Volume Title: A Retrospective on the Classical Gold Standard, 1821-1931

Volume Author/Editor: Michael D. Bordo and Anna J. Schwartz, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-06590-1

Volume URL: http://www.nber.org/books/bord84-1

Publication Date: 1984

Chapter Title: Italy in the Gold Standard Period, 1861-1914

Chapter Author: Michele Fratianni, Franco Spinelli

Chapter URL: http://www.nber.org/chapters/c11134

Chapter pages in book: (p. 405 - 454)

9 Italy in the Gold Standard Period, 1861–1914

Michele Fratianni and Franco Spinelli

9.1 Introduction

Little is generally known about Italian experience under the gold standard, especially during the gold standard period before World War I, since Italy adhered to the standard only intermittently. The Italian-language literature on the subject is mainly qualitative in nature, while the English-language literature is virtually nonexistent. For a long time the inadequacy or outright lack of data impeded progress. But relevant statistics are now available and we intend to exploit them to remedy, at least in part, this void.

Our strategy is to study the 1861–1914 period in light of what the literature today considers to be the important issues; these are discussed in the following section. Section 9.3 gives the reader a brief history of the period—a background essential for a deeper appreciation of the quantitative evidence presented in section 9.4. The salient findings of the paper are summarized in section 9.5. Some data not easily accessible are appended to the paper.

9.2 Theoretical Issues

9.2.1 Hume versus the Monetary Approach to the Balance of Payments (MAPA or Perfect Arbitrage)

Kreinin and Officer (1978, p. 10), in their survey of the monetary approach to the balance of payments, remark that

Michele Fratianni is professor of economics at Indiana University, Bloomington, Indiana. He was serving as senior staff economist at the Council of Economic Advisers when the paper was prepared.

Franco Spinelli is an economist with the International Monetary Fund.

> it is often suggested that the new monetary approach is the intellectual grandchild of the price-specie-flow mechanism developed by David Hume in the eighteenth century. Monetary flows are central to both theories, and both regard external imbalances as self-correcting. However, in the price-specie-flow mechanism, monetary flows rectify external disequilibria through their effect on relative commodity prices. In contrast, the monetary approach views a stable demand for money as the core of the mechanism, and relative commodity prices play no role in the adjustment process. Price elasticities are therefore considered irrelevant. In fact, some monetarists hypothesize that perfect international arbitrage ensures that one price will prevail internationally on all commodity and capital markets, so that no changes in relative commodity prices are even possible—let alone necessary—for international adjustment.

This distinction is fundamental and deserves close scrutiny. The world of Hume is traditionally analyzed in a two-country setting. Assume that an exogenous increase in the monetary gold stock takes place in country A, the effect of which is to raise, with a lag, the price level in A relative to country B. The changing terms of trade cause A to run a trade-account deficit matched by a surplus in country B. The deficit is financed by gold moving from A to B. On the assumption that the authorities do not sterilize gold flows, the trade imbalance produces a redistribution of the world monetary gold stock with the subsequent effect, again with a lag, of bringing the price level in A in line with the price level in B. At that point, equilibrium is restored in the external accounts as well as in the money markets. The world price level would be higher if the gold increase in A represented an increase in the world supply of gold.

The original formulation places the entire stress of the adjustment mechanism on the trade account. When capital is allowed to move, there is less stress on the trade account: the outflow of capital brought about by the monetary shock reduces the adjustment in the trade account that would have been required in the absence of capital movements. Several testable implications of this theory emerge: (1) money-supply changes affect the price level with a lag; (2) gold flows are a significant, if not dominant, cause of variation of the domestic money supply; (3) the domestic price level or its rate of change is inversely correlated with the foreign price level or its rate of change; (4) there is a real exchange rate that is serially correlated for relatively long periods of time; (5) a real depreciation of the home currency improves the trade account, which in turn reduces the real depreciation.

The version of the monetary approach that assumes perfect international arbitrage (MAPA)—of which McCloskey and Zecher (1976) are ardent proponents—departs from the Humean theory in a fundamental way. Gold flows do not serve to realign country A's price level with the

price level prevailing in country B but to restore equilibrium in the money market. Prices of (traded) commodities and assets are determined in the world market. Each country is too small to have a lasting influence on its own price level or interest rates. The law of one price in goods and asset markets prevails. Gold flows are only one of the means to enforce the law of one price; other commodities move from one region to another but gold flows may be quantitatively more relevant because transport costs are smaller relative to bulkier and lower priced goods. The testable implications of MAPA are: (1) purchasing-power parity and interest-rate parity hold in the short run as well as in the long run; (2) the trade account does not respond to changes in relative commodity prices, partly because the law of one price prevents the emergence of such changes and more fundamentally because spending decisions are influenced by changes in money demand and supply only; (3) gold flows are a small source of variation of the money stock, implying that changes in the domestic component of the monetary base dominate gold flows.

9.2.2 The Demand for and Supply of Money

In both Hume and MAPA a stable demand for money, influenced by a few variables and in a manner independent of the forces determining money supply, plays an important role. In MAPA an increase in the supply of money relative to demand generates an excess of spending over income which leads in turn to an outflow of money through a deficit in the balance of payments. The end result is that the monetary shock alters not the total stock of money but its composition between domestic and foreign source components. In Hume the same monetary shock instead affects the total money stock, its composition, and the domestic price level.

The two approaches diverge in five respects in their treatment of the supply of money. First, Hume assigns a large role to gold in the money stock process, while for MAPA the role of gold is small. More to the point, a fractional gold-bullion standard gives the monetary authorities the ability to create monetary-base liabilities against the acquisition of domestic assets, be those claims on government or the private sector. Second, for MAPA, foreign exchange is a significant component of international reserves. For Hume this is not a basic consideration. Third, for MAPA, neither authorities nor the so-called rules of the game play a role, for gold flows as well as changes in foreign exchange are automatically offset by opposite changes in the domestic source components. If a presumptive case for sterilization by monetary authorities can be made, can one discriminate changes in domestic source components of base money that cause opposite movements in foreign source components from sterilization behavior? Fourth, the two approaches differ on the link between monetary policy in Italy and monetary policy in the other

member-states of the Latin Monetary Union. Finally, the two approaches assign different roles to the public and banks in the money-supply process.

These issues are explored in some detail in the next two sections. We first assess the evidence qualitatively as we guide the reader through the relevant historical account, and subsequently more formally.

9.3 Historical Account

For brief periods in Italy, paper money was convertible at the official price in either gold or silver.[1] For the most part, fractional reserves of gold and silver bullion were held against paper money (i.e., the monetary base) created by banks of issue and the government. Italy did not develop a single monetary authority until 1926. Up to that time several banks, legally permitted to issue notes, held metallic reserves.

Despite the fact that Italy adopted the gold standard intermittently and for brief periods of time, her experience on the whole was not different from what it would have been had she adhered to the standard throughout, particularly from 1900 to 1913. The reason was that Italy's decision makers were aware of the limits of operating on a paper standard. Either they operated responsibly without gold or pulled back from the brink when acting irresponsibly. Briefly put, Italy was guided by the norm of the gold standard.

9.3.1 Competition versus Monopoly of Issue

Upon becoming a unified nation in 1861, Italy inherited the financial structures of the constituent states. Some of these states had banks that possessed characteristics of a central bank; others did not. In brief, there were three banks whose currencies (coins and paper money) were legal tender: the Banca Nazionale (BN) operating in Piedmont and Genoa, the Banca Romana operating in Rome, and the Banca Nazionale Toscana, operating in Tuscany; and six banks whose currency was fiduciary in the strict sense of the word and thus not legal tender (i.e., its acceptance depended on the trust of economic agents): the Banco di Napoli and the Banco di Sicilia, both operating in the Kingdom of the two Sicilies, the Banca Toscana di Credito per le Industrie ed i Commerci d'Italia operating in Tuscany, the Banca degli Stati Parmensi operating in Parma, the Stabilimento Mercantile di Venezia operating in Venice, and the Banca Pontificia per le Quattro Legazioni operating in Bologna.

Two intellectual and political groups competed in Italy to give shape to the country's monetary system. One supported more competition in banking and, in particular, complete freedom of currency issue; the other believed that the political and economic integration of Italy would be enhanced by a strong single monetary authority whose liabilities would be

legal tender. The intellectual leaders of the liberal camp (in the English tradition) were the economists Francesco Ferrara (1868), who became minister of finance in 1867, and Antonio Garelli (1879); the leader of the monopoly faction was the powerful Prime Minister Camillo Benzo di Cavour.[2] In Parliament the procompetition group usually was stronger than the monopoly-of-issue group.

The tug of war between the two opposing camps undoubtedly explains some of the haphazard, if not chaotic, development of banking. For example, in the early 1860s, the senate approved a bill that would have merged BN with the Banca Nazionale Toscana in a single bank of issue, but the lower house of Parliament defeated it. Numerous bills introduced in Parliament would have enlarged the number of banks of issue.

In addition to the nine banks noted above, a number of firms and individuals printed their own money. However, Parliament put a stop to this practice in 1874 for fear that the bankruptcy of one of them would endanger the entire banking system. In 1893 the Banca Romana failed. BN and the two Tuscan banks merged to form the Banca d'Italia (Bank of Italy). A law of 1894 prescribed that only the Bank of Italy, Banco di Napoli, and Banco di Sicilia had the right to issue currency. This situation lasted until 1926 when the Bank of Italy finally emerged as the institution with a monopoly of issue.

In short, though there was intellectual and political opposition to the creation of a single central bank, the belief that a competitive industry would overissue and the failure of a large bank finally prevailed over the opposition to a more centralized and legalistic structure.

9.3.2 The Bimetallic Standard and the Latin Monetary Union

In 1862, the newly elected Parliament of Italy approved a currency reform closely resembling that of France. Three options were open to the lawmakers: a gold standard, a silver standard, and a bimetallic standard. Policymakers preferred the gold standard; so did BN which had operated on that principle for several years. However, silver was the dominant money in the South, Lombardy, and Venice. The split between North and South was further complicated by the fact that France, the closest and most important trading partner of Italy, was de jure on a bimetallic standard. We stress de jure because de facto silver had disappeared from circulation in 1848 following the gold discoveries in Australia, California, and Russia.[3] At the official rate of exchange between silver and gold set at a ratio of 15.5 to 1, silver was undervalued relative to market conditions. Therefore, as predicted by Gresham's law, gold drove silver out of circulation.

Confronted with the three possibilities, Parliament chose a formal bimetallic standard where silver nominally could be exchanged for gold at the ratio of 15.5 to 1, but in fact, by diminishing the silver content of silver

coins of denominations smaller than five lire,[4] established the ratio of 14.38 to 1—a ratio that was in line with prevailing market conditions. As to silver coins of larger denominations used in international trade, the 1862 law provided for their issue only upon request; since the official parity undervalued silver relative to the market, the provision served to eliminate large-denomination silver coins. In this manner, Italian policymakers found a compromise between form and the realities of the market.

The 1862 law also granted legal tender to the coins of Belgium, France, and Switzerland. In 1865 Italy joined these countries to form the Latin Monetary Union; their coins circulated freely in the union.[5] In effect, the union decreed one common money without setting up a common monetary policy.

Less than a year after the birth of the union, Italy in 1866 suspended convertibility (see Martello 1881). Italian paper money depreciated relative to gold which was exported to the rest of the Latin Monetary Union. The world demand for gold, however, increased. In 1871 Germany adopted a gold standard; the Scandinavian countries, Holland, and the United States subsequently followed the German example. Concomitantly, the world demand for silver fell, while its supply rose due to new discoveries in Nevada (De Cecco 1984). The market-exchange ratio of silver for gold rose to 18 to 1 in 1876. The Latin Monetary Union, which overvalued silver, was flooded with the metal and by 1878 suspended the free coinage of silver. Although the union had manifestly failed in retaining a bimetallic standard, it was formally kept alive for a few more years.

9.3.3 The First Inconvertibility Period, 1866–84

The state of public finances in Italy in the period from 1861 to 1865 quickly deteriorated (see Fratianni and Spinelli 1982, and figure 9.1). Budget deficits, financed by an increase in public debt, rose over the five years to about 6 percent of average national income. The external accounts over the same period did not fare any better: the cumulative trade account represented about 4.5 percent of average national income. At the start of 1866 the government announced another large budget deficit, while another war against Austria was imminent. The market perceived Italy to be a decided risk. Bond prices fell dramatically, more so abroad than at home. Foreign-capital inflows dwindled, while domestic capital moved massively abroad, in particular to Paris, to exploit the large profit opportunities from arbitraging differences in bond prices (Majorana 1893). The outflow of gold was so large that some banks were on the verge of bankruptcy. Even the dominant BN had to reduce its portfolio of earning assets to a minimum to cope with the liquidity drain. On 1 May 1866, the authorities decreed *corso forzoso*—the inconvertibility (into gold) of paper money.

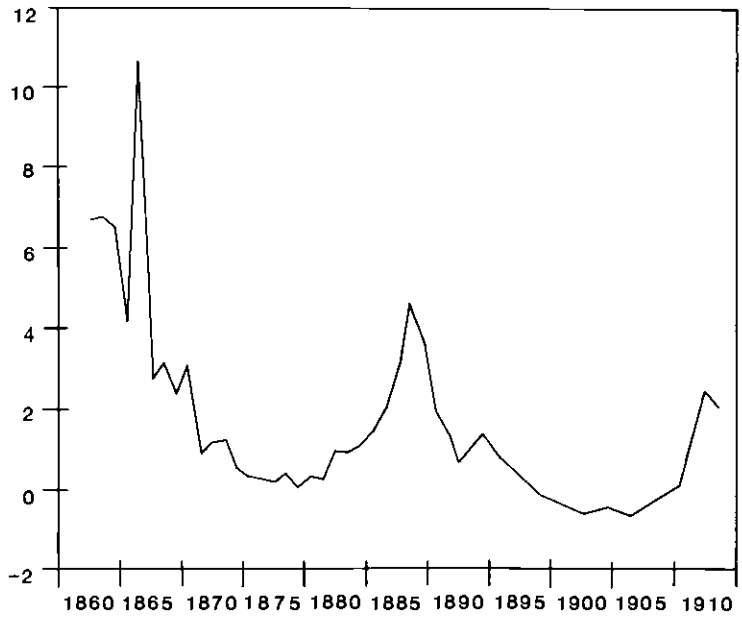

Fig. 9.1 Budget-deficit-to-GNP ratio, Italy, 1862–1913. Budget deficit is the difference between government expenditures and revenues as reconstructed in Pedone 1967, table A.1. *Source*: GNP at current prices: ISTAT 1957, table 35.

The exchange rate between the lira and the French franc, and the annual rate of change of the money stock, shown respectively in figures 9.2 and 9.3, capture the essence of the aforementioned events. The money stock exploded in 1866; so did the exchange rate. The fact that these two developments accompanied inconvertibility should not be a surprise. Inconvertibility was brought about partly by the injudicious fiscal policy of the government and partly by the war against Austria. Inconvertibility benefited the government by enabling it to monetize the deficit through direct borrowing from the banks of issue. The government's action was backed by the export sector which perceived the devaluation of the lira would stimulate the demand for their products.

The 1866 law granted the right to issue inconvertible notes not only to BN and the two Tuscan banks, but also to the Bank of Naples, the Bank of Sicily, and eventually (in 1870) the Roman Bank.[6] The major beneficiary of the new law was BN, since its paper money became legal tender throughout the nation. As a result of this provision, BN notes sold at a premium with respect to the paper money of the other five banks of issue. To limit the issue, all six banks had to keep a gold and silver cover of one-third against their note liabilities.

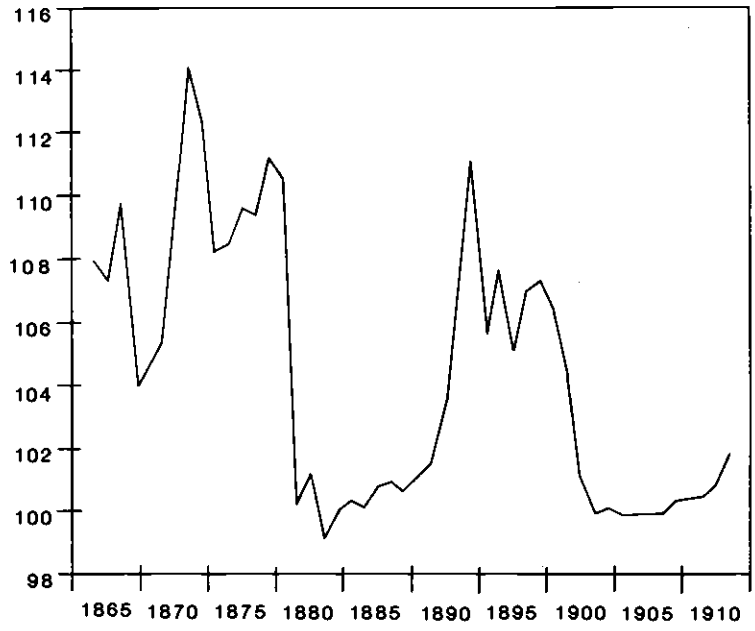

Fig. 9.2 Lira-franc nominal exchange rate, 1866–1913. *Source*: Number of lire per French franc (ELF, table 9.A.1, col. 11), from Borgatta 1933.

No sooner was inconvertibility in effect than Parliament contemplated a return to convertibility, creating a commission to study its feasibility (Commissione Parlamentare di Inchiesta 1868–69). Parliament was so eager to act on this matter that a law was passed in 1868—before the commission even produced its report—setting the maximum issue of BN notes at 750 million lire—approximately the amount then in circulation. The growth rate of the monetary base came to a halt in 1868 (see figure 9.3).

Monetary discipline lasted less than two years. Budget deficits then rose again. The government desired to finance the deficits by printing money,[7] so BN made loans directly to the Treasury. In return, BN was authorized to print additional currency, ignoring the existing gold-cover requirement. The consequence of these events may be gleaned from figures 9.1 through 9.4. The growth rate of the monetary base took an upward leap, as did the money stock. The lira depreciated drastically against the French franc, reaching its highest level of the sample period. The rate of inflation measured by the annual percentage change of the consumer price index which rose in 1871 reached an all-time peak in 1872 (see figure 9.4).

The 1866 law, as noted, gave a competitive advantage to BN, to the

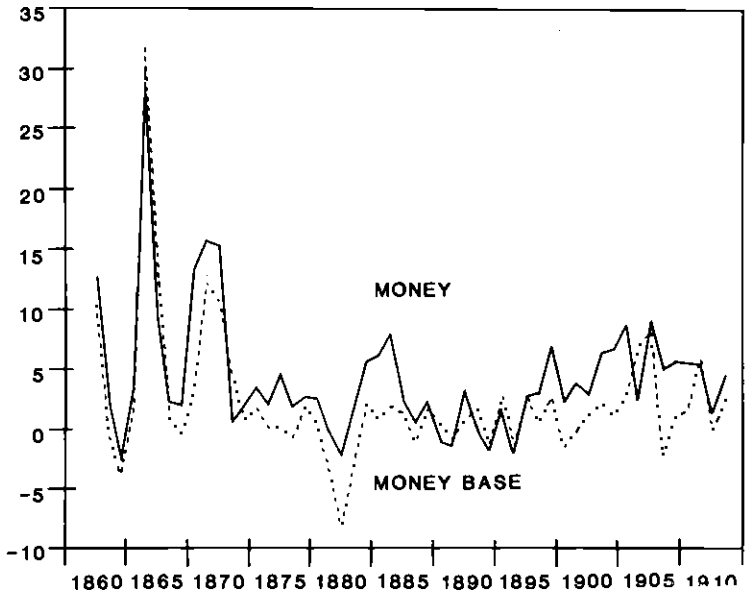

Fig. 9.3 Money and money base, annual percent change, 1862–1913. The money base is equal to *C*. *Sources*: *C* = total currency outstanding from De Mattia 1969, tables 5, 6, 7, and 14; *D* = total bank deposits from De Mattia 1969, tables 2, 2a, 2b, and 23.

distress of the procompetitive contingent in Parliament. Thanks to their efforts, in 1874 a law was passed designed to eliminate that advantage. The legislation included the following provisions. First, the six banks of issue were asked to repay the outstanding government indebtedness to BN. The repayment changed the ownership of claims on the government. The economic meaning of the transaction is that BN sold its claims on the government to the other banks against an equivalent reduction of BN notes in circulation and an equivalent increase of notes issued by the other five banks. Therefore, while the aggregate amount of notes in circulation did not change, the composition changed against BN notes and in favor of the notes of the other five banks. Second, legal-tender status was granted to the notes of all six banks. Third, the ceiling on currency issue was set at three times each bank's net worth as of the end of 1873.[8] Finally, the issue of notes by other institutions was made unlawful. Apparently, the procompetition faction had to concede this point in return for a more equitable market-share arrangement among the six banks of issue.[9]

By 1874 the government managed to balance its budget (see figure 9.1). The return to fiscal discipline was reflected immediately in low growth of the monetary base. The lira appreciated vis-à-vis the franc by

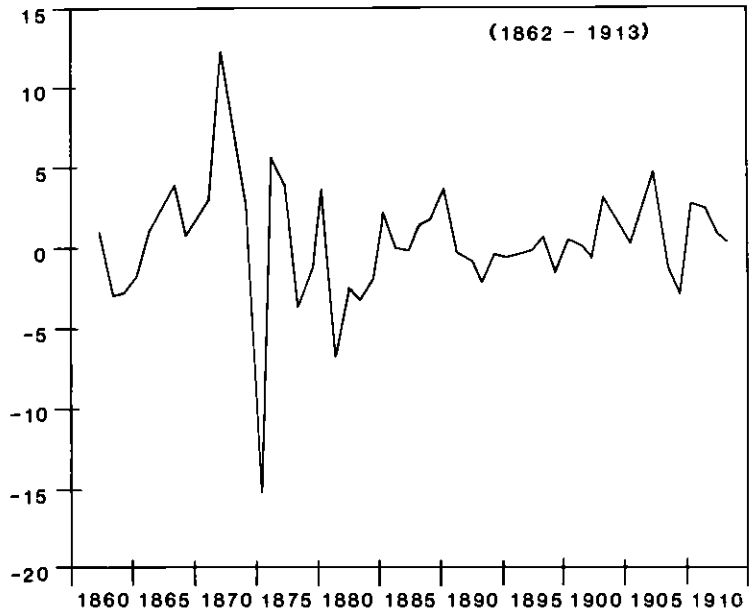

Fig. 9.4 Consumer price index, annual percent change, 1862–1913. *Source*: Consumer price index (table 9.A.1, col. 8) from De Mattia 1977, table 7.

5.5 percent in two years. The rate of change in the price level fell from +6 percent in 1873 to −16 percent in 1875, in response partly to domestic deflation and partly to the precipitous decline in world prices in 1874 (see figure 9.4).

The fall in Italian prices paved the way for serious policy discussions about a return to metallic convertibility. A bill was introduced in Parliament in 1880 to allow the government to borrow abroad up to 644 million lire to repay its indebtedness to the six banks of issue. The repayment would enable the banks to keep reserves only in the form of precious metals and would restore convertibility at a fixed price between paper money and gold and/or silver.

Disinflationary expectations were thus promoted. Individuals shifted from goods and real assets to money to capitalize on the anticipated increase of purchasing power.[10] Domestic prices fell sharply in 1881 (see figure 9.4). The appreciation of the lira was so pronounced that parity with the franc was restored (cf. figure 9.2).

Parliament approved the bill on 1 April 1881. The ensuing sale of government bonds was well received by the market. Since the bulk of the sale was to foreigners, Italy enjoyed a sizable capital flow. The proceeds of the bond sale were used to repay the loans extended by the six banks to

the government. Currency was taken out of circulation and the monetary base fell by 8 percent (cf. year 1888 in figure 9.3).

9.3.4 Return to Converbitility in 1884

On 1 March 1883, the government announced that convertibility would be restored on 12 April 1884. Banks were given the option to convert paper money into either gold or silver. Since the official exchange rate between silver and gold had remained fixed at a ratio of 14.38 to 1 and the market exchange rate had risen above 18.5 to 1, convertibility took place only in silver. Again, Gresham's law dictated that cheap money would displace dear money. In addition, Gresham's law—in the context of a world that was operating on a gold standard—implied that gold would be exported and silver imported. In fact, from 1883 to 1885 the outflow of gold coins from Italy rose from 9.2 to 101.3 million lire while imports of silver coins increased from 50.7 to 103.7 million lire (De Mattia 1969, table 10).

The course of public finances deteriorated again in the middle of the 1880s (see figure 9.1). The yield on Italian government bonds "Rendita Italiana," quoted in Paris, was higher than its yield at home, reflecting country risk as a factor affecting the market's valuation of Italian bonds. From 1883 to 1888 the lira depreciated marginally but continuously with respect to the French franc. Banks of issue raised the cost of exchanging silver for paper money (Supino 1929, p. 107), while overissuing notes—the Roman Bank was the main culprit—in relation to what was permitted by law. In 1891 the government decided to legalize the currency in circulation in contravention of the law. The aggregate ceiling for the entire system was raised from 755 million to 1064 million lire, which implied a reduction of the gold-silver cover from one-third to one-quarter.

In 1892 the revelation of the illegal practices of the Roman Bank precipitated a run on the bank that led to its failure. Widespread distrust of the banking system ensued, reflected in a sharp depreciation of the lira on the exchange markets. Banca Nazionale (BN) merged with the two Tuscan banks to strengthen its liquidity position and acquired the name of Banca d'Italia(BI). In the wake of the merger, Parliament passed a law in 1893 which entrusted BI with the task of absorbing the liabilities of the defunct Roman Bank, providing for the substitution of BI notes for Roman Bank notes. The law also made it unlawful for BI, Bank of Naples, and Bank of Sicily to issue notes without direct supervision of the state. "Excessive" circulation was to be reduced over several years, while the reserve requirement in bullion was to be raised to 40 percent.[11] Finally, the law called for full convertibility.

The economic essence of the 1893 law was that monetary discipline was

postponed to the future (Majorana 1893). The call for convertibility was assessed by the market to be wishful thinking. The continuous depreciation of the lira in the exchange markets tells the story very eloquently. The government acknowledged what the market already knew in 1894 when Italy was back to *corso forzoso* (forced legal tender of the paper currency).

9.3.5 The Second Inconvertibility Period, 1894–1913

This period was the most stable and prosperous of the entire sample period. Budget deficits were first reduced and later converted into surpluses (cf. figure 9.1). Monetary policy was consistently tight. The monetary base grew at a rate below the rate of growth of output. Concomitant with a world boom in economic activity, Italy's real output grew dramatically—at an average annual rate of 2.4 percent from 1897 to 1913, compared to 0.86 percent for the period 1861 to 1896 (cf. figure 9.5). Not surprisingly the lira started to appreciate vis-à-vis the franc in the mid-1890s. By 1903 its rate of exchange fell within the gold points and remained there until 1911. The period ended with World War I.

In sum, the historical account permits us to draw a few conclusions.

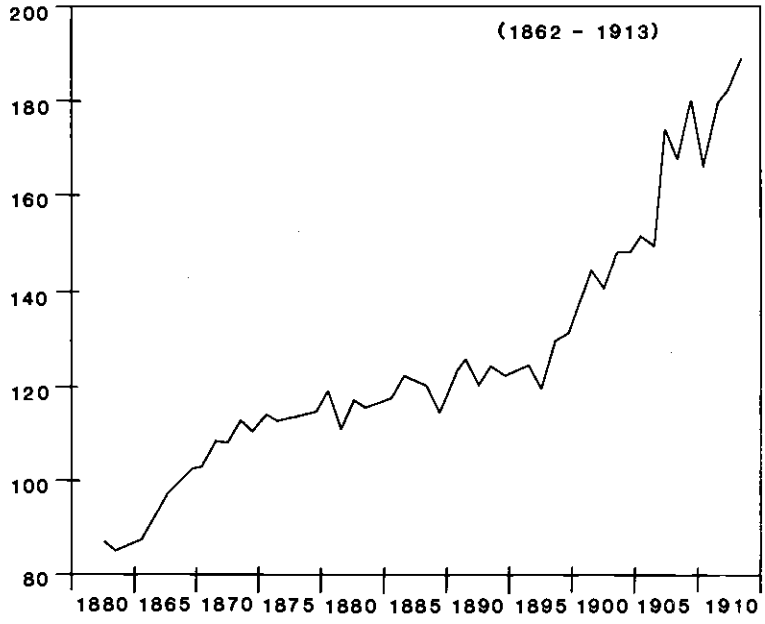

Fig. 9.5 Real GNP, 1862–1913 (millions of 1913 lire). *Sources*: Real GNP = *RYI* (table 9.A.1, col. 7), computed as GNP at current prices divided by the GNP price deflator, *PYI*: De Mattia 1977, table 7.

First, the government budget appeared to be responsible for the vicissitudes of the lira and Italy's alternate experiences with the gold standard. Budget deficits caused the abandonment of the gold standard in 1866, the monetary explosion of 1866–67 and 1870–72, and the return to inconvertibility in 1894. As the budget returned to equilibrium, Italy regained monetary and exchange-rate stability—aided by exceptional real growth. Second, the banks of issue tended to overissue. The government induced, tolerated, and legitimized excessive circulation, and possibly was responsible for unlawful note creation that ultimately led to the failure of the Banca Romana. That banks preferred inconvertibility to convertibility and more than once tested the government to see how much they could get away with is supported by some evidence (Supino 1925, p. viii). Third, gold played an explicit role in the period up to 1866; afterwards the system can be best described as a gold-silver-bullion standard. Fourth, the historical account suggests that the monetary base is exogenous relative to prices and income, in light of the tight link between budget deficits and money creation. Finally, the gold standard was not a sufficient condition for stability. Politicians had no difficulties in throwing off the straightjacket of the gold standard when it stood in the way of financing large budget deficits. On the other hand, the proper conduct of fiscal and monetary affairs was sufficient to guarantee stability, whether or not the country was on the gold standard. Indeed, the record indicates that the formal adoption of a standard was not very important. Politicians knew the limits of the paper standard and were willing to return to judicious policies after periods of laxity. It is clear, for example, that little would have changed had Italy returned to a formal gold standard in the first thirteen years of the twentieth century.[12] This assessment of the record permits us to treat statistically the periods of inconvertibility as qualitatively similar to the periods of convertibility.

9.4 Evidence

Having outlined the principal theoretical issues in section 9.2 and the broad historical facts in section 9.3, we are now ready to submit more formal evidence concerning the process of money creation, the demand for money, the interaction between the exchange rate and the difference between the domestic and external price level, and more generally the relative explanatory power of the two hypotheses of Hume and MAPA about the balance-of-payments adjustment mechanism.

9.4.1 Data and Sources

The foresight of the Instituto Centrale di Statistica (ISTAT) and the Banca d'Italia made possible the quantitative aspect of this study. Some time ago, these two institutions began a painstaking reconstruction of

historical time series of the real and monetary sectors of the economy. Three volumes are of particular importance: one by ISTAT (1957) deals for the most part with real-sector data and two by De Mattia (1969, 1977) with monetary statistics. The work of De Mattia is of very fine quality, certainly comparable to the reconstruction of monetary data made for approximately the same period for the United States by Milton Friedman and Anna Schwartz (1963).

Many of the time series we used—in particular those we think foreign researchers may have difficulty finding—are shown in appendix A, which also lists definitions and sources.

A few words are in order about the definition of the monetary base. While currency holdings of the banking system (i.e., banks other than banks of issue) are known, deposits of the system with banks of issue are not. There is no way to assess the size of this measurement omission, but qualitative accounts suggest it is small. It follows that our definition of the monetary base is equal to the outstanding stock of currency, and that the reserve-deposit ratio is measured by currency holdings of the banking system divided by all private-bank deposits.

9.4.2 The Money-Supply Process

We define the money stock M at time t as

$$M_t = m_t \cdot MB_t, \tag{1}$$

where MB denotes the monetary base and m the multiplier which depends inversely on the currency-deposit ratio (c), and the reserve-deposit ratio (r) (cf. Brunner and Meltzer 1961; Friedman and Schwartz 1963; Cagan 1965):

$$m_t = \frac{1 + c_t}{c_t + r_t}. \tag{2}$$

The relative contribution of m and MB to the growth of the money stock is obtained directly from (1):

$$1 = \frac{\dot{m}_t}{\dot{M}_t} + \frac{\dot{MB}_t}{\dot{M}_t}, \tag{3}$$

where a dot above the variable indicates the first difference of its natural logarithm. The first difference of the money multiplier, in turn, can be decomposed as follows:

$$\dot{m}_t = \left[\ln m_t - \ln \frac{(1 + c_{t-1})}{(c_{t-1} + r_t)}\right] + \left[\frac{\ln(1 + c_{t-1})}{(c_{t-1} + r_t)} - \ln m_{t-1}\right], \tag{4}$$

where the terms inside the two bracketed parentheses capture, respectively, the contribution to $\dot{m}$ of the currency-deposit ratio and the reserve-deposit ratio. Next, the growth rate of the monetary base depends on the weighted average of the growth rates of the domestic- (BD) and foreign- (IR) asset components of the consolidated balance sheet of the banks of issue:

$$\frac{\Delta MB_t}{MB_{t-1}} = \left(\frac{BD}{MB}\right)_{t-1} \frac{\Delta BD_t}{BD_{t-1}} + \frac{(IR)}{(MB)_{t-1}} \frac{\Delta IR_t}{IR_{t-1}}. \tag{5}$$

Finally, the growth rate of the foreign component reflects the growth rate of metallic reserves (IRA) and foreign-exchange reserves ($IRFE$), weighted by their initial relative shares:

$$\frac{\Delta IR_t}{IR_{t-1}} = \left(\frac{IRA}{IR}\right)_{t-1} \frac{\Delta IRA_t}{IR_{t-1}} + \frac{(IRFE)}{(IR)_{t-1}} \frac{\Delta IRFE_t}{IRFE_{t-1}}. \tag{6}$$

Table 9.1 shows the basic facts of the process of money-supply creation during the sample period. The first three rows relate to equation (3): column (2) gives the yearly sample means of $\dot{M}$, $\dot{m}$ and $\dot{MB}$; column (3), the long-run relative contributions of $\dot{m}$ and $\dot{MB}$ to $\dot{M}$; and column (4), the short-run relative contributions. In the long run both $\dot{m}$ and $\dot{MB}$ turn out to be of roughly equal importance with a slight tendency for the monetary base to dominate. In the short run—and this result is hardly surprising—the multiplier rises in importance relative to MB (lines 1–3). Changes in the currency-deposit ratio, in turn, dominate the short- as well as the long-run behavior of the multiplier (lines 4–5).

The domestic component of the monetary base is at least as important for the long-run growth of MB as the foreign component. In the short run, however, matters change dramatically: changes in BD affect MB negatively, while changes in IR influence MB positively (lines 6–8). A more detailed breakdown of the data is provided in table 9.2 which pairs yearly changes in BD and IR—the sort of evidence Nurkse (League of Nations 1944) and later Bloomfield (1959) considered to determine whether monetary authorities followed the so-called rules of the game. In the words of Nurkse:

> Whenever gold flowed in, the central bank was expected to increase the national currency supply not only through the purchase of that gold but also through the acquisition of additional domestic assets; and, similarly, when gold flowed out, the central bank was supposed to contract its domestic assets also. (P. 66).

Table 9.1 **The Money-Supply Process, 1862–1914**

	Variables (1)	Mean Yearly Value (2)	Relative Long-Run Contributions of Mean Yearly Values to Growth Rate of M (3)	Relative Short-Run Contributions of Mean Yearly Values to Growth Rate of M (4)
1.	$\dot{M}$	4.50	—	—
2.	$\dot{m}$	1.96	43.6	59.1
3.	$\dot{MB}$	2.54	56.4	40.9
Relation of currency ratio and reserve ratio to the multiplier				
4.	$\ln m_t - \ln\left(\frac{1+c_{t-1}}{c_{t-1}+r_t}\right)$	1.96	100.0	91.0
5.	$\ln\left(\frac{1+c_{t-1}}{c_{t-1}+r_t}\right) - \ln m_{t-1}$	0.00	0.00	9.0
Relation of domestic and foreign components to monetary base				
6.	$\Delta MB/MB_{-1}$	2.77	—	—
7.	$(\Delta BD/BD_{-1})\ (BD/MB)_{-1}$	1.56	56.3	−813.1
8.	$(\Delta IR/IR_{-1})\ (IR/MB)_{-1}$	1.21	43.7	913.1
Relation of gold and foreign-exchange reserves to foreign component of monetary base				
9.	$(\Delta IR/IR_{-1})$	6.57	—	—
10.	$(\Delta IRA/IRA_{-1})\ (IRA/IR)_{-1}$	6.04	91.93	6.65
11.	$(\Delta IRFE/IRFE_{-1})\ (IRFE/IR)_{-1}$	0.53	8.07	92.88

Source: Table 9.A.1.

Notes: Lines 4–5, 7–8, 10–11 sum to 100.00 in cols. (3) and (4) except for rounding errors. M = money stock; m = money multiplier; MB = monetary base; c = currency ratio ($(C–CB)/D$); r = reserve ratio (CB/D); BD = domestic-asset component of the base ($MB–IR$); IR = foreign-asset component of the base ($IRA + IRFE$); IRA = metallic reserves; $IRFE$ = foreign-exchange reserves; dot above a variable = first difference of its natural logarithm.

Table 9.2 **Yearly Changes in Domestic and Foreign Component of the Monetary Base, 1862–1914 (millions of lire)**

	BD	*IR*	Comovement		*BD*	*IR*	Comovement
1862	101.6	12.4	+	1891	−49.5	33.0	−
1863	−26.7	24.9	−	1892	15.1	4.5	+
1864	−31.8	−10.7	+	1893	44.8	−0.6	−
1865	12.5	3.9	+	1894	−118.1	90.0	−
1866	447.1	−26.9	−	1895	−63.4	−6.3	+
1867	198.7	15.5	+	1896	−58.0	28.6	−
1868	−81.3	91.4	−	1897	64.6	1.1	+
1869	−6.0	−0.2	+	1898	7.3	7.0	+
1870	39.3	20.1	+	1899	73.0	−5.1	−
				1900	−52.0	17.6	−
1871	260.9	−24.5	−				
1872	247.5	−16.8	−	1901	−26.4	26.6	−
1873	103.8	4.0	+	1902	−8.0	37.2	−
1874	27.5	−8.0	−	1903	−138.7	196.1	−
1875	103.8	−58.6	−	1904	7.1	23.0	+
1876	−1.0	5.6	−	1905	−123.1	190.6	−
1877	4.6	0.3	+	1906	43.3	144.8	+
1878	−15.6	1.5	−	1907	30.6	206.9	+
1879	53.1	−3.1	−	1908	−117.3	51.1	−
1880	−19.8	29.8	−	1909	17.3	17.2	+
				1910	33.0	14.7	+
1881	−42.7	−40.2	+				
1882	−211.6	20.9	−	1911	119.7	66.5	+
1883	−222.6	163.6	−	1912	−35.3	35.4	−
1884	1.3	48.5	+	1913	22.8	61.8	+
1885	52.8	−32.5	−	1914	639.0	79.6	+
1886	37.3	6.9	+				
1887	−2.3	33.6	−				
1888	−79.1	56.3	−				
1889	40.7	3.3	+				
1890	40.7	−29.1	−				

Source: Table 9.1.

Notes: *BD* = domestic-asset component of the monetary base; *IR* = foreign-asset component of the monetary base.

There are twenty-four instances in which ΔBD and ΔIR move in the same direction, and twenty-nine where they move in the opposite direction. Abstracting from lags, this evidence would indicate, according to Nurkse and Bloomfield, that the five banks of issue on the whole contravened the rules of the game through a policy of sterilizing foreign-exchange flows. However, these twenty-nine observations are also consistent with the monetary theory of the balance of payments (both Hume and MAPA) which predicts that autonomous increases (decreases) in *BD* cause outflows (inflows) of *IR*. And indeed there are several historical episodes

that we can identify in support of the monetary hypothesis. Take, for example, 1866, 1871, and 1872 when the government ran large budget deficits that were monetized by the banks of issue. The increases in *BD* were clearly autonomous in the sense that they were not induced by balance-of-payments considerations; yet they produced an outflow of foreign reserves. These outflows are consistent with a condition of excess supply in the domestic money market that finds its way abroad. As another instance, consider 1882 and 1883 when the government deliberately financed its deficits by borrowing abroad. The reduction in *BD* cannot be interpreted as a violation of the rules of the game, but as a way to restore equilibrium in the domestic money market, while at the same time raising the ratio of foreign reserves to total base money. The key point is that the occurrence of a negative correlation between the two source components of the monetary base cannot be interpreted *tout court* as evidence in favor of the reserve-sterilization hypothesis. The Nurkse-Bloomfield test ignores the compensatory response of *IR* to changes in *BD*. On the other hand, we do not pretend to shed light on the issue of how much of the observed negative correlation between ΔIR and ΔBD is attributable to "offset" behavior as opposed to sterilization practices. For that we would require the specification and estimation of the reaction function of the banks of issue (as well as of the underlying macro model), a task we are not ready to tackle.[13]

Returning to table 9.1, we note that gold flows were the main long-run driving force of the growth of international reserves; as a matter of fact, it was not until 1893 that banks were allowed to count foreign exchange as part of international reserves. But in the short run, once again, the findings are quite different, with gold movements accounting for less than 7 percent of changes in *IR* (lines 9–11).

In sum, the long-run growth of the money stock can be explained by the fall in the currency-deposit ratio (with a relative contribution of 45 percent), the expansion of domestic credit (30 percent), and net inflows of gold (22 percent). The ratio *c* falls from a value of 7.8 in 1861 to 0.35 in 1913, a steady decline interrupted by a sharp upswing in 1866–67 when convertibility was suspended and in 1873 when metal coins appreciated relative to paper money and deposits. The secular decline of *c* reflects the corresponding secular fall in the cost of maintaining deposit balances relative to currency. The contribution of *BD* to the growth of *M* is not surprising in light of section 9.3. Table 9.3 presents, as summary, parameter estimates of money-supply functions for the entire period and the subperiod 1895–1914. These results corroborate our earlier findings, namely, that changes in the multiplier are influenced predominantly by changes in *c* and that the elasticity of *M* with respect to *MB* is unitary. The estimates also suggest that the reserve-deposit ratio plays a more signifi-

Table 9.3 **Money-Supply Equations (*t*-statistics in parentheses)**

Dependent Variable and Sample Period	Constant	$\dot{c}$	$\dot{r}$	$\dot{MB}$	ρ^a	D.W.	R^2
$\dot{m}$	.004	−.292	−.022		.348	1.65	.73
1863–1914	(1.015)	(−11.039)	(−1.556)		(2.650)		
	−.001	−.644	−.046		.06	1.08	.99
1895–1914	(−1.679)	(−55.468)	(−5.042)		(.260)		
$\dot{M}$	.008	−.270	−.018	.913	.326	1.60	.89
1863–1914	(1.727)	(−9.370)	(−1.333)	(18.347)	(2.460)		
	−.001	−.618	−.039	.950	.226	1.47	.99
1895–1914	(.598)	(−37.604)	(−4.600)	(40.208)	(1.001)		

Source: See table 9.1.

Notes: m = money multiplier; M = money stock; c = currency ratio; r = reserve ratio; MB = monetary base; dot above a variable = first difference of its natural logarithm.

[a]First-order autocorrelation parameter (Cochrane-Orcutt estimation technique).

cant role in the money-supply process from 1895 to 1914 than in the earlier period.

9.4.3 The Demand for Money

One of us (Spinelli) has demonstrated that there was a well-defined demand-for-money function in Italy during the period under consideration. However, in light of an inadvertent error in the money-stock series that was used and the availability of an expanded data set, we reestimated the demand-for-money function. The model, the statistical procedure, and findings are discussed in appendix B. On the whole, the results do not change appreciably. Money was a "luxury" good over the sample period, a finding that is similar to Friedman and Schwartz's (1963) for the United States (see figure 9.6). As Sylla points out in his comments on this paper, the "secular fall in velocity in Italy, as elsewhere, was in part—perhaps in great part—the result of more and more economic units and activities becoming specialized, commercialized, and monetized."[14]

9.4.4 Deviations from Purchasing-Power Parity

A cursory look at the lira–French franc exchange rate (E_N) confirms that for long periods of time this rate was not contained within the gold points (figure 9.2). In fact, E_N was above the upper gold point from 1866 to 1881 and from 1891 to 1901.[15] The question posed by this observation is whether the evolution of E_N reflects differences in the two countries' price levels; namely, does purchasing-power parity (PPP) hold?

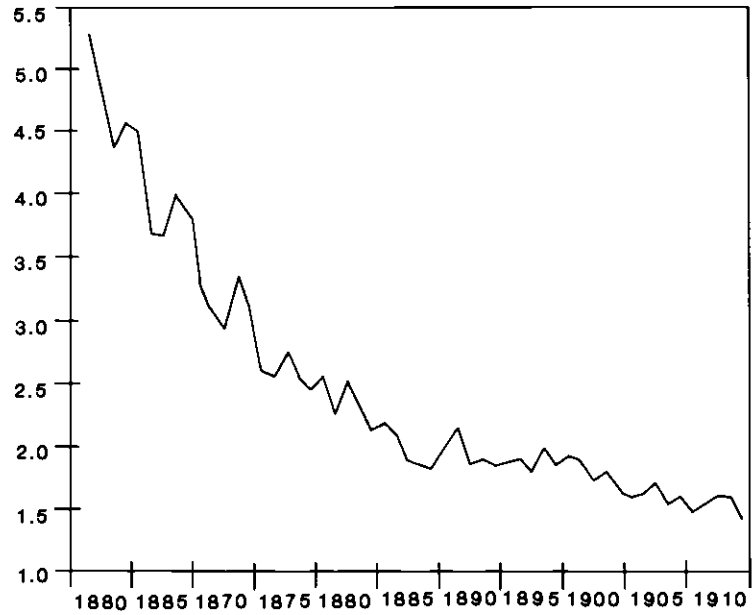

Fig. 9.6 Velocity of circulation, 1862–1913. Velocity is calculated as GNP at current prices divided by M.

A short answer to this question is provided by examining the behavior of the real exchange rate:

$$E_R = \frac{E_N \cdot P_F}{P_I} \tag{7}$$

where

E_R = the real exchange rate;

P_F = the wholesale price index in France 1913 = 100;

P_I = the wholesale price index in Italy 1913 = 100.

E_R is plotted in figure 9.7. PPP holds if E_R stays close to the parity line of 100. Upward sizable deviations from 100 imply a real depreciation of the lira; downward deviations, a real appreciation. By assumption, the 1913 exchange rate is at PPP. The figure tells a lucid story. On the whole, PPP did not hold. For a period of about twenty years, 1866–83, the lira was systematically undervalued relative to PPP. Yet the path of the inflation differential between Italy and France was very erratic (figure 9.8). The lira again became undervalued from 1892 to 1894 in the wake of the failure of the Roman Bank and of generalized mistrust of the banking system. Only the 1900s can be characterized as approximating long-run PPP.

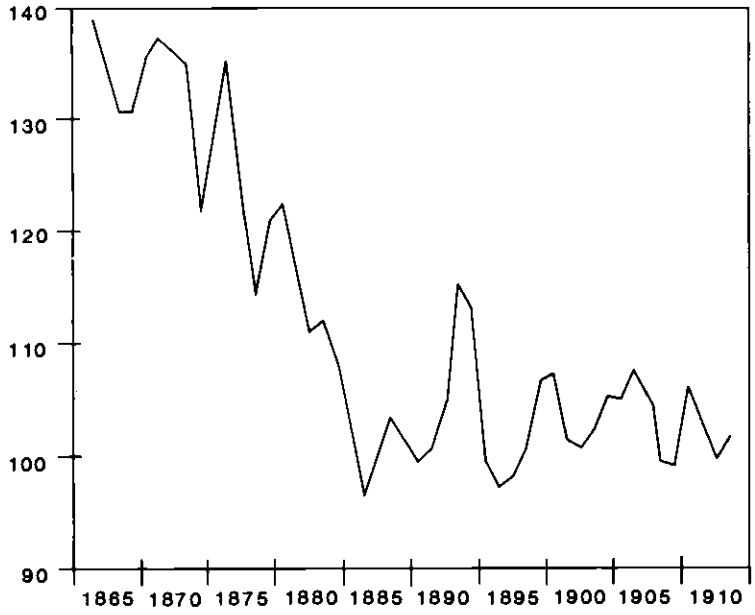

Fig. 9.7 Lira-franc real exchange rate, 1866–1913. *Sources*: Nominal exchange rate (*ELF*) times French wholesale price index from Mitchell 1978, divided by Italian wholesale price index: De Mattia 1977, table 7.

This assessment does not change when we regress changes in the log of E_N on changes in the log of P_F and P_I (see table 9.4). Both the explanatory power of the hypothesis (R^2) and the parameter estimates of the price variables (which a priori should be equal to unity) provide grounds for rejection. We performed modifications of the reported regressions—constrained estimation on the two inflation variables as well as introducing distributed lags—which however yielded no appreciable change in the statistical results.

If PPP cannot explain the movement in the exchange rate, what can? We considered the following model (see Meese and Rogoff 1981):

$$\dot{E}_N = b_0 + b_1\,(\dot{M}_I - \dot{M}_F) + b_2\,(\dot{Y}_I - \dot{Y}_F) + b_3\,(\Delta i_{s,I} - \Delta i_{s,F}) + b_4\,(\Delta i_{1,I} - \Delta i_{1,F}) + b_5\,CA_I + b_6\,CA_F + \epsilon \tag{8}$$

where

E_N = number of lire per French franc;

i_s = short-term interest rate;

i_1 = long-term interest rate (a proxy for the anticipated inflation rate);

Y = real GNP;

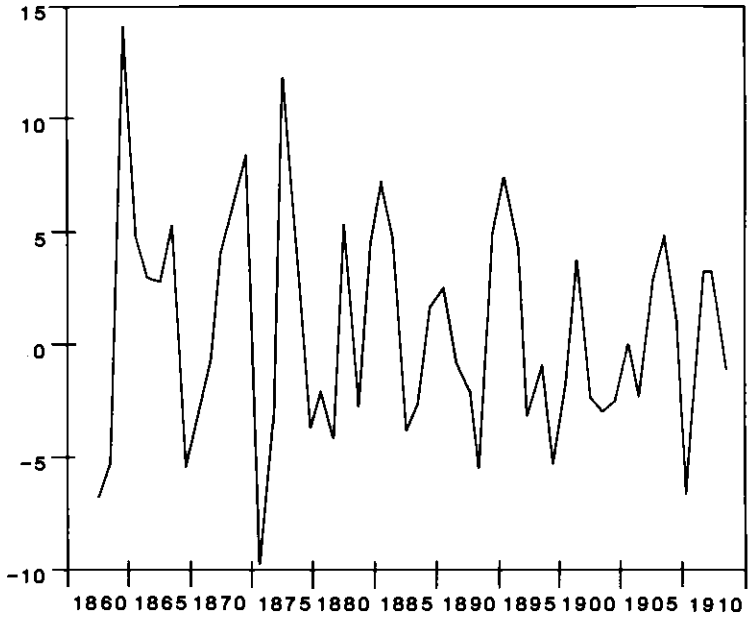

Fig. 9.8 Italy-France inflation differential, 1863–1913. Percentage change in the Italian wholesale price index (table 9.A.1, col. 9) minus percentage change in the French wholesale price index.

CA = current-account balance;

dot above a variable = first difference of its natural logarithm;

subscripts I and F = Italy, France.

Equation (8) is a testable implication of a rather eclectic asset view of the exchange rate, which incorporates the pure monetary model ($b_4 = b_5 = b_6 = 0$) with short-run deviations from PPP ($b_5 = b_6 = 0$) and possibly long-run deviations from PPP. The interested reader may refer to Meese and Rogoff and the literature cited therein for a deeper discussion of the theoretical and empirical issues underlying equation (8).

We fitted equation (8) for both the lira–French franc and the lira-pound exchange rates for the period 1882–1913. The results were disappointing: the parameter estimates were either inconsistent with theory or statistically insignificant and often both. A possible difficulty with equation (8) is that the sample period under consideration cannot be characterized as a regime of flexible exchange rates. Often changes in international reserves bore the brunt of the adjustment process. In light of this consideration, we replaced E_N with the composite variable, measuring exchange market pressure,

Table 9.4 **Tests of the PPP Hypothesis (*t*-statistics in parentheses)**

Exchange-Rate Changes for Italy vis-à-vis	Sample Period	Constant	Inflation		R^2	D.W.
			Domestic	Foreign		
France	1867–1913	−.002	.173	−.053	.10	2.04
		(−.522)	(2.192)	(−.539)		
United Kingdom	1882–1913[1]	.001	−.063	.026	.01	2.12
		(.166)	(−.666)	(.170)		

Sources: Lira-franc exchange rate: table 9.A.1, col. (11); lira-pound exchange rate: table 9.A.1, col. (12); wholesale price indexes: Italy, table 9.A.1, col. (9); France, Mitchell 1978; GNP deflator: Italy, table 9.A.1, col. (10); United Kingdom, Lewis 1978.

[1]Sample period was restricted by data limitations.

$$\frac{\Delta IR}{MB_{-1}} + \frac{\Delta \frac{1}{E_N}}{\left(\frac{1}{E_{N_{-1}}}\right)},$$

used by Girton and Roper (1977) in their study of post–World War II Canada. The outcome was that the coefficient of the Italian-money variable (in this case $\Delta BD/MB_{-1}$) turned out to be significant and of the correct sign; for the other parameters, however, there was no improvement. In sum, we can explain (marginally) more of the evolution of the composite variable of E_N, but the power of the explanation is far from satisfactory.

Again, we pose the question: What drives the exchange rate? Are nominal and real-exchange-rate changes largely unpredictable, or is there a common force underlying the large and persistent deviations from PPP? Our answer is that there is a common factor underlying the movements of the real exchange rate and that this factor can be labelled for short "country risk." More specifically, whenever financial markets perceived that the Italian government was not following prudent fiscal and monetary policies, the markets rated Italian debt instruments as less than risk-free assets. Potential owners of Italian debt instruments demanded a premium for the nonzero probability of a complete or partial default. Consider a model of interest-rate parity (IRP) between debt instruments of wide circulation:

$$D_t = \ln\,(1 + i_{I,t}) - \ln\,(1 + i_{F,t}) + \ln\,E^t_{t+1} - \ln\,E_t \tag{9}$$

where

$i_{I,t}$ = yield on Italian bonds at time t (table 9.A.1, col. 13);

$i_{F,t}$ = yield on French bonds at time t (table 9.A.1, col. 14);

E^t_{t+1} = the rate of exchange for $t + 1$ expected at t;

E_t = the rate of exchange at t (table 9.A.1, col. 11);

D measures deviations from IRP (when $D = 0$, IRP holds perfectly).

What is of interest here is not so much the absolute value of D, which can be influenced by transaction costs and differences in tax arrangements, but how it changes over time. We interpret these changes as changes in risk premia.

Equation (9) was computed using the yield on the Rendita Italiana (table 9.A.1, col. 13), a long-term government bond that was traded both at home and abroad, especially in Paris; the yield on a comparable French government bond (table 9.A.1, col. 14); and assuming perfect foresight in the exchange market, i.e., $ln\ E^t_{t+1} = ln\ E_{t+1}$.[16] Four periods are of interest: 1867 to 1884 when the lira was consistently undervalued relative to PPP; 1885 to 1892 when the nominal exchange rate was within the gold points and the real exchange rate oscillated around parity; 1893 to 1901 when deviations from PPP again became pronounced; and finally 1902 to 1912 when the nominal exchange rate remained within the gold points and the real exchange rate oscillated around parity. The yearly average values for D for these four periods were 2.37 percentage points, 0.02, 1.95, and 0.58.

Clearly, large and persistent deviations from PPP were associated with Italian financial assets carrying a higher yield, inclusive of exchange-rate appreciation, than French financial assets. These differences in D are too large and their timing too coincident with the underlying real-exchange-rate series to be explained by changes in transaction costs, exchange control, or tax treatment. The underlying force—we posit—is the changing perception by domestic and foreign markets of Italian country risk.[17]

Additional episodic evidence can be marshalled in favor of the hypothesis. In 1866 the lira depreciated by eight percentage points vis-à-vis the French franc, yet the Italian price level was below the French one.

As noted in section 9.3, two important events took place in 1866: a large budget deficit (figure 9.1) and the decision to make the lira inconvertible. In 1881 the nominal exchange rate appreciated suddenly (figure 9.2)—too suddenly to reflect changes in underlying competitiveness. However, that was the year the Italian government decided to return eventually to the gold standard. The anticipation that fiscal and monetary discipline would be restored had an immediate impact on the exchange markets. From 1891 to 1894 the lira depreciated dramatically; during this period uncertainties about presumed banking malpractices culminated

with the failure of the Roman Bank. All these historical episodes confirm the more general evidence presented above: Italy was perceived for long periods of time to be a substantial risk. That risk, in turn, was based on investors' assessment of Italian economic policy as imprudent enough to justify a positive probability of default on its debt instruments.

An alternative explanation for the persistence of deviations from PPP could be positive transaction costs that would inhibit arbitrage in both goods and securities markets. A variable risk premium that causes variations in the real exchange rate does not signify foregone opportunities to arbitrage across goods or between assets and goods. The aim of our tests is to uncover a variable risk premium. They are silent concerning the average transaction cost borne by a purchaser of Italian goods who intends to resell them in France for profit. We have no facts about transaction costs, but the downward trend in the real depreciation of the lira from 1866 to 1883 is consistent with falling transaction costs. The building of railroads, roads, and canals, the development of a merchant marine, and the ongoing process of commercialization that took pace in this period favor an explanation of declining transaction costs. In short, our risk-premium hypothesis does not necessarily imply irrationality in the goods market.

9.4.5 Causality Tests

So far we have identified the determinants of the money market and the exchange rate. In particular, we have demonstrated that PPP did not hold over the sample period, a fact that is more consistent with the Humean view of the adjustment mechanism than with MAPA's. We now want to marshal additional evidence to discriminate more effectively between the two hypotheses.

Table 9.5 contains summary information derived by applying Granger-Sims causality tests to variables of interest. The symbol $\tilde{x} \text{——>} \tilde{z}$

Table 9.5 **Causal Relationships**

A.	$\tilde{MB}_t \xrightarrow{+} \begin{cases} \tilde{Y}_{t+1} \\ \tilde{P}_{t+1}, (\tilde{P}_{t+2}) \\ \tilde{E}_{N_{t-1}} \end{cases}$
	$\tilde{P}_{t+1}, \tilde{P}_{t+2} \xrightarrow{-} \tilde{IRA}_{t+3}$
B.	$\tilde{P}_t^* \xleftrightarrow{+} \tilde{P}_t$
C.	$\tilde{P}_t^* \xrightarrow{+} \begin{cases} \tilde{IRA}_{t+2} \\ \tilde{Y}_{t+2} \end{cases}$

Notes: P = wholesale price index used in B; GNP price deflator used in A and C; Y = real GNP; E_N = lira-French franc exchange rate; P^* = Sauerbeck price index for Great Britain (proxy for world prices); $\tilde{}$ = indicates that the variable has been appropriately prefiltered. The reported relationships are statistically significant at least at the 5 percent level.

should be read as follows: prewhitened x, denoted $\tilde{x}$, causes prewhitened z, denoted $\tilde{z}$, in the sense that past values of $\tilde{x}$ explain current values of $\tilde{z}$; better than would ignoring past values of $\tilde{x}$. Causality in this sense is a matter of timing relationships. The sign $\leftrightarrow$ indicates bidirectional causality; + or − refer to the sign of the significant cross-correlation coefficient. Finally, the time subscripts denote the "causality lag." For example, changes in the monetary base "cause" changes in the price level with a lag of up to two years.

Several observations about the table are in order. First, the monetary base is unresponsive to changes in output, prices, and exchange rates while the converse does not hold. This evidence suggests that the supply of money is independent of the forces that influence the demand for money. Second, changes in domestic and foreign prices take up to two years to affect gold and silver flows—the external imbalance (table 9.5, part A). This evidence is consistent with the Humean adjustment process. Finally, there is bidirectional causality between foreign and domestic prices, a finding that is consistent with the Humean world but not with MAPA.

In the end the crucial difference between Hume and MAPA is that while the latter emphasizes changes in the money stock as the variable for restoring equilibrium in the balance of payments, the former recognizes also the importance of relative commodity prices. This difference can be tested by considering the following equation:

$$EDG = b_0 + b_1\, ESM + b_2\, E_R + b_3\, \bar{g} + b_4\, \bar{\tau} + \epsilon, \tag{10}$$

where

EDG = excess demand for goods;

ESM = excess supply of money;

$\bar{g}$ = deviations from trend of real government expenditures;

$\bar{\tau}$ = deviations from trend of tax rate;

ϵ = error term.

Assume that both Hume and MAPA share the common vision that $\bar{g}$ and $\bar{\tau}$ have a role to play in the excess demand for goods with $b_3 > 0$ and $b_4 < 0$. The dispute concerns b_2 which is zero for MAPA and positive for Hume. Note that the dispute is independent of the prevailing-exchange-rate regime. At issue is the existence of a real as opposed to a nominal exchange rate and its effect on the goods market. Hume posits that deviations from PPP are part of the engine that drives the adjustment mechanism. MAPA, instead, rules out such a mechanism and goes even further by postulating that PPP holds beyond the "momentary" run. The coefficient b_1 is positive. An increase in the domestic component of the

monetary base creates excess supply in the money market which spills over into the goods market by raising spending relative to income, which in turn causes a deficit in the trade account. For unchanged values of E_R, $\bar{g}$, and $\bar{\tau}$, equilibrium in the balance of payments is restored when the outflow of reserves restores equilibrium in the money market and in the goods market.

We tested equation (10), using annual data for the period 1867–1914. *EDG* was proxied by the log of real income minus the log of its trend value; *ESM* by the residuals of the demand money (cf. table 9.A.2); E_R by the log of the real exchange rate shown in figure 9.1; $\bar{g}$ by the log of real government expenditures minus the log of its trend value; and $\bar{\tau}$ by the log of the ratio of total taxes to nominal GNP minus the log of its trend value. Both $\bar{g}$ and $\bar{\tau}$ were lagged one period. The parameter estimates (absolute t-values in parentheses) and other statistics of equation (10) are:

$$\hat{b}_0 = -.007,\ \hat{b}_1 = .38,\ \hat{b}_2 = .22,\ \hat{b}_3 = -.002,\ \hat{b}_4 = -.33,$$
$$\quad (.86) \qquad (2.14) \qquad (3.7) \qquad\quad (.33) \qquad\quad (6.13)$$

$$R^2 = .63,\ \text{D.W.} = 1.77,$$

which suggests that the data are more consistent with the Humean view of the adjustment mechanism than MAPA's. Not only is arbitrage activity insufficient to equalize the lira price of Italian and French commodity indexes, but changes in these indexes play an important role in reequilibrating the external accounts.

9.5 Summary and Findings

Italy was not on the gold standard except for brief periods of time, and for the most part the lira was inconvertible in either gold or silver, yet fiscal and monetary policies in the latter part of the sample period, especially in the 1900s, achieved stability of nominal magnitudes. Indeed, Italian experience did not differ on the whole from what it would have been had the country adhered formally to the standard throughout.

The lira–French franc exchange rate, representative of other exchange ratios, floated more often than not and moved above the upper gold point in twenty-five out of forty-eight years, returning within the gold points during the 1900s when the lira was inconvertible. Deviations from PPP were sizable and long lasting. That persistence cannot be explained by either an Italian inflation rate systematically higher than the world inflation rate or by an expanded-asset theory of exchange-rate determination. Change in the valuation of the lira relative to PPP is best reconciled with the existence of changing perceptions of country risk. Investors demanded a risk premium for holding Italian debt instruments as compensation for a nonzero probability of complete or partial default. That risk, in turn, emerged whenever the market perceived that Italy was engaging

in imprudent fiscal and monetary policies; it disappeared when policies reverted to normal. Our evidence in favor of a risk-premium hypothesis does not necessarily imply irrationality in the goods market. Transaction costs on Italian goods, while probably falling from 1866 to 1883, could have been larger than implied by risk-premium calculations.

Deviations from PPP were found to have a considerable impact on the goods market and hence on the trade account. The fact that changes in the terms of trade could affect trade flows, and for that matter the very existence of these changes, differentiates the Humean view of the adjustment mechanism from the perfect-international-arbitrage version of the monetary theory of the balance of payments. The Italian evidence supports the former more than the latter. In favor of Hume, one may also note the one- and two-year lag of changes in the Italian price level over changes in the Italian monetary base and the two-year lag of changes in gold flows over changes in the domestic and foreign price levels. On the other hand, the strong form of Hume implies that gold flows are a significant, if not dominant, cause of variations in the domestic money supply. In fact, 45 percent of the long-run growth of the Italian money stock from 1862 to 1914 can be traced to a fall in the currency-deposit-ratio, 30 percent to expansion of the domestic component of the monetary base, and only 22 percent to net inflows of gold. Over the short run, the foreign component, being more volatile than the domestic component, exerted a larger impact on the growth of the money stock.

Italy did not have a monopoly bank of issue until 1926. Throughout the period under study several banks were authorized by the government to issue notes. Such an arrangement, however, did not prevent the government from monetizing its deficits. Fiscal and monetary policies were closely intertwined.

Yearly changes in the domestic component of the monetary base were in the majority of the cases compensated by oposite changes in the foreign component of the base. Nurkse and Bloomfield would consider these observations as evidence that the authorities did not play according to the rules of the game. Our interpretation is that this negative correlation is often more consistent with causality running from ΔBD to ΔIR, as implied by the monetary approach to the balance of payments, rather than as the reaction of the authorities to ΔIR.

The Latin Monetary Union which Italy joined in 1865 was never an effective constraint on Italian economic policy. Absence of policy coordination doomed the union to failure.

Money was as much a luxury good in Italy as it was in the United States during the same period. The demand for real-cash balances responded to changes in real permanent income with an elasticity of about 1.5. The impact on desired real-cash holdings of changes in the opportunity cost of holding such balances is statistically less clear.

Appendix A

Table 9.A.1 Basic Annual Data

	Money Stock (*M*) (1) (2) − (3) + (4)	Currency (*C*) (2)	Bank-held Currency (*CB*) (3)	Bank Deposits (*D*) (4)	Metallic Reserves (*IRA*) (5)
			(millions of lire)		
1861	1179.0	1044.4	n.a.	134.6	118.0
1862	1337.9	1159.3	n.a.	178.6	130.4
1863	1371.5	1157.5	n.a.	214.0	155.3
1864	1336.0	1115.0	7.4	228.4	144.6
1865	1386.8	1131.4	9.0	264.4	148.5
1866	1859.5	1551.9	9.5	317.1	121.6
1867	2041.0	1766.1	15.9	290.8	137.1
1868	2089.7	1776.2	11.3	324.8	228.5
1869	2131.5	1770.0	12.5	374.0	228.3
1870	2432.7	1829.4	31.1	634.4	248.4
1871	2845.2	2065.8	38.6	818.0	223.9
1872	3317.0	2296.5	66.7	1087.2	207.1
1873	3339.6	2405.0	61.7	996.3	211.8
1874	3412.7	2423.7	62.4	1051.4	203.0
1875	3536.7	2468.9	55.5	1123.3	144.4
1876	3613.7	2473.5	57.7	1197.9	150.0
1877	3781.3	2478.4	57.6	1360.5	150.3
1878	3855.5	2464.3	55.3	1446.5	151.8
1879	3960.0	2514.3	67.6	1513.3	148.7
1880	4066.5	2524.2	81.8	1624.1	178.5
1881	4055.2	2441.3	80.4	1694.3	138.3
1882	3968.4	2250.6	61.8	1779.6	159.2
1883	4057.7	2191.2	74.1	1940.6	322.8
1884	4292.5	2241.0	76.7	2128.2	371.3
1885	4561.6	2261.3	85.5	2385.8	338.8
1886	4943.4	2305.5	87.4	2725.3	345.7
1887	5071.2	2336.8	95.4	2829.8	379.3
1888	5107.0	2314.0	106.4	2899.4	435.6
1889	5226.1	2358.0	83.5	2951.6	438.9
1890	5178.2	2369.6	78.2	2886.8	409.8
1891	5110.8	2353.1	80.4	2838.1	442.8
1892	5275.7	2372.7	71.0	2974.0	447.3
1893	5270.6	2416.9	64.9	2918.6	446.7
1894	5186.0	2388.8	67.9	2865.1	514.2
1895	5269.8	2319.1	60.8	3011.5	506.2
1896	5173.2	2289.3	65.0	2948.9	516.5
1897	5317.0	2355.0	73.3	3035.3	465.5
1898	5478.1	2369.3	74.5	3183.3	477.8
1899	5871.4	2437.2	83.8	3518.0	469.5
1900	6009.4	2402.8	78.0	3684.6	468.4
1901	6247.8	2403.0	81.6	3926.4	494.7
1902	6431.2	2432.1	87.6	4086.7	528.4
1903	6850.5	2489.5	97.5	4458.5	721.6

Table 9.A.1 (continued)

	Money Stock (*M*) (1) (2)−(3)+(4)	Currency (*C*) (2)	Bank-held Currency (*CB*) (3)	Bank Deposits (*D*) (4)	Metallic Reserves (*IRA*) (5)
			(millions of lire)		
1904	7327.6	2520.1	102.9	4910.4	728.0
1905	7985.9	2587.6	129.6	5527.9	919.9
1906	8179.8	2775.7	134.8	5538.9	1068.6
1907	8960.3	3013.2	178.1	6125.2	1270.4
1908	9428.2	2947.0	189.4	6670.6	1314.7
1909	9984.5	2981.5	198.9	7201.9	1331.7
1910	10564.7	3029.2	198.7	7734.2	1344.6
1911	11160.7	3215.4	204.1	8149.4	1397.0
1912	11329.9	3215.5	231.9	8346.3	1433.9
1913	11849.3	3300.1	229.7	8778.9	1495.7
1914	12797.7	4018.7	276.1	9055.1	1532.3

	Foreign-Exchange Reserves (*IRFE*) (millions of lire (6)	Real GNP (*RYI*) (millions of 1913 lire) (7)	Consumer Price Index (*CPI*) (1913=100) (8)	Wholesale Price Index (*WPI*) (1913=100) (9)	GNP Deflator (*PYI*) (1913=100) (10)
1861		84.1358	82.0	97.58	73.94
1862		87.1822	82.5	91.19	74.74
1863		85.3033	80.1	87.17	70.22
1864		86.4842	77.9	87.17	70.51
1865		87.9622	76.6	85.80	70.86
1866		91.8083	77.4	89.73	74.71
1867		97.4362	79.3	90.18	76.84
1868		99.9044	82.5	95.75	83.68
1869		103.0410	83.0	89.27	78.93
1870		103.4800	84.2	88.54	78.16
1871		108.5480	86.8	91.28	80.14
1872		108.3870	98.1	99.14	90.02
1873		113.1790	104.0	105.08	98.64
1874		110.8970	106.5	104.89	95.90
1875		114.4030	91.2	92.91	80.68
1876		113.0780	96.5	90.04	81.97
1877		113.7130	100.4	102.11	91.59
1878		114.8740	96.7	98.85	85.99
1879		115.0260	95.5	92.82	89.12
1880		119.4100	99.0	93.30	87.12
1881		111.2060	92.6	87.26	82.99
1882		117.5900	90.4	89.56	85.16
1883		115.8470	87.5	83.91	80.90
1884		116.4960	85.8	80.36	78.99
1885		117.9630	87.7	84.67	84.73
1886		122.2680	87.6	85.15	85.28

Table 9.A.1 (continued)

	Foreign-Exchange Reserves (*IRFE*) (millions of lire) (6)	Real GNP (*RYI*) (millions of 1913 lire) (7)	Consumer Price Index (*CPI*) (1913 = 100) (8)	Wholesale Price Index (*WPI*) (1913 = 100) (9)	GNP Deflator (*PYI*) (1913 = 100) (10)
1887		121.1680	87.4	79.41	79.27
1888		120.2110	88.5	80.75	78.77
1889		114.5710	90.0	85.44	83.66
1890		123.0170	93.2	87.64	85.33
1891		126.2310	92.9	85.25	87.34
1892		120.3140	92.1	81.03	82.06
1893		124.5200	90.1	75.96	80.67
1894	22.5	122.5690	89.7	73.75	78.56
1895	24.2	123.3080	89.2	77.59	80.40
1896	42.5	124.9400	88.8	78.16	79.07
1897	94.6	119.8550	88.6	76.63	80.03
1898	89.3	129.8240	89.2	78.74	83.96
1899	92.5	131.2540	87.8	80.75	83.03
1900	111.2	137.2890	88.2	84.50	84.10
1901	111.5	144.9760	88.3	84.10	81.31
1902	115.0	140.8630	87.7	81.30	79.46
1903	117.9	148.4830	90.3	80.60	83.08
1904	134.9	148.2080	91.4	77.00	82.29
1905	133.6	151.6760	91.5	80.30	82.63
1906	129.7	149.7520	93.2	83.30	88.60
1907	134.8	173.6640	97.6	89.80	88.32
1908	141.6	167.6950	96.6	87.40	86.86
1909	141.8	179.7000	93.9	88.10	88.67
1910	143.6	165.6680	96.5	88.20	94.17
1911	157.7	179.2430	98.9	95.30	96.69
1912	156.2	182.6290	99.8	102.60	99.42
1913	156.2	188.8500	100.0	100.00	100.00
1914	199.2	184.5260	100.0	95.80	98.94

	No. of Lire per French Franc (*ELF*) (11)	No. of Lire per British Pound (*ELUK*) (12)	Yield on Long-term Government Bonds (percent per year)	
			Italy (*RII*) (13)	France (*RIF*) (14)
1861	n.a.	n.a.	6.97	4.38
1862	n.a.	n.a.	7.26	4.28
1863	n.a.	n.a.	7.09	4.39
1864	n.a.	n.a.	7.55	4.54
1865	n.a.	n.a.	7.83	4.42
1866	107.99	n.a.	9.23	4.55
1867	107.37	n.a.	9.66	4.41

Table 9.A.1 (continued)

	No. of Lire per French Franc (*ELF*) (11)	No. of Lire per British Pound (*ELUK*) (12)	Yield on Long-term Government Bonds (percent per year)	
			Italy (*RII*) (13)	France (*RIF*) (14)
1868	109.82	n.a.	9.32	4.27
1869	103.94	n.a.	8.95	4.17
1870	104.50	n.a.	9.00	4.76
1871	105.35	n.a.	7.20	5.51
1872	108.66	n.a.	5.98	5.47
1873	114.20	n.a.	6.25	5.34
1874	112.25	n.a.	6.25	4.90
1875	108.27	n.a.	5.88	4.66
1876	108.47	n.a.	5.84	4.35
1877	109.63	n.a.	5.88	4.27
1878	109.42	n.a.	5.60	4.06
1879	111.19	n.a.	5.15	3.73
1880	110.53	n.a.	4.88	3.56
1881	100.28	25.40	4.87	3.54
1882	101.26	25.55	4.97	3.67
1883	99.15	25.03	4.97	3.83
1884	100.00	25.23	4.61	3.88
1885	100.38	25.38	4.56	3.79
1886	100.19	25.31	4.14	3.66
1887	100.82	25.54	4.46	3.78
1888	100.98	25.57	4.52	3.63
1889	100.67	25.42	4.58	3.51
1890	101.15	25.54	4.60	3.26
1891	101.55	25.65	4.71	3.18
1892	103.55	26.06	4.66	3.07
1893	107.97	27.19	4.63	3.10
1894	111.08	27.94	4.59	2.98
1895	105.57	26.58	4.37	2.96
1896	107.63	27.11	4.35	2.94
1897	105.14	26.45	4.18	2.90
1898	106.97	27.05	4.06	2.92
1899	107.32	27.07	4.01	2.98
1900	106.44	26.77	4.02	2.98
1901	104.30	26.25	3.97	2.96
1902	101.21	25.46	3.91	2.99
1903	99.95	25.15	3.91	3.06
1904	100.12	25.20	3.90	3.11
1905	99.94	25.14	3.82	3.03
1906	99.94	25.15	3.87	3.08
1907	99.97	25.18	3.69	3.16
1908	100.00	25.13	3.63	3.13
1909	100.42	25.29	3.61	3.07
1910	100.51	25.35	3.60	3.06

Table 9.A.1 (continued)

	No. of Lire per French Franc (*ELF*) (11)	No. of Lire per British Pound (*ELUK*) (12)	Yield on Long-term Government Bonds (percent per year)	
			Italy (*RII*) (13)	France (*RIF*) (14)
1911	100.52	25.39	3.67	3.14
1912	100.93	25.47	3.60	3.27
1913	101.77	25.68	3.58	3.44
1914	n.a.	26.24	3.75	3.78

Sources: Col. (2), Del Mattia 1969, tables 5–7, 14; col. (3), ibid., table 22; col. (4), ibid., tables 2, 2a, 2b, 23; col. (5), ibid., tables 11–15, 19, 23, 26, 28; col. (6), ibid., table 19; cols. (7)–(10), De Mattia 1977, table 7; cols. (11)–(12), Borgatta 1933; col. (13), De Mattia 1969; col. (14), De Mattia 1977, table 81.

Appendix B *New Estimates of the Demand for Money Function*

Despite the research already done by one of us (Spinelli 1980) on the demand for money in Italy for the period 1867–1965, three reasons were persuasive for reestimating the function. First, our money-stock series excludes currency held by banks whereas Spinelli included it by oversight. Second, Spinelli used the official discount rate as a measure of the opportunity cost of holding money. We have uncovered a long-term rate of interest that is in principle superior to the discount rate. Third, we wanted to ascertain the sensitivity of the demand-for-money function to a change in the sample period.

The model employed is that used by Spinelli (1980). It postulates that the demand for money depends upon permanent income and the opportunity cost of holding money. Actual real-money balances adjust slowly to the difference between actual and desired real balances; permanent income is a weighted average of past actual values of income. Such a partial-adjustment–adaptive-expectations model can be represented by the following equations:

$$M_t^* = a + bY_t^* + ci_t;\ a,\ b > 0,\ c < 0; \tag{A1}$$

$$M_t - M_{t-1} = \alpha(M_t^* - M_{t-1}) + u_t;\ 0 < \alpha \leq 1; \tag{A2}$$

$$Y_t^* - Y_{t-1}^* = \beta(Y_t - Y_{t-1}^*);\ 0 < \beta \leq 1, \tag{A3}$$

where M^* is the desired stock of real-money balances, M is the actual stock, Y^* and Y permanent and actual real income and i the proxy for the

Table 9.A.2 Money Demand (*t*-statistics in parentheses)

a	b	c	t	α	β	R^2	D.W.
−.925	.868	−.138	.016	.968	.278	.99	2.106
(−1.700)	(2.320)	(−1.160)	(5.938)	(5.309)	(2.562)		

Sources: Real income is GNP at constant prices (*RYI*, table 9.A.1, col. 7). Real permanent income is solved out by the model. The rate of interest is the yield on the long-term government bonds *Rendita Italiana* (*RII*, table 9.A.1, col. 13).

opportunity cost of holding money. The model is estimated for the period 1867–1914. Money data were centered at midyear and deflated by the consumer price index. All relevant variables were deflated by population. A time trend was added as a regressor; its coefficient is denoted by t. The functional specification is logarithmic, except for the time variable. We employed a nonlinear OLS estimation procedure which is subject to the well-known single-equation bias. However, we believe this bias is quantitatively small and not worth pursuing here (cf. Laidler 1977a). Calliari, Spinelli, and Verga (1981) show that simultaneous-equations estimates for Italy are about the same as single-equation ones.

The parameter estimates are given in table 9.A.2. The permanent-income coefficient, b, is not significantly different from unity. To correctly evaluate the inflationary impact of monetary growth, however, we cannot overlook the role of the time variable which is strongly significant and has an elasticity of about 0.5.

The relative interest insensitivity of the demand for money confirms the earlier results of Spinelli (1980). The reader is cautioned not to draw the conclusion that velocity is unresponsive to interest rates. Changes in transitory income may be regarded as a proxy for interest-rate changes. To the extent that the demand for money responds to permanent income, the estimates are compatible with a positive relationship existing between velocity and interest rates (cf. Laidler 1977b).

The adjustment between actual and desired money balances is completed within a year; learning takes longer.

Notes

1. The U.S. Commission of Gold and Silver Inquiry (U.S. Congress 1925, pp. 347–52) has a compact but useful history of this period.

2. The economist R. Busacca (1870) also supported the monopoly thesis.

3. In addition to the increase in gold supply, the increase in the market price of silver relative to gold possibly resulted from the shift of the source of European cotton imports from the Civil War–ravaged United States to Far Eastern countries with silver standards (De Mattia 1959).

4. Gold lire and gold francs had equivalent gold content. Silver lire of denominations of five and above and silver francs also had equivalent silver content.

5. There was a condition: Within two years after its secession from the union, a member-state pledged to repurchase, with gold or foreign exchange, small-denomination coins circulating outside its territory.

6. The five minor banks of issue received BN notes for an amount equal to their metal holdings. Since this transaction did not alter the aggregate amount of currency in circulation, the law can be explained as a governmental scheme to raise the market share of BN, thus paving the way for BN as the only bank of issue.

7. The then–Minister of Finance Sella stated several times that so long as the prices of bonds were low, it was preferable to monetize the deficits.

8. The net worth of each bank was as follows (in million lire): BN 450, Banca Nazionale Toscana 63, Banca Toscana di Credito 15, Banca Romana 45, Banco di Napoli 146.25, and Banco di Sicilia 36.

9. The intended effects of the legislation were not fully realized. The national branch network of BN and the regional character of the other five banks of issue preserved the premium of BN notes over their notes.

10. The immediate impact of a change in regime on the exchange rate is not limited to the Italian experience. British economic history offers similar evidence.

11. Paper money in circulation was to be reduced from 1097 to 864 million lire. As to the reserve requirement, the law prescribed that gold had to account for 33 percent and silver for 7 percent of note liabilities. There was no reserve requirement against deposit liabilities.

12. This point is often stressed by Triffin (1964).

13. See Herring and Marston 1977 for an approach of this sort applied to Germany of the 1960s.

14. Velocity of circulation fell by 131 percent from 1861 to 1913 (figure 9.6).

15. The observation for 1865, which we could not discover, is presumed to be 100. In the empirical work this observation is omitted.

16. An obvious criticism is that a careful application of equation (9) requires one-year rather than long-term bonds. Unfortunately, we had no alternative to our procedure.

17. Lindert's evidence (1969) of asymmetries between the interest differentials required to attract funds to major money-market centers may be in agreement with our hypothesis; e.g., the interest differential required to attract funds from small countries to London was greater than that required to attract funds to Paris. Our evidence suggests that if Lindert's asymmetries incorporate differences in country risks, they are far from being constant over time. It may well be that France was preferred to Italy at all times—an inference consistent with the data reported above—but this difference was not time independent. In sum, the variability of Lindert's asymmetries is explained by a variable risk premium against the lira.

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Comment

Richard E. Sylla

Fratianni and Spinelli's paper in my view has two objectives. The broader of the two objectives is to sketch the historical facts and quantitative considerations that are pertinent to what might be called "A Monetary History of Italy, 1861–1914." This sketch appears to be modeled on the *Monetary History* of Friedman and Schwartz. It is filled with fascinating interpretations and hypotheses. One hopes that it is preliminary to a full-length study. The second objective, more specific and in keeping with the theme of this conference, is to ask the question, Does Italian experience, 1861–1914, support the classical analysis of Hume and others, or does it lend more credence to the more recent "monetary approach" developed by a number of writers but applied most prominently to economic history in the work of McCloskey and Zecher? The answer that Fratianni and Spinelli give is almost certain to attract a lot of scrutiny because it runs counter to the results of many other tests of the two theories. Their answer holds that at least for Italy in the period studied, the price-specie-flow analysis is more supported than the monetary approach and purchasing-power parity.

My comment covers each of the two objectives.

Italian Monetary History, 1861–1914

For most of the period, as Fratianni and Spinelli point out, Italy was not on the gold (or silver, or bimetallic) standard in the strict sense because Italians could not convert their paper bank notes and bank deposits into gold (or silver) at fixed rates. Nonetheless, even during the long periods of inconvertibility (1866–84, 1894–1913) the Italian banks were required by law to maintain a fractional specie cover for their note issues (but not deposits), the fraction being one-third from 1866 to 1891, one-quarter from 1891 to 1893, and two-fifths after 1893. Fratianni and Spinelli describe the periods of inconvertibility as a "gold–silver bullion standard" in which the requirement of a specie cover for bank notes exerted enough discipline (they presume) to allow the periods to be treated as one for econometic analysis with the periods of de facto gold standard (1861–66) and de facto silver standard (1884–94). Indeed, one of the main lessons they draw from their study of the Italian experience is that a standard or lack thereof is not very important: The "gold standard is not a sufficient condition for stability" because

> politicians had no difficulties in throwing off the straightjacket of the gold standard when it stood in the way of financing large budget deficits. On the other hand, the proper conduct of fiscal and monetary

Richard E. Sylla is professor of economics at North Carolina State University.

> affairs was sufficient to guarantee stability, whether or not the country was on the gold standard . . . little would have changed had Italy returned to a formal gold standard in the first thirteen years of the twentieth century. (P. 417)

Most economists and politicians probably would agree in general with these views.

Fratianni and Spinelli's description and analysis of the proximate determinants of the Italian money supply is a welcome addition to the growing literature on quantitative monetary history. In the proximate-determinants framework, the long-term growth of money in Italy was the result in roughly equal measures of a rise in the monetary base and a rise in the monetary-base multiplier. The base, defined as the currency stock, grew in two ways, also of roughly equal importance. It grew first as the banks issued currency to buy domestic assets, with issues to purchase the government securities generated by budget deficits being the main irregular force in this process, according to Fratianni and Spinelli. And it grew, secondly, as currency was issued to buy "foreign" assets, which were mainly metallic reserves in the long run. Changes in the domestic and foreign components of the base were in opposite directions in more than half of the years studied, but Fratianni and Spinelli are not sure whether this finding should be interpreted to mean that Italian banks sterilized specie flows, thereby contravening the so-called rules of the game, or whether the finding is an example of one source of base offsetting the other, as either Humean or monetary-approach analysis might predict. The lack of a central monetary authority and—most of the time—a convertible currency raises questions about how applicable the rules of the game were in Italy.

The money multiplier contributed almost as much as a rising base to long-term money growth. The main reason for the rising multiplier was that the Italian public changed from holding most of its money in the form of currency in 1861 to holding most of its money in the form of bank deposits in 1913. The development of banking and a growing appreciation of the conveniences of bank money were as characteristic of Italy as of other modernizing economies during the nineteenth century.

Whether money was a luxury in Italy, as Fratianni and Spinelli say is implied by their analysis of money demand, may be doubted. The secular fall of velocity in Italy, as elsewhere, was in part—perhaps in great part—the result of more and more economic units and activities becoming specialized, commercialized, and monetized. Economic historians can teach economists that there are better ways to describe, for example, the declining share of nontraded agricultural products in GNP in a developing economy than as "a decline in velocity" or money as "luxury." To teach these lessons, however, we have to do some hard work on the relative importance of production in the money-using and non-money-using sectors of developing economies.

Purchasing-Power Parity (PPP)

Since the lira was not convertible at a fixed rate into gold for most of the 1861–1914 period, it is hardly surprising that "for long periods of time [the lira–French exchange] rate was not contained within the gold points." The lira depreciated with respect to the franc when Italy abandoned convertibility because the politicians found that convertibility impeded the ability of Italian banks to create new money to finance the public sector's deficit. When suspension of convertibility allowed the new money to be created, advocates of PPP would expect Italian prices to rise relative to French prices and the exchange rate to rise in order to equalize exchange-adjusted prices in France and Italy. Fratianni and Spinelli say that it didn't happen that way. There was a substantial real, not merely nominal, depreciation of the lira from 1866 to 1883 and again from 1892 to 1894. As an aside one might note that this story, if true, confirms the alleged irrational attachment of the French to gold: they kept their gold and paid high French prices when they could have used the gold to buy lira and then lira to buy lower-priced Italian products.

But is the story true? Fratianni and Spinelli argue that it is true, and they attempt, after trying some tests that are inconclusive, to explain the deviations from PPP by introducing the hypothesis of "country risk":

> Whenever financial markets perceived that the Italian government was not following prudent fiscal and monetary policies, the markets rated Italian debt instruments as less than risk-free assets. Potential owners of Italian debt instruments demanded a premium for the nonzero probability of a complete or partial default. (P. 427)

In support of their hypothesis they introduce evidence that "large and persistent deviations from PPP are associated with Italian financial assets carrying a higher yield, inclusive of exchange-rate appreciation, than French financial assets."

This *financial* theory of deviations from PPP merits closer examination. As the lira depreciated relative to the franc, allegedly because of the Italian government's untrustworthy fiscal and monetary policies, one would expect the franc price of Italian debt to fall accordingly to a new equilibrium reflecting the new exchange rate. But Fratianni and Spinelli appear to argue that the process of arbitrage didn't stop at this point. Rather, the (all powerful?) French investors marked down the Italian debt instruments still further because they expected the Italian policies to become still worse. With interest arbitrage one would predict that Italian-government debt would decline in price (and yields would rise) in Italy. Or, without instant arbitrage, the French would sell their Italian bonds back to Italians until they fell enough in price to equalize the exchange-adjusted prices in the two countries. In either case the French investors supposedly enforce a real depreciation of the lira and create all those

opportunities for French goods buyers to increase their incomes by buying Italian goods.

This analysis is curious because it appears to assume that the rationality that characterizes French investors is not shared by French goods buyers. If we assume, on the other hand, that rationality is evenly distributed across French persons, then the case for deviations from PPP collapses. In such circumstances, the suspicions of French investors would lead only to a rise in yields on Italian debt relative to yields on French debt, and this rise is precisely what the evidence brought forward by Fratianni and Spinelli indicates. "Country risk" remains intact as an explanation of relative interest-rate movements between the two countries, but it does not seem to be able to account for deviations from PPP. For country risk to perform the latter feat, Fratianni and Spinelli need to demonstrate that French goods buyers were irrational and they do not do this. Indeed, they say very little about the trade account or even capital flows despite the predictions that a more fully developed analysis of their country-risk hypothesis generates with respect to these variables.

If PPP is not refuted by the country-risk hypothesis, how might one account for the behavior of the real exchange rate calculated by Fratianni and Spinelli? It is, of course, calculated by multiplying the nominal lira-franc exchange rate by the ratio of French to Italian wholesale price indexes, with each index set at 100 in 1913. If one plots the two price indexes, it becomes apparent that they are very close together from 1885 to 1913, but that before 1885 the French index is well above the Italian one with a noticeable tendency for the two to converge in the 1870s and early 1880s. The behavior of the two indexes is consistent with a hypothesis that international transactions costs (the costs of transportation, information, and so on) declined from the 1860s to the 1880s. And, as a matter of economic history, the completion of the Italian railroad network in the 1880s, the decline of ocean freight rates, and the spread of telegraphic and other information networks are often cited by historians as key developments in this period. So the data are not inconsistent with the view that Italian prices were world prices, adjusted to take account of transactions costs.

Nonetheless, pending further study, an agnostic position on instantaneous PPP versus price–specie flow seems warranted. The Granger-Sims causality tests reported by Fratianni and Spinelli support the Humean approach, but now that such tests have been used to demonstrate that fluctuations in U.S. GNP have caused variations in sunspots, one might be a little skeptical (Sheehan and Grieves 1982). (Moreover, Fratianni and Spinelli provide no information on the statistical significance of the "causal relationships" in their table 9.5.) The results of Fratianni and Spinelli's estimation of equation (10) are more troublesome for advocates of the monetary approach because the statistically

significant coefficient on the real exchange rate indicates that (1) rises in French wholesale prices, ceteris paribus, increased demand for Italian goods; (2) rises in Italian wholesale prices, ceteris paribus, reduced demand in Italy; and (3) rises in the nominal lira-franc exchange rate, ceteris paribus, raised demand in Italy, presumably by making French imports more costly. One may not be persuaded by Fratianni and Spinelli that Italian goods were persistently undervalued for almost two decades, but the authors at least cast doubt on the notion that instantaneous arbitrage worked to bring about purchasing-power parity at all times in Italy during the 1861–1914 period.

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General Discussion of Jonung and Fratianni-Spinelli Papers

BRUNNER commented on an important paradox raised by the conference—that the rules of the game are frequently violated by most of the participants but nevertheless the system functioned remarkably well and that there was no major financial crisis within the system over thirty or forty years. He submitted the following thoughts on this issue. During the gold standard era we observe a huge variety and array of adjustment mechanisms involving allocation of resources between production and trade. Also we observe changes in relative prices, changes in the allocation of real capital, changes in the shares of traded and nontraded goods, changes involving long-term and short-term capital, etc. All these operations and transactions involve a wide spectrum of information and transaction costs, and they all occur in the context of a variety and in response to a variety of shocks—nominal shocks, real shocks, and shocks with variable durations, i.e., more or less transitory shocks and more or less permanent shocks. Shocks also occur in the context—and that is really the basic theme for our purposes—in the context of well-established expectations that the system will be maintained, that the central bank will honor the gold standard and will honor the buying and selling of gold at the stipulated prices.

This context suggests that we would not always expect to see the price-specie-flow mechanism involving relative price changes operate. In the Dornbusch-Frenkel case, which is a classic case of real *transitory* shocks, everybody would understand that a bad harvest is a transitory

event. Under such circumstances we would not expect the Humean mechanism to operate. We would see adjustment mechanisms that operate in the range of information and transactions costs that are very small—exactly what we find in the Dornbusch-Frenkel piece.

On the other hand, in the case of more *permanent* phenomena of the kind we saw in the gold standard era, in countries such as Sweden, Germany, Switzerland, and the United States, where we observe a massive transformation from a predominantly rural society to a highly industrialized one, expressed by a similar pattern of real goals and supplemented by a similar pattern of monetary goals and no fiscal policy, the price-specie-flow mechanism probably helped.

Thus it depends very much on the mixture of shocks that occur, to what extent the various mechanisms operate, and whether the adjustment takes place primarily in traded goods, financial markets, or substantial changes in relative prices.

LINDERT, following his comment on Jonung's paper, made some remarks on the self-destruction of a successful gold standard. His argument was that if a gold standard were successful, the main visible symptom of that success without any particular causal modeling would produce a key-currency system. This outcome occurs because people recognize that some currencies are as good as gold; once they are as good as gold, why ship or hold as a large share of reserve backing a barren, unproductive, and non-interest-earning metal? Thus a successful gold standard will lead to a key-currency system.

But this phase is only the first, and if it were the only one, little more would need to be said. The distinction between a key-currency system and a gold system is merely semantic, which may be sufficient in a world of contract enforcement and deposit insurance where the person, agency, or nation issuing an obligation to the rest of the world must back it up in the metallic way if a crunch comes.

However, a second phase would almost surely have to come eventually in any kind of twentieth century that we can imagine. Sooner or later the key-currency country will be subjected to a foreign-sector shock that will require deflation to hold the domestic money supply down to match the external demand for her money. Now if the shock is more severe and long lasting than say the 1847 harvest failure, would the key-currency-country officials be expected to deflate enough to meet the shock? Lindert answered in the negative—sooner or later the authorities will jettison the system. With respect to the Bretton Woods system, with or without Vietnam, America seemed headed on a path that would eventually require her to waive the rules, e.g., as soon as there was a serious deflationary bid imposed by the gold-rattling French and others. Interwar Britain came to a similar end. Such an outcome would have happened to pre-WW1 Britain. Even if World War I had not disrupted the entire

world, there is reason to doubt how long Britain would have held out in any case. As he (Lindert) has shown elsewhere, by 1913 Britain had enormously high external liabilities relative to any measure of her gold reserve, and that ratio looks high even by the post–World War II dollar standard. Lindert argued that even without war in August 1914, there were plenty of gathering clouds that would have made anyone question convertibility. The growing public awareness of the relevance of a decline in the money supply on the real economy, Lloyd George and the people's budget, and a considerable shift in political power—all of these factors would have made somebody question whether simple convertibility would have dominated British policy forever. Moreover, a rising foreign share of world output and foreign competition, in addition to domestic pressure, would have led to the abandonment of full convertibility.

FRENKEL made several comments. He referred first to Jonung's correlations of prices of wheat and rye within Sweden and across countries. High correlations, he suggested, do not necessarily imply unified markets. Similar price movements might simply reflect a similar response to the same climatic conditions in otherwise unconnected markets.

Frenkel's second remark concerned Fratianni's paper. He argued again that the Humean approach, which places great weight on relative price changes, and the purchasing-power-parity approach, which permits no such relative price changes, are both consistent with the monetary approach to the balance of payments.

Frenkel's last point had to do with interest parity. Fratianni attempts to relate deviations from purchasing-power parity to deviations from interest-rate parity. His results indicate the existence of large deviations from interest-rate parity. However, because he has no data on the forward market for foreign exchange, he is forced to use the future spot rate as proxy for the forward rate. Yet, on the basis of our experience with forward markets in the 1970s, we now know that the current forward rate can be a poor predictor of the future spot rate. As a matter of fact, since the spot rate follows approximately a random walk, the current forward rate and the current spot rate are almost identical. Therefore, using the future spot rate as the measure of the current forward rate may indicate large deviations from interest parity that are not really there.

BORDO commented that the similarity between the experience of Italy and Argentina is striking. The parallel illustrates that the gold standard only seemed to work well for relatively stable economies. In response to a conjecture made by Peter Lindert that the gold standard would have been abandoned because of the inevitable conflict between deflation and convertibility, Bordo described a simple counterfactual experiment he had conducted. He asked what would have been the behavior of the U.S. price level and real output had she followed classical gold standard rules throughout the post–World War II period. Assuming a fixed ratio of the

monetary base to the monetary gold stock, a fixed ratio of the U.S. monetary gold stock to the world monetary gold stock, a fixed ratio of the world monetary gold stock to the world total gold stock, but allowing the money multiplier to vary as it actually did, Bordo constructed a hypothetical gold-based U.S. money supply. He then used St. Louis–type price and nominal-income equations to simulate the behavior of the price level and real output since 1960 under a gold standard regime. He found exactly what one would expect—the classical gold standard pattern of a stable trend in prices, surrounded by alternating shorter periods of inflation and deflation, and alternating short-run movements in real activity. He conjectured that faced with such a pattern, the United States would have inevitably left gold.

BARRO asked the authors whether they had attempted to include in their money-demand functions measures of the extent of monetization?

JONUNG described his attempts to incorporate variables measuring monetization, financial sophistication, and the growth of the welfare state in money-demand functions. These attempts employ, as a proxy for monetization, the number of inhabitants per bank office, which fell from 30,000 people per bank office in Sweden in 1871 to a low in 1922 with 4,500 people per bank office, and is now 5,500 per bank office. A number of other proxies for financial sophistication and monetization was used.

FRENKEL questioned whether inhabitants-per-bank-office is an adequate measure of financial sophistication.

FRIEDMAN described his and Anna Schwartz's attempts to introduce a measure of financial sophistication in the determination of the velocity of circulation in the United States before World War I. None of their proxies proved successful.

Friedman also made a remark concerning the proper way to test purchasing-power parity. He argued that it was not advisable to rely on the correlation of individual prices, but that it was necessary to construct frequency distribution of prices. One might take the price of wheat in Sweden and the price of wheat in Great Britain and divide one price by the other to generate a wheat exchange. Similarly, the ratio of rye prices could be used to generate a rye exchange. Taking as many identical commodities as possible, one can construct a frequency distribution of relative prices and study their behavior over time. This method would be a way of constructing a measure of changes in the degree of market integration over time.

MCCLOSKEY responded to Friedman's suggestions about purchasing-power parity, pointing out that the origin of modern notions of purchasing-power parity was the use by Cassel, Keynes, and others of purchasing-power parity as a guide to the exchange rate governments should adopt after exchange rates had been floating for a considerable period of time. Price indexes were commonly used in these early calculations.

McCloskey suggested that there can be drift in purchasing-power parity for a number of different reasons. Even when arbitrage in traded goods is highly efficient, nontraded goods cannot be directly arbitraged. Productivity changes between traded and nontraded sectors can lead to changes in equilibrium exchange rates and in the purchasing-power parity index. By implication, under certain conditions purchasing-power parity cannot be used as an accurate predictor of equilibrium exchange rates. But this implication does not call the underlying concept into question. Just as we hold constant income and tastes in any analysis of demand, so too when we talk about purchasing-power parity we should hold constant other things that are themselves unaffected by the particular experiment we are trying to perform. For example, with regard to Fratianni's paper, McCloskey suggested that a problem with figure 9.7 is that the apparent deviation from purchasing-power parity might well be explained on productivity grounds and not be a deviation from purchasing-power parity at all.

KOCHIN emphasized the importance of the distinction between periods of irresponsible fiscal policy and wartime exigencies. Borrowing during wars will cause capital inflows which would raise the purchasing power of the Italian lira against the French franc. This circumstance could explain some of the deviations from purchasing-power parity observed in Fratianni's paper.

JONUNG responded to Peter Lindert's comments by suggesting that the gold standard was beneficial for Sweden in a number of respects. In particular, the standard made economic planning easier. In comparing Sweden with Italy, Jonung emphasized the importance of recognizing that Sweden was a smaller country than Italy. And Sweden was closely connected to Great Britain. In such an environment, the relationship of Sweden to Britain is not unlike that of the State of New York to the rest of the United States.

FRATIANNI raised a number of issues in his reply. One dealt with deviations from purchasing-power parity and the real exchange rate. He suggested that some of the disagreement among discussants may be terminological. What some label the real exchange rate, others label deviations from purchasing-power parity. As Richard Sylla points out, a number of factors can cause the equilibrium real exchange rate to change over time: differences in productivity in Italy and France, changes in production processes, and changes in tastes.

In response to Frenkel's comments, Fratianni suggested that he had not attempted to exclude either the Humean mechanism or the perfect-arbitrage version of the monetary approach to the balance of payments. He agreed that the monetary approach does not rule out by definition changes in relative prices. The two views differ only in emphasis: one

emphasizes relative prices; the other, changes in the level of expenditure. The paper takes extreme versions of the two theories in order to delimit the relevant issues as clearly as possible.

Fratianni also cautioned that the 1970s are a very different period than the 1880s and 1890s. National economic policies and inflation rates differ more now than then. Therefore it may not be advisable to generalize concerning current policy on the basis of nineteenth-century experience.

PART

IV. International Linkages under the Gold Standard