# 9 Saving, Investment, and Gold: A Reassessment of Historical Current Account Data

Matthew T. Jones and
Maurice Obstfeld

## Introduction

This chapter revises pre–World War II current account data for thirteen countries by taking explicit account of the distinction between monetary and nonmonetary international flows of gold. The new data are used to examine the historical cross-sectional correlation between national saving and domestic investment rates. Our statistical analysis is based on an econometric specification that is appropriate for a world in which gold serves as both domestic and international money.

In a seminal paper, Feldstein and Horioka (1980) demonstrated that industrial countries with high saving rates also tend to have high investment rates in post-1960 data. The interpretation of this finding has proven controversial, and has spawned a vast literature. Feldstein and Horioka interpreted their result as indicating a long-term international immobility of capital: national savings, rather than seeking out the most productive uses anywhere in the world, remain in their country of origin. Current account imbalances thus do not allow countries to finance long-run capital needs with foreign savings. Many subsequent authors have been reluctant to embrace this vision, because it contradicts other evidence pointing to a high degree of capital mobility within the modern industrial world.[1]

A natural question to consider, therefore, is whether the Feldstein-Horioka regularity persists in data from the classical gold standard, a period of presumed high capital mobility. An affirmative answer would tend to support the critics of Feldstein and Horioka who have argued that common determinants of saving and investment rates, not capital immobility per se, generate the high post-war saving-investment correlations. Bayoumi (1990) and Eichengreen (1992a) both examined gold standard data, but reached different conclusions. Bayoumi, who

worked with data from 1880–1913 for eight countries, found no significant cross-sectional correlation for any sub-period of the gold standard. In contrast, using different data for a sample of nine countries (the additional country being the United States), Eichengreen found much higher and marginally significant coefficients in cross-sectional regressions of investment on saving.

Both Bayoumi and Eichengreen relied heavily on standard data sources such as Mitchell (1981, 1983, 1988, 1992). While these data are often useful for the purposes of historical comparison, they have at least two shortcomings. One shortcoming that is particularly worrisome for an analysis of current accounts during the gold standard era is the treatment of gold in trade statistics. For many countries in the available sample, official balance of payments statistics confound net exports of commodity gold with monetary gold flows. Some countries exclude all gold flows, while others attempt to make a distinction between nonmonetary and monetary gold trade. Nonmonetary gold exports are a valid current account credit, while exports of monetary bullion and coin should be treated as a capital account credit, and not a current account credit. This misclassification can introduce substantial errors into saving rates, which in the absence of direct observations must be estimated residually as the sum of investment and the current account. As we shall see, however, it is often impossible to classify particular gold transactions as either monetary or nonmonetary.

A further shortcoming of Mitchell's data is their omission of inventory changes from many countries' investment data. When data are available, estimates of gross capital formation should include changes in stocks or inventories as well as gross fixed capital formation. Overlooking inventory accumulation may give an upward bias to estimates of the correlation between saving and investment.[2]

Our yearly data on saving and investment rates from the late nineteenth century through World War II expands the sample of countries examined in previous work.[3] The data we report include inventories for a larger number of countries and treat international flows of gold on a more consistent basis. Our basic finding is that the cross-sectional correlation between gold-standard-era saving and investment rates is somewhat lower, and less significant, than Eichengreen's (1992a) estimates suggest, but it is still greater than the correlation Bayoumi (1990) reports. The explanatory power of these regressions is uniformly much lower under the gold standard than in post–World War II data.

Although we present a specific application of these data, they obviously have many other uses. Researchers interested in studying long-

run saving behavior or economic growth, for example, should find the data we present useful.

### The Treatment of Gold Flows in Current Account Data

Under the classical gold standard (ca. 1870–1914), gold was the predominant means of official international settlement, as well as being the lodestar of monetary policy in most market economies.

> Prior to 1914 the major nations had alternated between gold and silver and bimetallic standards, but by 1870 gold ruled the roost. Gold was the anonymous monarch in a world of creative nationalism, and it counted for more than a mere medium of exchange and contract; it symbolized internationalism and the rule of international law. (Mundell 1968, 288)

In addition to its monetary role, however, gold was also a traded commodity, the product of mineral exploitation. Indeed, the growth of world monetary gold reserves depended on new production and discovery. For gold producing countries, official statistics on gold exports and imports usually did not attempt to distinguish between exports of nonmonetary gold (such as exports of newly produced unrefined gold) and shipments of preexisting monetary stocks. Exports of newly produced gold, for example, represent a current account credit, just like any other merchandise or service export; ceteris paribus they add to national saving. Net shipments to foreigners of monetary gold, however, are a capital account credit.

Why worry at all about distinguishing monetary from nonmonetary gold flows in the balance of payments? After all, exports of monetary gold and newly produced gold alike serve the purpose of allowing an economy to consume more of other commodities, now or in the future. Our motive for pursuing the distinction is to preserve the traditional conceptual separation that balance of payments statistics make between current and capital transactions, or between transactions on goods and asset account. In the traditional framework, an economy's current account balance measures its accumulation of negotiable foreign claims—of which gold was the example par excellence during the period we study here. It is especially important to maintain the identity of the current account as net foreign asset accumulation when we are obliged to measure saving indirectly, as the sum of the current account and investment. Thus, despite the manifest imperfections in the period's data, some attempt at an appropriate adjustment of the standard current account figures seems warranted.

Of course, the preceding rationale for hoping to distinguish monetary from nonmonetary gold flows leads to well-known ambiguities. Why not consider silver to be an international asset and separate monetary from nonmonetary silver flows as well? Why not do the same with diamonds, or other precious items often hoarded as part of wealth? While there is a coherent conceptual case for proceeding in this manner, especially as regards silver, in practice we must draw the line somewhere, and in this study we have chosen—arbitrarily, some will conclude—to draw the line at gold. Our basic reason is that over our sample period as a whole, gold stood without peer as a universally acceptable reserve asset, and as the clear leader in quantitative importance.[4]

Historians have dealt with the problem of classifying gold flows by using several different methodologies. One practice (Feinstein 1972, 115 n. 1) has been to classify all gold movements as monetary in nature, and to subtract them from measured export balances in calculating the current account. A second procedure is to leave all gold shipments in the current account (Viner 1924). A third approach, theoretically preferable to the first two, is to attempt to distinguish monetary from nonmonetary gold movements. Doing so is not always straightforward, however, as we shall see. The next section describes the assumptions that underlie proper application of this third approach.

### *Gold Flows in the Balance of Payments*

It might appear feasible to adjust official current account data simply by subtracting some measure of the net shipments of monetary gold. Typically, countries classified gold flows into three different categories: specie (coin), bullion, and unrefined gold. Unfortunately, these three categories do not correspond directly to monetary and nonmonetary flows of gold. For example, circulating coins may be melted down to bullion and exported to finance the balance of payments. This would imply that monetary gold flows were not fully captured by the data on specie exports. As Morgenstern (1955, 5) observes:

> The separation of monetary and non-monetary gold is neither simple nor conclusive. Gold can move from one category into the other within one country and domestic gold production can affect the stocks of both. During the classical gold standard period it was impossible to know, in the vast majority of cases, whether gold leaving and arriving came from one or the other of these sources and whether it was going—or in which proportions—to industrial or monetary use.

Figure 9.1 illustrates the problem by showing two equivalent international transactions.[5] In the first, indicated in the upper half, an ounce of newly mined gold ore is shipped directly from an Australian mine to an industrial user in the United Kingdom. This transaction raises Australia's official current account surplus (in terms of gold) by one ounce. Since the transaction clearly is not a monetary gold shipment, any reasonable measure of the current account surplus would rise by one ounce.

The lower half of figure 9.1 shows what happens when the U.K. industrial user satisfies his or her demand by purchasing an ounce of monetary gold in Australia, instead of relying on a direct shipment of ore. In this version of the transaction, the gold ore enters the Australian monetary gold stock in the form of bullion but is then immediately shipped abroad for industrial end use (so that Australia's monetary gold stock is not affected within the accounting period).[6] Is the gold shipment to be considered monetary or nonmonetary? If it were labeled as "monetary" and subtracted from Australia's exports to the United Kingdom, then, arguably, Australia's current account deficit would be overstated by one ounce of gold and Britain's surplus correspondingly overstated.

To avoid such problems, it is standard practice in balance of payments accounting to classify all movements of gold from domestic nonmonetary sources into the domestic money supply as nonmonetary gold exports. To offset this current account credit in the balance of payments, an equal capital account debit is added. The debit reflects the

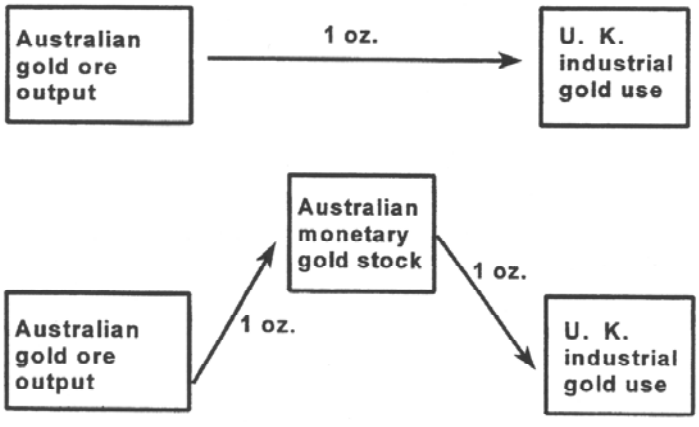


**Figure 9.1**
Equivalence of different gold transactions

acquisition of foreign assets and is a monetary gold import.[7] The rationale for this practice is that any increase in the monetary gold stock is an increase in national foreign exchange reserves. As Gardner (1953, 159) writes:

> Gold is peculiar . . . in the way it affects international monetary reserves. Sales of ordinary merchandise increase those reserves only if the sale is to foreigners. Domestic sales of newly mined gold . . . to the Central Bank or Treasury of the producing country effect the same additions to the country's international reserves as if the gold has been exported and sold abroad. Foreign exchange or its equivalent is created in the hands of the monetary authorities by either process. Hence newly mined gold is regarded as an export of the country whether sold abroad or directly to the local monetary authorities.

Similarly, domestic consumption out of the monetary gold stock is regarded as a simultaneous import of nonmonetary gold and export of monetary gold (the latter being a capital inflow). A key implication is that *any* increase in the domestic monetary gold stock is deemed a monetary gold import (and an "international" capital outflow).

Under this convention, it becomes straightforward to separate monetary from nonmonetary gold flows. Let $\Delta MG$ be the change in the monetary gold stock. Since $\Delta MG$ also equals net monetary gold imports, net nonmonetary gold exports can be calculated as total net gold shipments to foreigners, $SG$, less net monetary gold exports, $-\Delta MG$:

$$\text{Net nonmonetary gold exports} = SG - (-\Delta MG) = SG + \Delta MG. \tag{9.1}$$

On this definition, the true current account, $CA$, is the sum of the current account excluding all gold flows, $CA^{NG}$, and net nonmonetary gold exports from equation (9.1):

$$CA = CA^{NG} + SG + \Delta MG. \tag{9.2}$$

Notice that any monetary gold shipments in $SG$ are canceled by the corresponding decrease in the monetary gold stock $MG$ and thus do not affect the true current account. Equation (9.2) also has the following interpretation: under a gold standard, the current account equals total net foreign asset accumulation including all net accumulation of monetary gold.

Returning to the examples in figure 9.1, neither transaction sequence changes Australia's monetary gold stock, so both of the gold shipments shown raise Australia's current account balance as measured in equation (9.2) by one ounce of gold.

## *Application*

We now describe the standard historical data and the adjustments that we have made to them. Our adjustments amount to adding the change in the domestic monetary gold stock to the current account inclusive of all international gold shipments.[8] Given the unrivaled universality of gold as an international reserve asset in our sample period, this adjustment is appropriate even when a country is not formally on the gold standard; we therefore apply it in every year for which we have data. We treat Australia and Canada individually and then discuss more briefly the treatment of other countries.[9]

### Australia

The standard historical data on the Australian current account are those compiled by N. G. Butlin (1962). He adjusts the Australian current account figures by using data on gold production instead of net exports:

$$CA^{BUTLIN} = CA^{NG} + YU = CA^{O} - SG + YU, \tag{9.3}$$

where $CA^{O}$ is the current account inclusive of all gold shipments $SG$, and $YU$ is Australia's total output of unrefined gold. Butlin argued that gold production was the appropriate current account credit for a gold producing country. Boehm (1965) criticized N. G. Butlin's treatment of gold, and argued that this procedure overstates the extent of gold exports, and consequently understates the current account deficit. We can see that the approach adopted by Butlin omits some of the terms that appear in equation (9.2), and is, therefore, a less accurate correction of official statistics. No doubt Butlin proposed this approximation because the problem of identifying monetary gold flows is particularly acute for a gold producing country such as Australia. For instance, one might hope to identify monetary gold movements with gold shipped by banks and then adjust the trade figures accordingly. Unfortunately, it is not clear from the data that banks were always shipping gold to reduce desired domestic monetary gold holdings. To get the appropriate current account figure for Australia, we can modify equation (9.3) to get

$$CA = CA^{BUTLIN} + SG - YU + \Delta MG. \tag{9.4}$$

We applied this procedure to Australia to calculate a new current account series. Estimates of the change in the monetary gold stock were derived as follows. Specie flows into and out of New South Wales,

Victoria, and Western Australia (as reported in Annual Report of United Kingdom, Deputy Master of the Mint) were added to the change in the total bullion holdings of Australian trading banks. The mint reports document the flow of gold specie into and out of the three colonies only. However, this measure of the change in Australia's monetary gold stock appears to be the best available. For data after 1900, we use the estimates of the gold coin and bullion stock compiled by S. J. Butlin et al. (1971).

**Canada**

Viner's (1924) classic study assembled balance of payments data for Canada between 1900 and 1913. Viner's current account estimates, however, included all international gold shipments (monetary as well as nonmonetary). Thus, Viner's empirical measure of the current account corresponded to $CA^O$. Hartland (1954) extended Viner's methodology to cover the years 1868–1899.

In a meticulous analysis, Rich (1988) adjusted the Canadian data to account properly for monetary gold flows. Rich's current account estimates for Canada, however, omit net interest and dividend flows, despite his recognition that they constituted "a sizeable item in the Canadian balance of payments" (Rich 1988, 248). His motive in this omission was the unreliability of available estimates of net foreign asset income.

We calculate Canada's current account for the years 1870–1926 as follows. We take the current account including all gold shipments from Urquhart 1986. As in equation (9.2), we add the change in the total domestic monetary gold stock, as calculated by Rich (1988) for 1872 through 1913, supplemented by our own estimates for 1869–1871 and 1914–1926. Thus our approach corresponds to Rich's, except that Urquhart's data include superior estimates of net dividend and interest payments.[10] For 1927 onward, we use the Dominion Bureau of Statistics estimates presented in Urquhart and Buckley 1965, which appropriately separate monetary from nonmonetary gold flows.

**Other Countries**

Given the predominance of gold as an international reserve asset for the entire period, we perform the gold adjustment for all countries in every year of our sample.

For Denmark, France, Germany, Italy, Japan, Norway, Russia, Sweden, and the United Kingdom, the standard current account data

exclude all gold flows. The Finnish data on the current account include all gold shipments. The standard data for the United States current account include all gold shipments prior to 1874; thereafter they include nonmonetary gold exports (calculated appropriately as the sum of total net gold shipments and the change in the monetary gold stock).

For Denmark, Norway, and Finland, data limitations lead us to proxy the monetary gold stock by the stock of gold at the central bank. Data on net shipments of gold for Denmark and Norway are derived by taking the change in the monetary gold stock, supplemented by League of Nations data and trade statistics. For Sweden the gold holdings of the central bank were used to calculate changes in the monetary gold stock for several periods, supplemented by data on gold in banks. Data on net gold shipments and the monetary gold stock for Germany are reported by the Bundesbank.

For France, the data on net shipments of gold include silver until 1870, then subsequently include gold only.[11] Up until 1913, estimates of the French monetary gold stock are based on the work of Flandreau (1995) and Sicsic (1989); later data come from the *Annuaire Statistique* (France, Ministère des Finances et des Affaires Économiques 1966). For Italy and Japan, the specie component of the monetary gold stock is estimated in a manner similar to the Australian calculations: taking the sum of inflows and outflows of coin from the mints and trade statistics.[12] The Italian data relating to monetary bullion are fragmentary and difficult to interpret, so we make no use of them. For Japan, the change in the monetary gold stock is calculated as the change in the estimated stock of specie in the country, less net exports of bullion. Use of bullion exports is problematic, as we have discussed, but should induce less serious errors than in the case of a gold producer like Australia. For Russia, the monetary gold stock is proxied by the sum of gold holdings in the treasury and state bank until 1891; thereafter gold in circulation is included.

For the United Kingdom, estimates of the monetary gold stock outside the Bank of England are provided by Capie and Webber (1985) up to 1921. We add to their numbers data on Bank of England gold holdings. After 1921 data limitations lead us to proxy the U.K. monetary gold stock essentially by the gold holdings of the Bank of England. Trade statistics provide the estimates of net gold shipments from the United Kingdom. For the United States prior to 1874, the treasury figures on the monetary gold stock are used throughout: we add

changes in the monetary gold stock to the official pre–1874 current account numbers, which include all gold flows across United States borders.

From the preceding discussion it is obvious that the data on monetary gold flows and net shipments of gold are far from perfect. Our reliance (in some cases) on central bank gold holdings for estimates of changes in the monetary gold stock overlooks the important role often played by changes in private hoards. The gaps in the trade data for some countries also force us to rely on central bank gold stocks to proxy gold trade figures, a procedure that effectively ignores industrial consumption of gold. Thus we are often left with imprecise measures of gold flows.

However, it is difficult even today to obtain accurate estimates of currency in the hands of the public, because of unrecorded flows into and out of a country. The object of this chapter is to obtain estimates of gold flows for a wide group of countries and then ensure the consistent treatment of gold in the current account statistics. The inaccuracies of the data must be considered in light of that objective. Bearing in mind these caveats, the data we have compiled should provide a superior estimate of the current account and savings flows, one that is less distorted by the conflicting national treatments of gold in the balance of payments.

The end result of the estimation of gold flows is presented in figure 9.2, which shows average current account-to-GDP ratios over 1885–1913 for the countries in our sample.[13] The figure presents the original current account figures given in the standard historical sources, along with the gold-adjusted figure, as per equation (9.2). We can see from this figure that correcting for gold flows can make a substantial difference to the measured current account, even when averaged over relatively long periods of time.

Adjusting for gold flows has the biggest impact on the averaged original data for Australia, Canada, France, Japan, Russia, and the United Kingdom. We would expect Australia, Canada, and Russia, as major gold producers, to be prime candidates for current account mismeasurement. The standard current account figures for both France and Japan exclude all gold flows. Therefore, the differences between the original current accounts and the gold-adjusted figures represent nonmonetary gold flows, which seemingly were substantial for these two countries.[14] Both of these instances should be treated with caution, since they may reflect mismeasurement of the change in the monetary gold