Kong Futures Exchange				
Futures: 100 ounces	1,122	5	--	--
Bolsa de Mercadorios, São Paulo				
Options: 250 grammes	6,953,149	1,738	--	--
Total tonnage		<u>40,836</u>		
II. Volume, stocks, and open interest				
			(Percent)	
New York and Tokyo Exchanges				
Year-end open interest as percentage of volume			2.27	
Year-end stocks as percentage of open interest			10.01	
Year-end stocks as percentage of volume			0.23	

Sources: Gold Fields Mineral Services (1990), Montagu & Co. (1990), CPM Group (1990), and Shearson Lehman Hutton (1990).

Once transmitted to the floor, all customer orders are executed by a broker in the trading area ("pit") for the specific commodity... The transaction is consummated by "open outcry" in auction style whereby bidders and offerers compete for the best price. Under normal market conditions, trades are executed swiftly, within two to three minutes after the order is entered, and then reported back through the firm's system. Since time is crucial to futures market customers, the Exchanges keep precise account of the time at which any price change occurs. Customer orders are time-stamped at receipt and confirmation.

Once the customer order has "cleared," the Clearing House of the Exchange becomes the opposite party: the seller for every buyer, the buyer for every seller. ^{1/} Customers need not be concerned about who takes the opposite side of their trades on the floor, since the Clearing House stands for performance of the contract.

Once a trader has taken a position in the market by buying or selling one or more contracts, he has two options: (1) to maintain this position until the contract matures and then to accept or make delivery, or (2) to offset the contract before maturity by assuming a position equal and opposite to the original trade. In other words, if a trader originally bought one gold contract, he could liquidate or offset by selling that contract; if he originally sold a contract, he could offset by buying it back. In both cases, his liquidating trade must be made for the same delivery month and on the same exchange as the original contract. Approximately 97 percent of all commitments are offset in this manner, rather than by delivery of the gold itself.

According to Potts:

The customer's account is kept current by each member firm on a daily basis. When a customer enters the market, he deposits with his firm a required "margin." This represents a security deposit toward any adverse price movements in the market. If the market continues to move against the customer position and the margin money is eroded below a minimum set by the Exchanges, the customer is required to deposit additional money with the firm. If the market moves in favor of the customer position, the customer may withdraw the excess money on deposit in his account... Because security deposits (margins) are relatively small, futures market positions are highly leveraged. As a result, the Exchanges establish daily limits on the amount which the price of a

^{1/} The members of the Clearing House Association are the actual counterparties to these trades, and each member of the association guarantees jointly, and without limit, the contractual obligations of every other member. A "settlement price" is established at the end of each trading day, and at the start of the next day each member must furnish a maintenance margin to the Association for each adverse position carried on its books.

particular contract can move, up or down, on a single trading day. This serves to brake extreme price fluctuations and gives the participants an over-night chance to cool down and review the market. It also gives the firms a chance to call for new or more margin should it be required. The markets also utilize an "expanded limit" formula which works to expand the daily limits so that, when necessary, the market can more quickly catch up to world spot prices. ^{1/}

When the contract expires, on the final day of the delivery month, the contract price conforms to the spot price being quoted by local bullion houses.

In November 1986, the Sydney Futures Exchange began trading in COMEX futures, which are cleared through the COMEX Clearing Association. This trading permitted the market for futures to continue virtually around the clock, and it added another seven hours of public outcry to the exchange of COMEX contracts (with one hour of overlap).

COMEX is also the dominant options exchange. Options are traded on futures contracts. The strike prices offered are differentials of \$10 around the spot price, if the spot price is below \$400, and \$20, if the spot price exceeds \$400. All options are American style and, like futures, are traded by members of the exchange and cleared by members of the Clearing Association.

b. Other exchanges

Table 6 summarizes the relative importance of the contracts actively traded in 1989, and it is clear that all other exchanges are subsidiary in importance to COMEX. Table 7 outlines the trading hours on these exchanges, together with the tick sizes and traded months for the various contracts. Beyond these differences, however, each of the exchanges operates in a similar manner to COMEX, and the above explanation of market mechanisms can be applied to them also.

2. Over-the-counter options and "exchange for physical" transactions

Futures positions and options may also be obtained off the exchange, but in this case they are less liquid. In the United States, over-the-counter (or dealer) options are offered by dealers approved by the Commodity Futures Trading Commission. Dealers quote options based on prevailing rates on the exchange, but they can be flexible in the description of the contract. Through an "exchange-for-physical" (EFP) transaction, a client may adopt a futures position when the exchange is not operating; the bullion house then acts as counterparty and adopts the risk involved until it is able to offset the position when the exchange opens. Alternatively, the

^{1/} Potts (1980, p.64).

Table 7. Tick Sizes and Contracts Traded on Paper Gold Exchanges

Exchange and contract size	Tick size	Exchange hours and months traded
New York Commodity Exchange Including Sydney		<u>9 a.m. - 2:30 p.m.</u>
Futures: 100 ounces	US\$0.10/oz	Spot + 2 next + even months
Options: 100 ounces	US\$0.10/oz	Spot + 2 next + even months
Chicago Board of Trade		<u>8 a.m. - 1:40 p.m.</u>
Futures: 1 kilogram	US\$3.22/kg	Spot + 2 next + even months
100 ounces	US\$0.10/oz	Spot + 2 next + even months
Mid-America Commodity Exchange		<u>8 a.m. - 1:40 p.m.</u>
Futures: 100 ounces	US\$0.10/oz	All months
Options: 33.2 ounces	US\$0.10/oz	Even months
Tokyo Commodity Exchange		<u>Six sessions:</u> (9:10 a.m., 10:30 a.m.; 11:30 a.m.; 1:10 p.m.; 2:30 p.m.; and 3:45 p.m.)
Futures: 1 kilogram	¥1/g	Spot + next + even months
Hong Kong Futures Exchange		<u>9 a.m. - noon and 2:30-5:30 p.m.</u>
Futures: 100 ounces	US\$0.10/oz	Spot + 2 next + even months
Bolsa de Mercadorios, Sao Paulo		<u>11 a.m. - 4:30 p.m.</u>
Options: 250 grams	Cr0.10/g	Even months

Sources: Sarnoff (1987) and Shearson Lehman Hutton (1990).

position may be closed with a resting (i.e., an offsetting) EFP order before the exchange reopens.

VI. Summary and Concluding Remarks

Since 1968, the world gold market has developed into a fully-fledged global market, complete with a full range of derivative financial instruments that allow the adoption of hedging and options strategies. ^{1/} While this conforms to the trend toward rapid financial innovation in other international commodity and asset markets, a number of features of the gold market appear to have evolved in response to some of gold's unique characteristics both as a commodity and a financial asset. As such features might provide avenues for further research, they are at least worth a brief mention here.

Because gold cannot be consumed and can easily be transformed, a large existing stock constantly overhangs the market, and market participants are particularly sensitive to any changes in its distribution. Perhaps, for this reason, large gold holders are very secretive about their positions, and market placements are conducted with the utmost confidentiality. However, it is difficult to place a large sell order without its being detected by other market participants. The gold market appears to have discovered a unique solution to this set of problems, and this solution may explain the division of market functions between Zurich and London. The Zurich banks operate a pool that can absorb (and therefore disguise) large sales, so that Zurich has retained its dominance as the entrepôt for new gold supplies. The London fixing allows the rest of the world to absorb any net supply (or demand) and is regarded as the true market price by virtue of its market-clearing mechanism.

Exchange-traded derivative financial instruments are essentially located in the New York market. Exchange trading, because of its disclosure requirements, does not promote confidentiality and therefore attracts a type of market participant different from those who hold large positions in physical gold. The market is largely confined to speculative interest. Although futures contracts do provide adequate hedging facilities, most large positions in physical gold are hedged through forward dealer contracts or swaps, and these are likely to remain an integral part of the market.

Finally, gold's historical role as a monetary anchor has led to large stocks that have been accumulated as reserves at central banks, which in turn has facilitated the development of a market in gold loans. Although the market for large syndicated loans has now been substantially diminished, an inter-dealer market lending rate is quoted. From this market the possibility of discovering a "real" interest rate (which is not related to a

^{1/} For a discussion of hedging and options strategies, see Sarnoff (1987, Chap.7) or Jacks (1990).

particular currency), without recourse to derivation from a nominal (currency specific) rate, is somewhat intriguing, and might also be a fruitful avenue for research.

Conversion Factors and Purity Standards for Gold

1. Conversion factors

	Metric tons	Kilograms	Grams	Troy ounces	Tolas	Taels
1 Metric ton	1.000000	1000.000	1000000	32150.74	85735.35	26717.25
1 Kilogram	0.001000	1.000000	1000.000	32.15074	85.73535	26.71725
1 Gram	0.000001	0.001000	1.000000	0.032151	0.085735	0.026717
1 Troy Ounce	0.000031	0.031103	31.10348	1.000000	2.666666	0.830906
1 Tola	0.000012	0.011664	11.66380	0.375000	1.000000	0.311624
1 Tael	0.000037	0.037429	37.42900	1.203370	3.208988	1.000000

2. Purity standards

Carats	Parts per 1,000
24	1,000.000
22	916.667
18	750.000
14	583.333
9	375.000
1	41.667

Source: Golddealers Luxembourg (1988).

Note on the Official Reporting of Gold Flows

1. Fund practice and recommendations

The Fund distinguishes between "monetary gold" and "nonmonetary gold," defining the former as any gold held by an official monetary institution and the latter as all other gold stocks. Because monetary gold is included in official reserves, it is not included in either the current or capital account of the balance of payments and appears instead as a monetary movement below the line.

With respect to the reporting of nonmonetary gold in the balance of payments, Fund practice has been the product of two distinct areas of consideration in a global context. The primary recommendation 1/ is that nonmonetary gold be treated as a commodity and thereby included in the current account, because gold at end use is closely related to a commodity. 2/ The secondary recommendation is that commodity flows in general be included on a gross basis, because imports and exports of a particular commodity are seldom related in a simple manner and because this representation has more informational content, particularly with respect to industry production. The Fund's Balance of Payments Manual, in recommending procedures for reporting payments statistics, reflects the Fund's desire to "facilitate the analysis of countries' international economic relationships and to maximize intercountry comparability." 3/ Virtually all countries have adopted these recommendations in the reporting of their gold flows, with the two most notable exceptions being Switzerland and the United Kingdom: Switzerland reports the majority of gold flows in the capital account on a gross basis; the United Kingdom also includes them in the capital account, but on a net basis.

2. Reporting gold flows through Switzerland

Regarding the reporting of nonmonetary gold flows for balance of payments purposes, the Swiss authorities distinguish three categories of gold flows for separate treatment as follows:

(1) Imports and re-exports on behalf of nonresidents through fiduciary or trustee accounts are excluded from the balance of payments.

(2) Gold imported for finished manufactures in Switzerland is included in the current account.

1/ As set forth in paragraph 464 of the Fund's Balance of Payments Manual.

2/ On average, some 85 percent of new gold is eventually used in fabrication.

3/ International Monetary Fund, Balance of Payments Manual, paragraph 2.

(3) All other flows, which make up the vast bulk of imported gold (as presented in Table 5 of this paper), are recorded in the capital account.

Gold flows categorized under (1) are excluded from the balance of payments in accordance with the procedure recommended in the Fund's Balance of Payments Manual (paragraphs 221-25) on goods crossing a frontier without change of ownership. The distinction made between categories (2) and (3) reflects gold's dual characteristics as a commodity and as an investment instrument, which have resulted in most gold transactions being recorded in the capital account and implicitly treated as financial asset transactions. While this deviates from Fund methodology, it would appear to reflect the nature of gold flows through Switzerland because, of the gold flows that currently appear in the Swiss capital account, an average of 86 percent (based on the period 1968-89) is re-exported after only a minor degree of transformation.

3. Reporting of gold flows through the United Kingdom

As regards the reporting of gold movements in its balance of payments statistics, the United Kingdom has followed a consistent policy of differentiating between commodity gold and all other gold movements, which are regarded as "financial gold." In United Kingdom Balance of Payments (1989, page 71), the Central Statistical Office explains:

Transactions in commodity gold are recorded in the visible trade account and include overseas trade in finished manufactures together with net domestic and overseas transactions in gold moving into or out of finished manufactured form (i.e., for jewelry, dentistry, electronic goods, medals and proof--but not bullion--coins). 1/

Furthermore, the publication states that because "the figures of exports and imports [which are recorded] in the Overseas Trade Statistics include only finished manufactures of gold...[to] achieve the coverage required for balance of payments purposes, an adjustment is made to exports to include the value added in refining gold and in the production of proof coins, and to imports to cover the value of gold used for finished manufactures. The import adjustment is based on commercial statistics on hallmarking of gold items (published by the Assay Offices of Great Britain) and gold uses in other finished forms (e.g. electronics, dentistry) published by Consolidated Gold Fields plc." 2/

The Central Statistical Office explains further:

All other transactions in gold (i.e. those involving semimanufactures such as rods, wire, etc., or bullion, bullion coins or banking-type assets and liabilities denominated in gold, including the official

1/ United Kingdom Balance of Payments (1989, p.71).

2/ United Kingdom Balance of Payments (1989, p.14).

reserves) are treated as financial gold transactions and included in the capital account. The distinction between commodity and financial gold differs from that drawn by the IMF, in its Balance of Payments Manual (4th edition, 1977), between nonmonetary and monetary gold. The United Kingdom has adopted different definitions to avoid distortion of its visible trade account by the substantial transactions of the London Bullion Market. 1/

The capital account records: "Net transactions in gold which is held as a financial asset by listed institutions in the London Bullion Market (LBM) outside the U.K. monetary sector and by other non-bank residents... from the beginning of 1982 in the case of the LBM institutions; and from the beginning of 1970 in the case of other U.K. residents." 2/ This rather oblique reference to a change in reporting procedure concerns the only significant change in reporting practices since 1970, with effect from January 1, 1981. Thereafter, gold transactions by domestic residents, other than banks or the London Bullion Market, were included as imports and exports in the merchandise trade account to reflect the lifting of exchange control restrictions in 1979, but are not separately quantifiable on the basis of available data. They had hitherto been included on a net basis in the capital account along with LBM transactions, at least insofar as they existed.

A reference in Overseas Trade Statistics clarifies this: "With effect from January 1981, all trade in gold, other than that in unwrought refined bullion which is the subject of interbank or London Gold Market dealings (which is to be considered as monetary gold), is included in merchandise trade. Imports and exports of monetary gold continue to be excluded from merchandise trade." 3/ Further explanation is offered by the Central Statistics Office: "transactions between the U.K. monetary sector... and other U.K. residents... are recorded twice within the capital accounts thereby giving no net effect on the total capital account." 4/ The only other change in reporting procedure, with effect from January 1976, was that trade in gold coin was thereafter included in the merchandise trade account, having been hitherto included with "monetary gold." 5/

Therefore, data for the United Kingdom on imports and exports of what the U.K. authorities describe as "financial" gold movements in the United Kingdom balance of payment are included on a net basis in the capital account. 6/ The U.K. Central Statistical Office (CSO) does publish data on both imports and exports of financial gold, however, but uses the term "monetary gold" to describe them in a separate table (VIII) in its

-
- 1/ United Kingdom Balance of Payments (1989, p.71).
 - 2/ United Kingdom Balance of Payments (1989, p.43)
 - 3/ Overseas Trade Statistics of the United Kingdom (1986, p.v).
 - 4/ United Kingdom Balance of Payments (1989, p.43).
 - 5/ Overseas Trade Statistics of the United Kingdom (1986, p.v).
 - 6/ United Kingdom Balance of Payments (1989, p.43).

Overseas Trade Statistics (even though such data are excluded from the current account). The CSO defines "monetary gold" to include "unwrought refined bullion which is the subject of interbank or London Gold Market (LGM) dealings." 1/ It therefore comprises gold not held as official reserves, as well as movements in or out of official reserves, and deviates from Fund terminology, which uses the term "monetary gold" to refer exclusively to gold held in official reserves. The categories for monetary gold in Overseas Trade Statistics have varied slightly over the years, but the vast bulk of gold movements involved in any given year can be assimilated as "unwrought refined bullion." 2/

1/ Overseas Trade Statistics of the United Kingdom (1986, p.v).

2/ Some assessment of the magnitude of these gold movements is a useful indicator of what is included. The figure recorded for imports in 1989 is £4,182 million, which is \$6,859 million at the average exchange rate. In turn, at the average U.S. dollar gold price, this figure represents 560 tons of gold--very close to industry estimates that 550 tons of "financial gold" flowed through London in 1989. This is a further indication that what the Central Statistical Office (CSO) calls "monetary gold" includes "nonmonetary gold" in Fund terminology. It is worth noting that there was no significant change in U.K. gold reserves in 1989.

References

- Aggarwal, Raj and Soenen, Luc, "The Nature and the Efficiency of the Gold Market," Journal of Portfolio Management, vol. 14, no. 3 (Spring 1988).
- Baker, James A., Statement Before the Boards of Governors of the World Bank and International Monetary Fund (Washington: September 30, 1987, Press Release No. 50).
- Bank for International Settlements, Fifty-Ninth Annual Report (Basle: BIS, June 1989).
- Brody, Alan J., "Gold as a Financial Instrument," Mining Journal, Supplement, October 21, 1988.
- Chua, Jess H., Sick, Gordon, and Woodward, Richard S. "Diversifying with Gold Stocks," Financial Analysts Journal, vol. 46, no. 4 (July/August 1990).
- Conger, Harry, "Gold: Glitter or Glut?" Chief Executive Issues, no. 62 (October 1990).
- CPM Group, Precious Metals (New York: Christian, Podleska and van Musschenbrock Ltd.), vol. 1, no. 1 (fourth quarter, 1987).
- _____, Precious Metals: Gold (New York: Christian, Podleska and van Musschenbrock Ltd.), vol. 4, no. 2 (second quarter, 1990).
- Craig, Malcolm, Making Money from Gold: An Essential Guide to Successful Gold Investment (Kingsclere, England: Scope Books, 1982).
- The Economist, "Fool's gold," March 17, 1990, p.79.
- _____, "The Real Goldfingers," August 19, 1989, p.61.
- Euromoney, "Soviet Figures: A Well-Kept Secret," in January 1987 Supplement: Gold: Refining the Market, p.12.
- _____, "Deriving Some Added Value," in July 1990 Supplement: Gold: A Bumpy Ride Ahead, p.24.
- Followill, Richard A. and Helms, Billy P., "Put-Call-Futures Parity and Arbitrage Opportunity in the Market for Options on Gold Futures Contracts," Journal of Futures Markets, vol. 10, no. 4 (August 1990).
- Gehr, Adam, "Undated Futures Markets," Journal of Futures Markets, vol. 8, no. 1 (February 1988).

- Gold Fields Mineral Services Ltd. (also known as Consolidated Gold Fields), Gold (London: various years).
- Gold, Sidnez, "New Products and the Possibilities for More," in Financial Times World Gold Conference, Venice, June 25 and 26, 1990 (London: Financial Times Conference Organization, 1990), pp.12.1-12.5.
- Golddealers Luxembourg a.s.b.l., Guide to Precious Metals 1988 (London: Mint, 1988).
- Gooding, Kenneth, "Gold Lending Rate at Record Level," Financial Times (London), December 4, 1990, p.34.
- _____, "SA Bank Sends Bullish Signal to Gold Market," Financial Times (London), January 4, 1991, p.22.
- _____, "Forward Selling by Producers Putting Cap on Gold Price," Financial Times (London), January 24, 1991, p.32.
- _____, "Peace Will Boost Gold Demand," Financial Times (London), February 22, 1991, p.26.
- Green, Timothy S., "The Above-Ground Stocks of Gold," in World Gold Markets, 1981/1982 (London: Proceedings of Conference, May 18-19, 1981, sponsored by Consolidated Gold Fields Ltd. and Government Research Corporation, 1981), pp.27-28.
- _____, The New World of Gold: The Inside Story of the Mines, the Markets, the Politics, the Investors (London: Weidenfield and Nicolson, 1985).
- _____, The Prospect for Gold: The View to the Year 2000 (London: Resendale Press, 1987).
- Greenspan, Alan, "Statement of the Chairman, Board of Governors, Federal Reserve System, Before the Subcommittees on Domestic Monetary Policy and on International Finance, Trade, and Monetary Policy of the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, December 18, 1987," Federal Reserve Bulletin (Washington), February 1988, pp.103-104.
- Gulley, David, "Gold and Crises: New Myths for Old?," Euromoney (London), January 1991, pp.65-68.
- Hok, Gan Tjoen, "The Singapore Gold Market," in World Gold Markets, 1981/1982 (London: Proceedings of Conference May 18-19, 1981, sponsored by Consolidated Gold Fields Ltd. and Government Research Corporation, 1981), p.95.

Inoue, Junnosuke, "New Products and the Possibilities for More," in Financial Times World Gold Conference, Venice, June 25 and 26, 1990 (London: Financial Times Conference Organization, 1990), pp.13.1-13.2.

International Monetary Fund, Balance of Payments Manual (Washington: IMF, 1977).

Jacks, Jessica, "Gold Options," Mining Journal, May 25, 1990, pp.12-14.

Kettell, Brian, Gold (London: Graham & Trotman, 1982).

Kuhn, Susan, "Is Gold Still the Best Bet for Troubled Times?" Fortune, vol. 122, no. 7 (September 24, 1990).

Martin, Michael G., "Gold Market Developments, 1975-77," Finance and Development (Washington), March 1978, pp.31-35.

_____, "The Changing Gold Market, 1978-80," Finance and Development (Washington), December 1980, pp.40-43.

McGanty, Dan, "New Products and the Possibilities for More," in Financial Times World Gold Conference, Venice, June 25 and 26, 1990 (London: Financial Times Conference Organization, 1990), pp.14.1-14.3.

McNamee, Mike, "Baker's Plan: No Glitter," Business Week (New York), October 19, 1987, p.56.

Melvin, Michael and Sultan, Jahangir, "South African Political Unrest, Oil Prices, and the Time Varying Risk Premium in the Gold Futures Market," Journal of Futures Markets, vol. 10, no. 2 (April 1990).

Milling-Stanley, George, "Gold Update," Shearson Lehman Brothers (New York), August 1991.

Mining Journal, "Soviet Secrets," April 22, 1988, p.334.

Montagu, Samuel, & Co., Annual Bullion Review (London), 1990.

Moore, Geoffrey, "Gold Prices and a Leading Index of Inflation," Challenge, vol. 33, no. 4 (July/August 1990).

Moore, Phillip, "Gold in Need of Investor Appeal," Euromoney, Gold Supplement, July 1990.

Nathans, Leah, "How Drexel Burnham Turned Gold into Junk," Business Week, no. 3162 (June 4, 1990).

- Ogden, J.P. and Tucker, A.L. "Arbitraging American Gold Spot and Futures Options," Financial Review, vol. 25, no. 4 (November 1990).
- Poitras, Geoffrey, "The Distribution of Gold Futures Spreads," Journal of Futures Markets, vol. 10, no. 6 (December 1990).
- Potts, David, ed., Gold 1980 (London: Consolidated Gold Fields Ltd., June 1980).
- Roethenmund, Otto F., "Spot Trading Centres," in Gold, ed. by Paul Sarnoff (London: Euromoney Publications, 1987), pp.73-80.
- Salomon Brothers, Precious Metals (New York, September 25, 1991).
- Sarnoff, Paul, Trading in Gold (Cambridge: Woodhead-Faulkner, 1980).
- _____, ed., Gold (London: Euromoney Publications, 1987).
- Schriber, R., "The Zurich Market," in World Gold Markets 1981/1982 (London: Proceedings of Conference, May 18-19, 1981, sponsored by Consolidated Gold Fields Ltd. and Government Research Corporation, 1981), pp.80-83.
- Shearson Lehman Hutton, Annual Review of the World Gold Industry 1990 (London: Metals Research Unit, May 1990).
- Smith, Keith, "The London Market," in World Gold Markets 1981-1982 (London: Proceedings of Conference, May 18-19, 1981, sponsored by Consolidated Gold Fields Ltd. and Government Research Corporation, 1981), pp.77-78.
- Swiss Bank Corporation, Gold: Myth and Reality (Zurich: Swiss Bank Corporation, 1985).
- Tan, Ronald, The Gold Market (Singapore: Singapore University Press, 1986).
- Temple, Peter, "Has the Gold Rush Stimulated Renewal?" Accountancy, vol. 105, no. 1161 (May 1990).
- U.K. Central Statistical Office, United Kingdom Balance of Payments (London: Her Majesty's Stationery Office, 1989).
- U.K. Department of Trade and Industry, Overseas Trade Statistics of the United Kingdom 1986 (London: Her Majesty's Stationery Office, 1987).
- Williams, David, "The Gold Markets, 1968-72," Finance and Development (Washington), December 1978, pp.9-16.

Yeung, Kenneth B.K., "The Hong Kong Gold Market," in World Gold Markets 1981-1982 (London: Proceedings of Conference, May 18-19, 1981, sponsored by Consolidated Gold Fields Ltd. and Government Research Corporation, 1981), pp.92-94.

