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## **Was Italy Ever on Gold?**

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# 1

## Was Italy Ever on Gold?<sup>1</sup>

*Giuseppe Tattara*

### Introduction

On one historical point most economists, bankers and statesmen are in accord: the international monetary system worked exceptionally well before the First World War. This system is commonly referred to as the gold standard system, emphasising the fact that central banks had the responsibility of preserving the official parity between their currencies and gold, and that this simple rule provided the system with an essentially automatic self-adjusting mechanism, operating without the aid of human intervention from either central bankers or finance ministers.<sup>2</sup>

In the late nineteenth century Italy was at best a semideveloped country. Its foreign trade was heavily dependent on agricultural exports, there were various episodes of budgetary difficulty for the government, there was a plurality of banks of issue and regulation of the monetary supply was very loose. It provided the standard illustration of the arguments against irredeemable currency and fluctuating exchange rates, arguments that are still current today.

The gold standard, as an international system, did not last as long as is usually supposed. Britain had been on a gold for a couple of centuries, but the gold standard system can only be considered an international standard, enjoying widespread agreement, from 1879, when the United States joined. The system would later be swept away at the outbreak of the First World War.<sup>3</sup> Before 1879, during the 'green-back period', the dollar floated against the pound and most of Europe was on a bimetallic standard. When a bimetallic country was on silver (a bimetallic country could be on either silver or gold at any particular time), its currency was in effect floating against the currencies of the

gold standard countries. But there were other examples of floating that were not based on the choice of the silver standard. The Austro-Hungarian gulden and the Russian rouble floated until they joined the gold standard in 1892 and 1897 respectively, and Spain was never on gold.<sup>4</sup>

For most of the period from the unification of Italy in 1861 until the First World War, the lira was a floating currency (that is, from 1866–84 and from 1894–1913, see Figure 1.1). It was only really tied to gold and silver through a bimetallic system for two very short periods: from 1861–66 and, for a short while, after the 1883 convertibility declaration. After the 1890s Italy was not legally on gold when almost all other nations were, but nevertheless the country had a remarkably stable exchange rate and took an active part in the rapid development of trade and international capital flows that were the distinguishing feature of these fortunate years.

During this period the Italian balance of payments was affected by large inflows and outflows of foreign capital, and also benefited from a growing inflow of invisible earnings. In the thirty years, that followed the unification of the kingdom, there was a substantial flow of capital into Italy. Although this flow was subject to large and sudden fluctuations, it certainly helped the country to face very large structural deficits on the commodity account – those typical of a country at the beginning of the industrialisation process – without burdening its exchange. The arrival of emigrant remittances, together with a tight control of circulation, made it easier for Italian reserves to reach very high levels. The exchange rate was stabilised, and Italy became a net exporter of capital, which reduced the burden of interest payments abroad.<sup>5</sup> From the late 1890s a virtuous circle was established that stabilised the exchange rate at the 'gold import point'. A stable rate of exchange proved very important in creating a positive climate that allowed emigrants to send back their savings with confidence. Capital repatriation was made compatible with the persistence of a large trade imbalance, thanks to a substantial flow of invisible earnings free from the fear of exchange rate depreciation.

From the very beginning, the lira's nominal exchange rate against the pound was relatively stable, apart from a small fluctuation in the late 1860s following the war with Austria-Hungary, and again during the international financial crisis of the 1890s. On the whole, the floating of the lira occurred within very strict margins, with a standard deviation of 4.3 over the whole period (2.9 if the period is restricted to 1872 onwards), and a maximum divergence from the average value,

which reached around 7 per cent on only a couple of occasions (Figure 1.1). Italy never resorted to competitive devaluation.<sup>6</sup>

For Italy, becoming one of the stable exchange countries was more the result of a series of fortunate circumstances than the outcome of deliberate policies; capital was abundant in Europe, emigrants sent remittances because of the necessity to feed their families, and tourist expenditure was part of a larger global movement.

The first section of this chapter sketches the evolution of the Italian economy in the last part of the nineteenth century and the beginning of the twentieth century, with particular emphasis on money and banking. It also deals with the problem of the Italian state's huge public debt, the foreign debt and the relation of these to the money supply. The second section examines the exchange rate regime and its main determinants. The third section presents a model of exchange rate determination for the years 1872–1913, which supports the position that the main determinants of the exchange rate were capital imports, interest rate differentials and a measure of both country and currency risk. The relevant variables are cointegrated over the whole period so that these series may be regarded as defining a long-run equilibrium relationship.<sup>7</sup> Taking this equilibrium static solution as a starting point, an error correction model will be estimated, which will enable the dynamics of the system to be represented. The final section considers some of the factors that determined Italy's exchange regime. An important element of Italian policy was the commitment to, or the opportunity for, limiting fluctuations in the exchange rate while isolating the process of money and credit creation from external shocks. Needless to say, the adjustment mechanism was rather different from the processes envisaged by the gold standard myth.<sup>8</sup>

### **A partial outline of Italian economic history**

The new Kingdom of Italy was established in 1861 and inherited its financial structure from its constituent states. There were six main banks: the Banca Nazionale, Banca Nazionale Toscana, Banco di Napoli, Banco di Sicilia, Banca Toscana di Credito (since 1864) and Banca Romana (since 1870). Three banks of issue operated from 1894–1926 – the Banca d'Italia, Banco di Napoli and Banco di Sicilia – and a single bank of issue – the Banca d'Italia – was not created until 1927. Between 1860 and 1874 there was no state law to discipline the relationships among the different banks of issue. Nonetheless various circumstances worked together to reinforce the predominance of the Banca Nazionale, whose name was

changed in 1866 to Banca Nazionale del Regno d'Italia, which later was to play a major role in the creation of the Bank of Italy.

The monetary system in the new kingdom was called 'the bimetallic Piedmont system', which was in fact the bimetallic French system. The unit of account was the lira, consisting of 5 grams of silver, and a fixed relationship was established between the silver and gold content of the coinage (15.5:1).<sup>9</sup> The adoption of a bimetallic standard of French origin is easy to understand if one considers the overwhelming importance of Italian trade with France and the new kingdom's reliance on the Paris financial market, which was then enjoying a very prosperous period. Gold and silver could circulate freely in Italy, and various other currencies besides the lira, originating both from the previous systems and from abroad, were in circulation.<sup>10</sup> In 1865 Italy joined the Latin Monetary Union, within which the currencies of Belgium, France and Switzerland circulated freely.<sup>11</sup> Circulation was mainly metallic, its fiduciary part remaining rather low.

Italy inherited a small external debt from the preunification states. Immediately after unification, public finances had to face new tasks: public administration had to be completely reorganised and the country was in need of the most basic public services. The fiscal system, however, was highly defective. In the early 1860s only 50 per cent of state expenditure was covered by fiscal revenues, and the budget deficit, which rose over the first years to about 11 per cent of the national income, had to be financed by an increase in the public debt.<sup>12</sup>

The Italian state debt was represented by a consolidated bond, the Rendita Italiana. New issues of the Rendita between 1860 and 1870 amounted to roughly 3100 million lire nominal value corresponding to a cash inflow of 2500 million lire.<sup>13</sup> The main issues of the Rendita took place in 1861, 1863 and 1866.

Part of the Italian state debt was subscribed on the internal market, and the Banca Nazionale took an active part in its placement by carrying out a sequence of rather profitable 'open market' operations.<sup>14</sup> A large part of the subscription – more than one third – was placed abroad, mainly in Paris, through Rothschild's intermediation (this proportion reached 37 per cent by 1865).<sup>15</sup> The Paris market at that time was a major source of foreign funds, mainly financing the governmental expenditures of European nations.<sup>16</sup> The effective rate of interest paid on the Italian debt was, on average, higher than 7 per cent and looked rather profitable on the international market. Moreover interest on the Rendita abroad was paid in gold to guarantee international investors against exchange rate fluctuations.<sup>17</sup>

Italian external accounts were in a bad state, both because of the trade deficit, which represented about 4.5 per cent of the average Italian national income, and because of interest payments abroad. In need of foreign exchange, Italy had to rely on the international financial market, which was flourishing.

At the beginning of 1866, with war against Austria-Hungary in the offing, the budget situation deteriorated rapidly and the price of the Rendita halved, making any new issue very expensive (interest reached almost 10 per cent in 1867).<sup>18</sup> At the same time, Italian consol prices in Paris were much lower than in Rome, since the foreign market anticipated the uncertainties of the Italian political situation. As a result it was almost impossible to raise finance abroad. Capital left the country, for Paris in particular, in order to exploit both the profit opportunities from arbitraging differences in bond prices between the French and the Italian markets, and the gain accruing from a possible lira devaluation (investors bought the Rendita in France in order to sell it in Italy at some future point, that is exported capital).<sup>19</sup> Gold outflow was quite substantial and reserves dwindled (Figure 1.2).

In spring 1866 a law was passed giving the government full power over financial matters. The following day the government issued a decree arranging a large loan from the Banca Nazionale to the Treasury at a very low rate of interest. At the same time it declared *corso forzoso* for the notes of the Banca Nazionale and introduced legal tender for notes issued by other banks.<sup>20</sup> The inconvertibility of its notes marked the clear preeminence of the Banca Nazionale in the Italian financial market.<sup>21</sup> Finally, the law required the banks of issue to keep gold and silver reserves in a proportion of 1:3 to their circulation.<sup>22</sup>

The paper standard was not synonymous with complete freedom for the banks of issue, however. On the whole, Italian decision makers were well aware of the advantages and limitations of operating on a paper standard, and with the 1866 law they reaffirmed their faith in proportional backing, tempering the rule with flexibility when the needs of the states were at stake.

Italian paper money depreciated and gold flowed out of the country to the other members of the Latin Union. The real exchange rate pointed to an increase in competitiveness due to a small rise in domestic prices; exports experienced considerable growth, while imports were maintained more or less constant.

The decision to abolish convertibility was never viewed as definitive. Parliament envisaged an almost immediate return to a bimetallic standard and created a commission to study its feasibility. A law was

passed in 1868, before the commission produced its report, setting the maximum amount of issue of the Banca Nazionale at approximately the amount then in circulation. This rigid control of the money supply lasted only a few months, after which the limit on new issues was raised and the Banca Nazionale was authorised to print additional currency.

After 1866, Sella, the minister of finance, signed four agreements with the Banca Nazionale which allowed the latter both to finance the Treasury and to increase its note circulation.<sup>23</sup> As a result, circulation 'by the state' increased continuously until 1874, although metal reserves had been drastically curtailed (Figure 1.2).<sup>24</sup>

In 1871 the budget was finally brought under control, and for a decade afterwards was in surplus. Various factors prevented convertibility from being resumed in the 1870s. The metal reserves of the banks of issue were extremely low and convertibility would have required a substantial external injection. This was not easily obtainable, in part because of the difficulties experienced by the French capital market following the Franco-German war and in part because the price of the Rendita was so low that any new issue would have proved so expensive that it would have brought the Italian budget back into deficit in a short time.

Under these new circumstances the growth of circulation 'by the state' was reduced, never reaching the 1000 million lire limit established by the law of 1874.<sup>25</sup> Meanwhile, however, overall circulation continued to grow at a rapid rate, new banks were established and credit policy remained expansionary throughout the period. The inflation rate took an upward swing, the lira depreciated on the foreign markets and the country's competitive position deteriorated. Metallic money was hoarded or exported<sup>26</sup> and reserves continued to fall (Figure 1.2).

During this period the discount rate was never considered an effective policy instrument. The reason for this is relatively simple. Whenever banks are not obliged to convert paper money on request and credit is deliberately expansionary, there is no longer any reason to have recourse to variations in the rate of discount, the principal aim of which would be to protect metal reserves.<sup>27</sup> In such a situation the interest of the government is to keep the interest rate low in order to develop an atmosphere of solidarity between banks and the government and so keep stable or depress the rate of discount.<sup>28</sup> Conversely the rate of interest plays a very important role whenever the amount of circulation approaches the limit declared by the law, but this seldom happened in the historical case under consideration.<sup>29</sup>

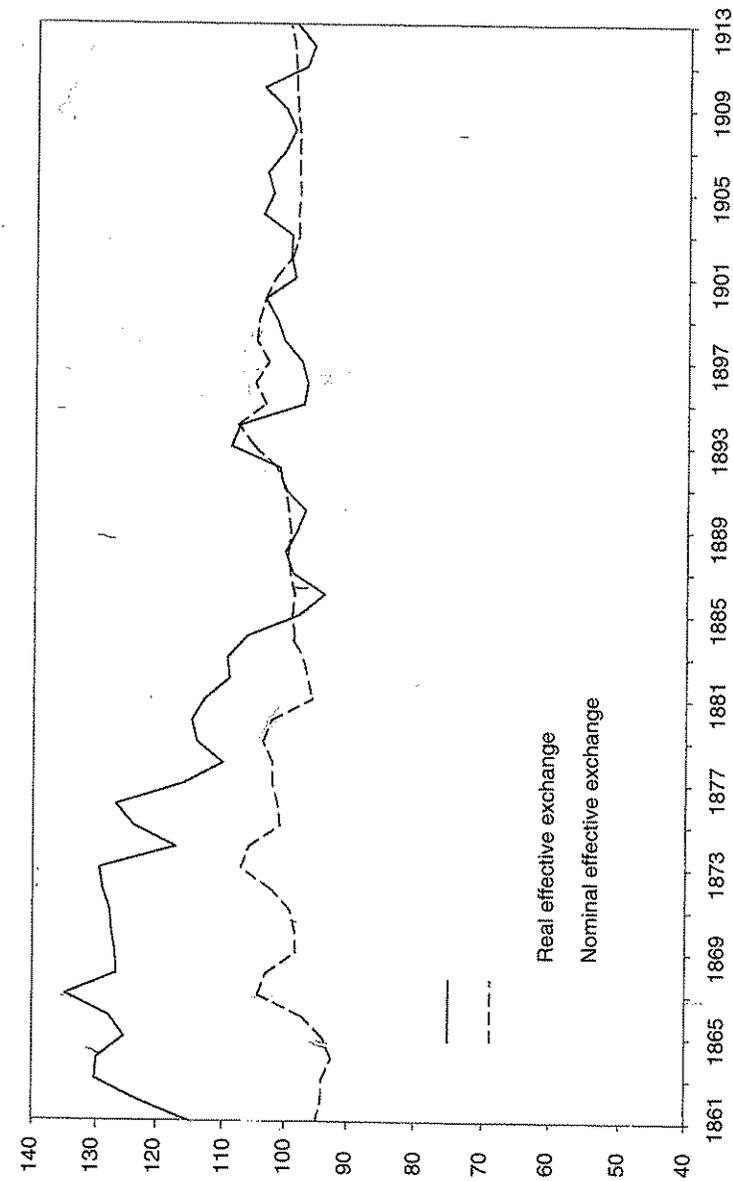
The fall in Italian prices in the late 1870s, the decline in the trade deficit, the balanced budget and the recovery of the quotations of the Italian Rendita in Paris finally cleared the way for the resumption of metallic convertibility, which although long contemplated, had always been delayed.<sup>30</sup> In the autumn of 1880 a bill was introduced allowing the government to borrow abroad and obtain the gold with which to repay its debt to the banks of issue.<sup>31</sup>

Domestic prices fell sharply in 1881 and deflation was expected to follow. The appreciation of the lira was so huge that parity with the French franc was suddenly restored. In March 1883 the government announced that convertibility would be reestablished the following month. The demand for gold and silver in exchange for paper currency was to be financed by the proceeds from the first tranche of a loan launched in London in 1881, a loan that was not easily subscribed but eventually replenished the central bank's bullion reserves (Figure 1.2).<sup>32</sup>

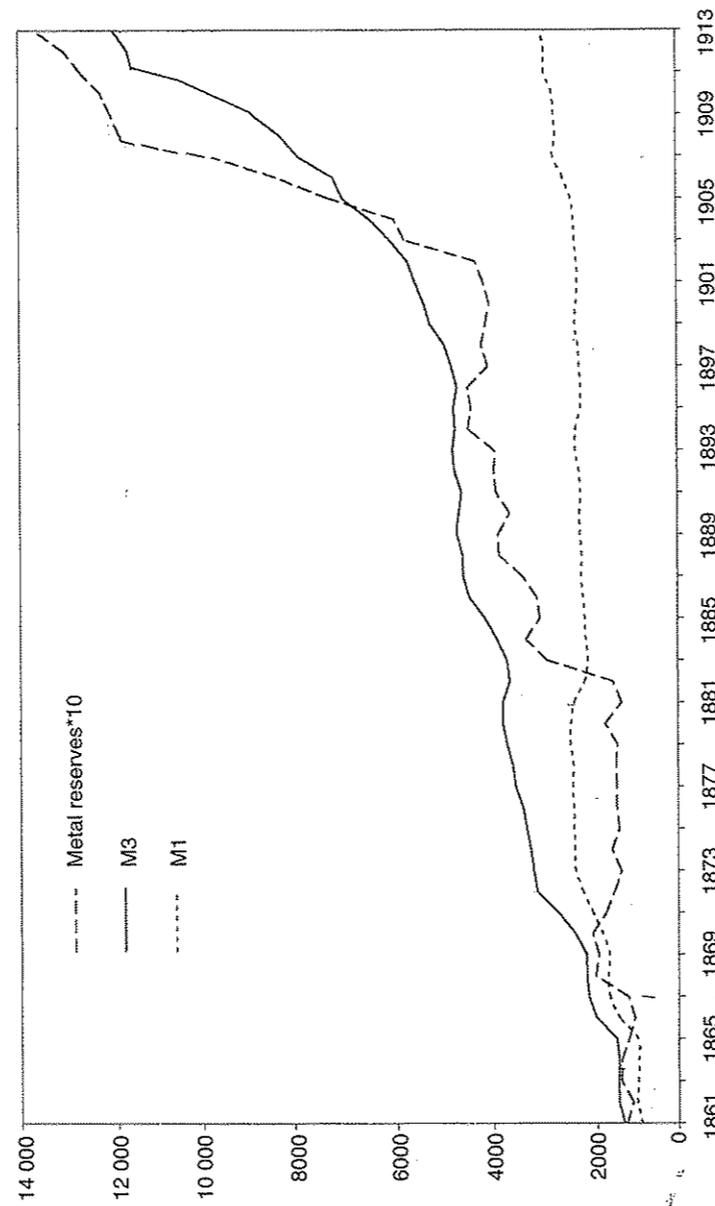
As it turned out, convertibility never became effective. In the 1870s the discovery of new silver mines had depreciated silver and its market ratio to gold had risen to 18.5:1. When convertibility was resumed in 1883, at the previous ratio of 15.5:1, banks put in force several devices to discourage the public from asking for conversion, and since the banks had the option of converting paper money into either gold or silver, they tended to convert into silver and keep their gold.<sup>33</sup> This was not an attractive option for the public.<sup>34</sup> The second convertibility law linked monetary circulation both to the banks' metal reserves and to their net worth. It was possible to exceed this net worth if full gold coverage was provided.

The return to bimetallism turned out to be both short-lived and unhappy. The year 1887 marked the peak of both an international and a domestic crisis. Italian agricultural production was hit by a sharp decline in grain prices on the international market, and the tariff that ensued provoked a long, disruptive trade war with France. This in turn caused exports to decline considerably, with negative consequences for domestic agricultural production. Public finances deteriorated once again, this time as a result of expenditure on the African campaign in 1886-89, and the Rendita quotations in Paris declined.<sup>35</sup> Interest payments abroad arising from the recent increase in the external debt totalled 1600 million lire in 1890, imposing a heavy burden on the current account and reducing bullion reserves (Figure 1.2).

From 1885, three banks of issue – the Banca Nazionale, Banca Romana and Banco di Napoli,<sup>36</sup> overissued notes in relation to the



Source: Appendix 3, Table A 3.3. The rate of exchange is defined as lire per unit of foreign exchange. The real rate is defined as the reciprocal of the nominal rate multiplied by the ratio of foreign to domestic prices.  
Figure 1.1 Real and nominal effective exchange rate of the lira. Index numbers, 1900 = 100



Source: Appendix 3, Table A 3.1. Reserves were multiplied by 10 for visual presentation.

Figure 1.2 Italian monetary circulation (M3 and M1) and official metal reserves of the banks of issue (millions of lire)

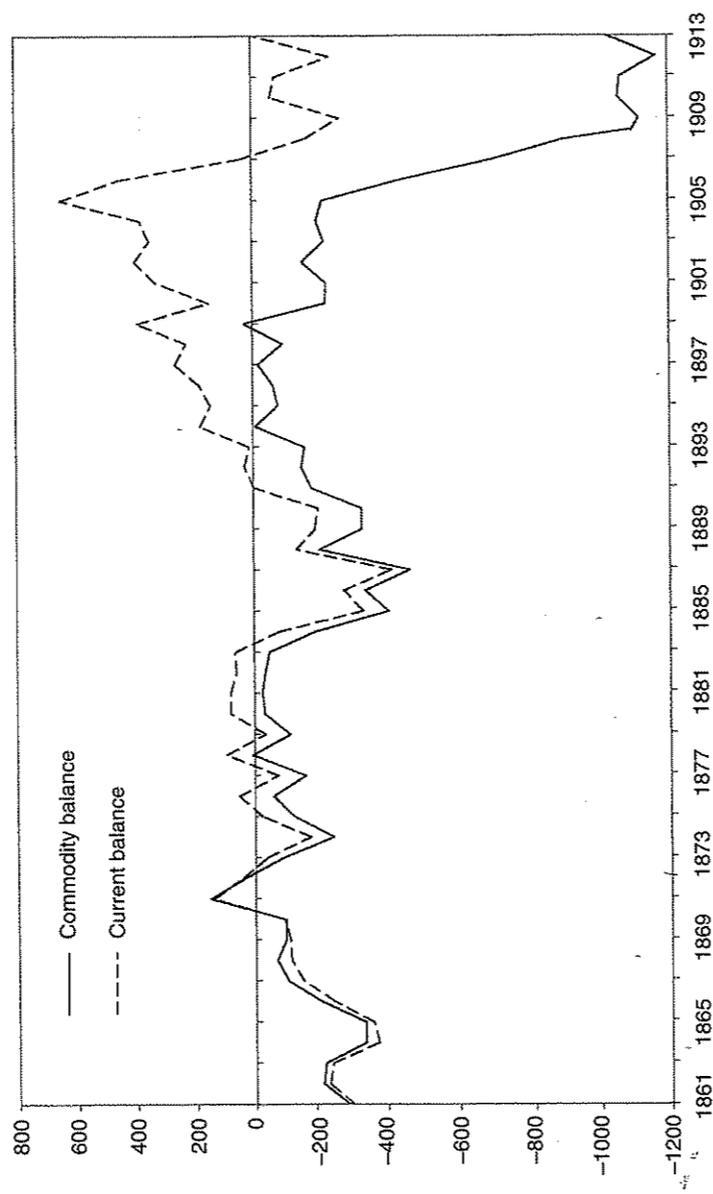
permissible legal limit in order to finance private construction activity. This was done with the tacit approval of the government,<sup>37</sup> and the gold-silver cover of notes in circulation was drastically reduced. In 1892 the revelation of illegal behaviour by the Banca Romana and the arrest of its governor and chief cashier initiated a run by the public to withdraw deposits and ultimately led to the bank's collapse. Meanwhile the lira depreciated sharply on the exchange markets (Figure 1.1).

In 1893 a law was passed reorganising the banks of issue. The Banca Nazionale and other minor banks were merged to form the new Bank of Italy, which now shared issuing rights with the Bank of Naples and the Bank of Sicily only. Circulation was to be controlled more tightly and the reserve requirement was to be raised to 40 per cent (a very small part – 7 per cent – could be kept in foreign currency). The same law called for convertibility, but delayed all measures necessary for its practical application, and so had no effect whatsoever. One year later the actual situation of the exchange market was officially recognised and Italy declared *corso forzoso*.

The second period of inconvertibility – from 1894 to 1913 – was marked by a rapid growth in national income.<sup>38</sup> Italy shared in the advantages of the 'golden age' that characterised the world economy. Budget deficits were at first reduced and later converted into surpluses, and investment rose at a very high rate. The current account balance was in surplus for almost the entire period due to emigrant remittances and tourist expenditure, and this allowed a net import of merchandise without running into reserve problems (Figures 1.3 and 1.4).

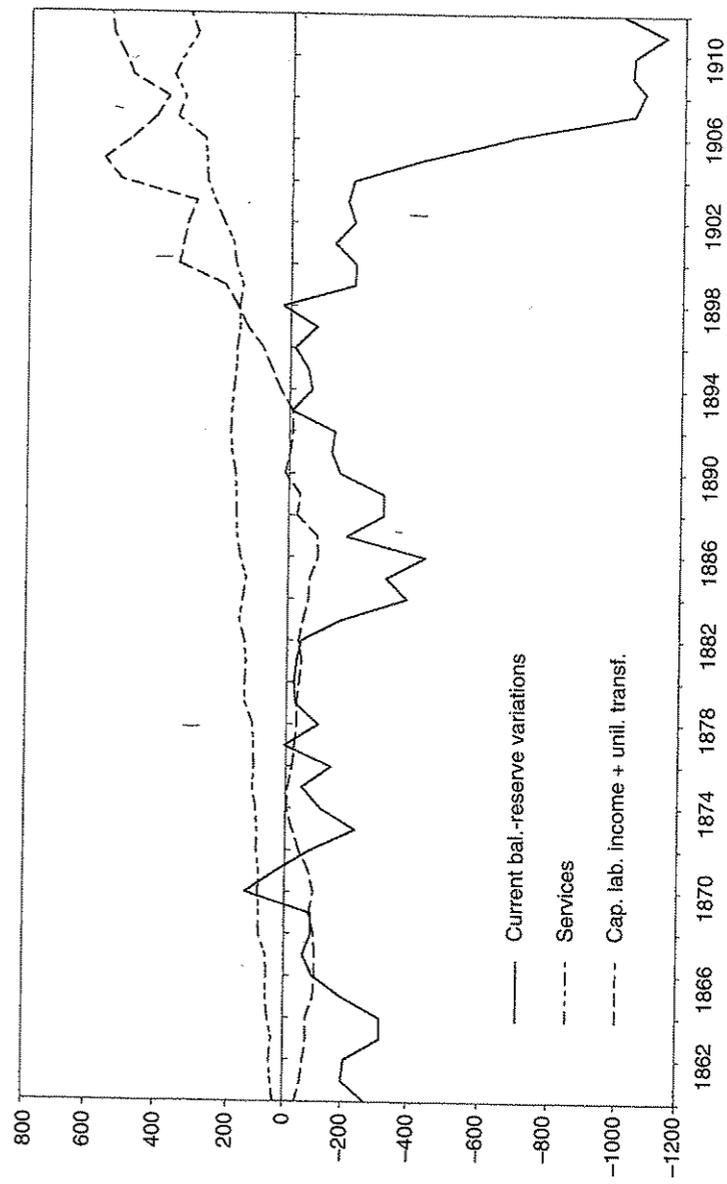
From the start of the twentieth century, reserves built up very rapidly. The banks of issue were permitted to keep part of these reserves in foreign currency and foreign state bonds, and consequently the potentially destabilising effect on circulation was sterilised. The lira started to appreciate *vis-à-vis* other currencies, and from 1902 the exchange rate achieved stability with that of the gold standard countries, at the level established by the metallic content of the respective currencies. This situation continued until the First World War, uninterrupted even by the 1907 financial crisis (Figure 1.1).

The reserves of Italian banks of issue reached remarkable levels (Figure 1.2), and were larger than those of the central banks of other important European countries such as Britain, Germany and Austro-Hungary.<sup>39</sup> This gave the Italian banks of issue, and principally the Banca d'Italia,<sup>40</sup> a great deal of freedom to intervene directly in the exchange market.<sup>41</sup>



Source: Appendix 3, Table A 3.2.

Figure 1.3 Italian current balance and commodity balance (millions of lire)



Sources: Appendix 3, Table A 3.2; Istituto Centrale di Statistica (hereafter ISTAT) (1957). Net capital movements were computed as the difference between current balance and reserve variations. Emigrant remittances are assumed equal to positive unilateral transfers.

Figure 1.4 Italian net capital movements, services and labour and capital income (emigrant remittances added to labour income) (millions of lire)

The Banca d'Italia started to rely on movements in the discount rate in order to stabilise the lira (consent from the finance minister was no longer necessary following the return to convertibility), and Walter Bagehot became the explicit point of reference as far as monetary operations were concerned.<sup>42</sup> The bank was not always successful in its actions,<sup>43</sup> but reserves were so huge and the current account balance so positive that brief drains of gold and capital were easily handled and posed no threat to domestic monetary policy. This situation was rather more similar to that in France and Germany than to that in Britain.<sup>44</sup>

In the twentieth century, with a stable exchange rate and a favourable international climate, Italy became a net exporter of capital and was able to become part of the global system of 'rapid portfolio adjustment', which has been presented as an explanation for the world-wide success of the gold standard.<sup>45</sup>

### The lira rate of exchange

The gold standard era is commonly considered a period in which the great majority of the industrialised world operated under fixed exchange rates. This was not entirely true, and when it was the case it only lasted a short period. There were a number of reasons for this. First, several European countries did not adopt the gold standard until the 1890s, and prior to this their exchange rates fluctuated against gold. Other countries were on silver, which also fluctuated against gold. Still others, particularly those of the periphery, only adhered sporadically to the standard and devalued their parities from time to time, with a significant impact on the effective rates of exchange of the gold standard countries (defined as nominal bilateral rates weighted by the importance of the respective trading partners). Effective rates at the core of the gold standard system were not stable either.

The lira exchange rate did not have to bear the burden of the huge movements in the periphery of the system because, on average, 70–75 per cent of Italian imports and exports involved the United States and a few European economies, notably France, Germany and Britain, which were already on gold by the end of the 1870s.<sup>46</sup> The lira's effective exchange rate did not diverge significantly from either the bilateral lira–pound or the lira–franc exchanges. These three series ran very closely together for the entire period, and the stability of the lira–pound exchange was reflected in the stability of the lira's effective rate of exchange.<sup>47</sup>

Although Italy stayed off gold for most of the period, it would not be appropriate to refer to the lira exchange rate as a pure floating rate. A floating exchange rate adjusts to maintain internal and external equilibrium, corresponding to different rates of monetary issue. Real equilibrium and monetary equilibrium are independent. Real variables are determined by tastes, technology and so on while movements in the exchange rate are a monetary phenomenon and have immediate repercussions on price levels. As a consequence the real exchange rate should be considered as fixed.

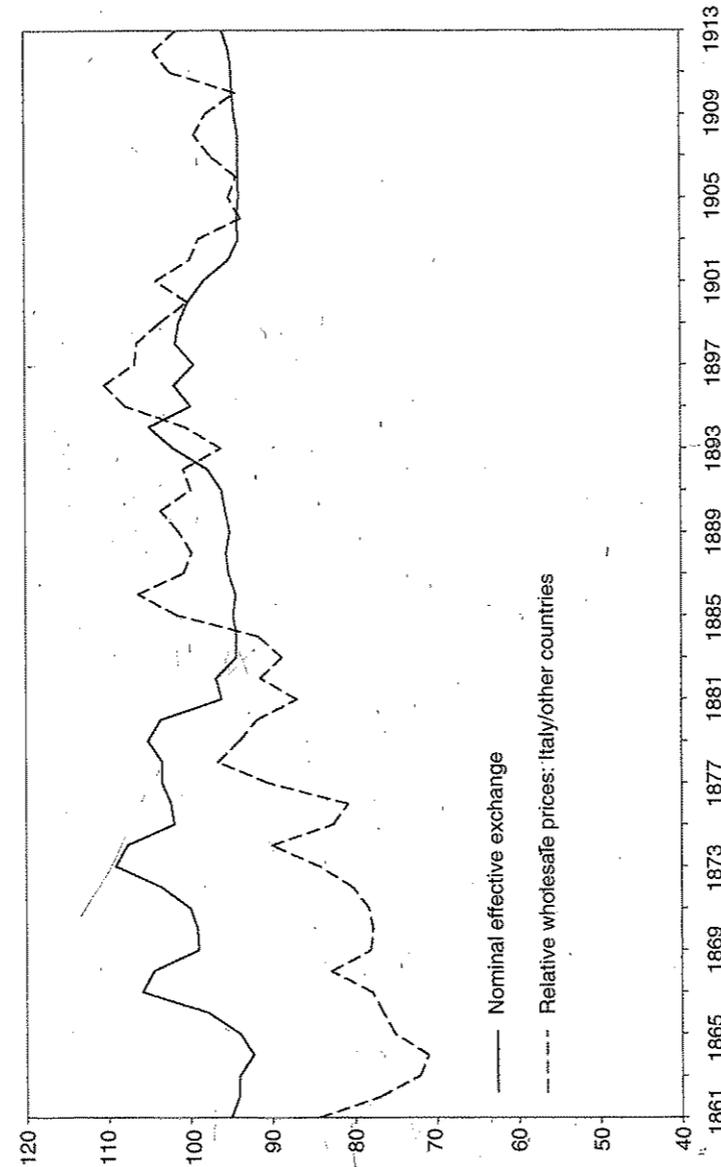
A model for the behaviour of the rate of exchange based on purchasing power parity (PPP), and with reference to the lira–franc exchange rate for the period 1861–1913, has been tested by Fratianni and Spinelli with no success.<sup>48</sup> The authors are very clear that PPP cannot explain the movement in the exchange rate. Despite this they continue to adhere to the basic PPP model, and develop an indicator of 'country risk', which helps to explain deviations in the rate of exchange from PPP.<sup>49</sup>

Figure 1.5 illustrates the lack of correlation between nominal exchange rates and relative prices over the period in question.<sup>50</sup> It also shows that the real exchange rate of the lira appreciated after 1873 as prices in the gold standard countries took a definite downturn. This downward trend in prices was much less steep in Italy than in other countries, particularly the United States and Germany after 1880, and this caused an appreciation of the effective real rate of the lira. On the whole, the effective real rate exhibited lasting variations of over 30 per cent.

A different approach to the problem of determining the exchange rate emphasises the importance of capital flows. One of the first models to incorporate a major role for the capital account of the balance of payments was the Mundell–Fleming model.<sup>51</sup> The version presented below is a modified version of this model.

### The lira exchange rate and the Rendita

Contemporaries had a clear conception of the relationship between money and the rate of exchange through the influence of money on prices, but they also took note of the interaction of other important factors. Senator Boccardo remarked that 'the influence of circulation is much smaller than that of other factors, such as the abundance or scarcity of crops, purchases or sales of gold ... the solidity of the bank of issue ... public finances'.<sup>52</sup> Stringher also noted that income level was largely dependent on the exchange rate because wages lagged



Sources: Appendix 3, Table A3.3. The rate of exchange is defined as lire per unit of foreign exchange. The real rate is defined as the reciprocal of the nominal rate multiplied by the ratio of foreign to domestic prices.

Figure 1.5 Nominal effective exchange rate of the lira and wholesale relative prices. Index numbers, 1900 = 100

was largely dependent on the exchange rate because wages lagged behind price rises.<sup>53</sup>

Other contemporary scholars discussed the influence of capital movements on the exchange rate, and Stringher, Benini, Ferraris and Flora repeatedly pointed to financial flows between Italy and France as being a very significant independent variable.<sup>54</sup> The Italian financial market had always been subject to the influence of the state, which intermediated resources and entered directly into debt. It also financed industries and infrastructure.<sup>55</sup> A large part of the Italian public debt was issued in foreign markets, particularly in Paris, and as already noted, was represented by the Rendita Italiana. Investments in the latter, in Paris, and domestic financial investments were very close substitutes, facilities in such transactions were rather well organised, and fluctuations in the lira exchange rate provided room for capital gains. Therefore capital moved in substantial amounts between the Italian and foreign markets, and part of the Italian investment abroad went on the Rendita.

The free transferability of capital across national borders is also a part of this picture. During this period it was never prohibited, but the possibility for Italian citizens to receive interest in gold abroad was removed with the introduction of the 'affidavit' in 1874. It was reestablished in 1881, removed again in 1893 and then reestablished 11 years later.<sup>56</sup> The affidavit was a sworn declaration that was required when collecting interest abroad, stating that the bond in question did not belong to an Italian citizen.

In the 1860s the stock of Italian public debt held abroad was approximately ten times the average yearly current account balance and double the average yearly value of imports. In such a situation, even a small shift in asset preferences could lead to a very large capital transfer, and expectations on the exchange were much more dependent on the mood of the international financial markets than on commodity markets. Movements in international financial markets were reflected in the Rendita quotations in Paris, and the consequent movement of funds in and out of Italy was the real factor behind the lira exchange rate.<sup>57</sup>

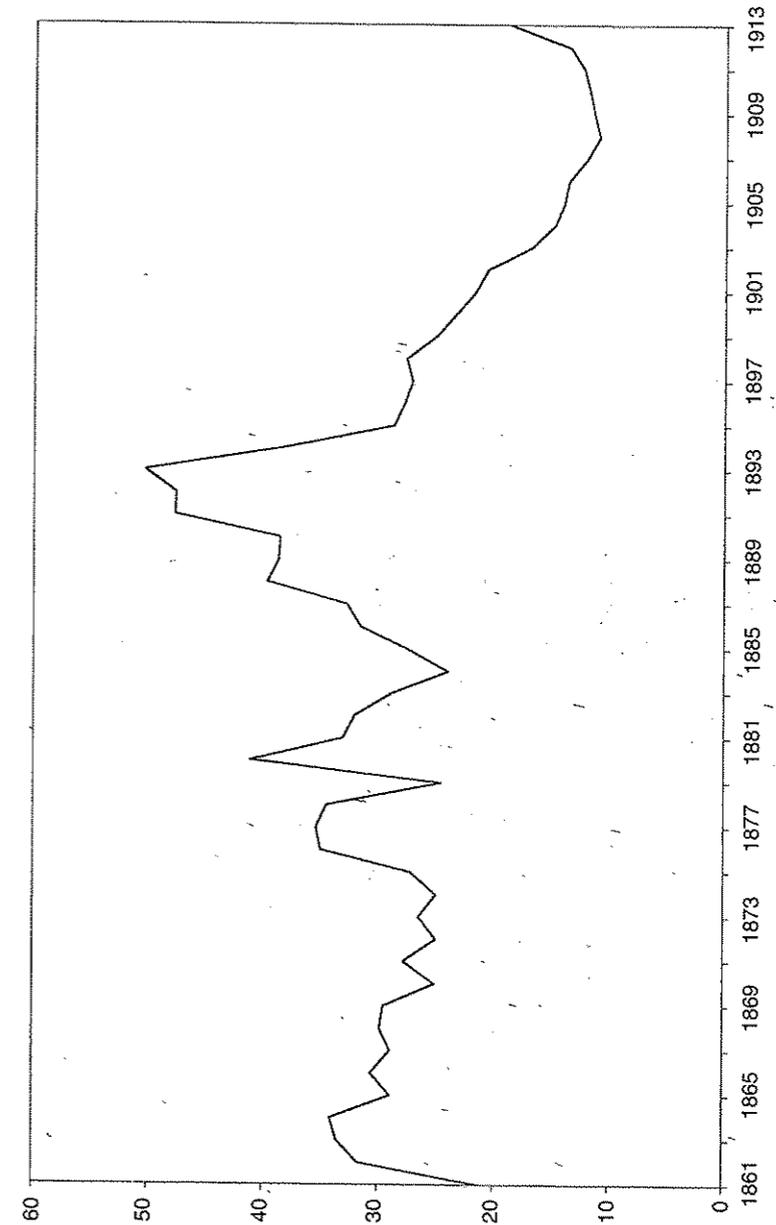
There are several arguments that support the position that the lira exchange rate was mainly affected by capital movements. The first has to do with exchange regime shifts and the formation of expectations. Interest on the Rendita abroad was paid in gold to protect foreign investors against lira devaluations, and consequently it was convenient for domestic bond holders, as soon as *corso forzoso* was declared, to take

the Rendita abroad, collect interest in gold and then change it into Italian lira at the devalued rate of exchange.<sup>58</sup> As much as 37 per cent of the Rendita was held in Paris during the first period of inconvertibility (Figure 1.6). The return to convertibility in 1883 saw a large increase in the share of Rendita holdings in Paris, rising to over 50 per cent. This is contrary to what one would expect after the stabilisation of the exchange rate, but as already noted, convertibility during this period took place only in silver, and holding the Rendita abroad was a way to export gold as soon as expectations about the exchange rate began to weaken a few months after the convertibility declaration.

The second argument for the effect of capital movement on the lira exchange rate concerns the impact on the security market of disturbances originating in the exchange markets in Rome or abroad. Whenever the Paris market forecast negative events in advance of the domestic market, as happened both in 1866, with the war against Austria-Hungary, and in 1892, with the Banca Romana scandal,<sup>59</sup> the Rendita became temporarily cheaper in Paris than in Rome, and capital left the country. On the whole, the 1890s saw a large undervaluation of Italian bonds in Paris and Italians were induced to repurchase their old debt in quite a substantial way for profitable resale in Rome. These imports of securities and exports of capital tended to anticipate the lira's depreciation on the exchange market.<sup>60</sup>

At the turn of the century the Italian debt held abroad was less than 10 per cent of the total public debt, an insignificant proportion when compared with that of the previous decade (Figure 1.6), but all the same, capital movements and Rendita arbitrage were still fairly influential on the exchange. The 'affidavit' rule, in force between 1894 and 1904, reduced the profitability of transferring capital abroad for the purpose of collecting interest payments, and the Rendita conversion announced for 1906 was preceded by large sales abroad, which further reduced its foreign holding. It has been estimated that the share of the Rendita then held abroad was less than 5 per cent.<sup>61</sup> The importance of the Paris market in the international arena declined, while financial investments abroad became spread across different international centres and types of asset. Italy's political reputation was by then consolidated, the Italian Rendita price was high and stable, the interest differential required to move capital in and out of the country was much lower than in the preceding period and financial markets were much more integrated.

Meanwhile the exchange market was fed on an enormous scale by emigrant remittances and income from tourism. Taken together, these two items covered more than 50 per cent of total Italian imports,



Source: Zamagni (1988). Estimated from the percentage of interest that was paid abroad.  
Figure 1.6 Estimated share of the Italian Rendita held in Paris.

allowing the country to participate in the world economic boom without experiencing a balance of payments crisis, and capital abroad could be repatriated without burdening the exchange rate.<sup>62</sup> From the early 1890s the state budget came close to being balanced, while the burden of financing the deficit had long since disappeared, and the Bank of Italy could both vary the rate of discount and intervene directly in the exchange market. As a consequence, a policy founded upon the rate of discount came into operation with respect to the international capital market<sup>63</sup> and a different set of forces rose in importance in the lira exchange market.

### Testing the model of exchange rate determination

#### The data

It is no simple task to develop indices that are not only appropriate for representing the working of the securities market but also fit a model of exchange rate determination. With a well-integrated capital market, *ex-post* differences in yield represent differences in the default risk among various classes of assets (including currency depreciation and changes in tax treatment). In equilibrium, the yield premium is a measure of the perceived possibility of default of the Italian bonds. As increase in the premium means that the equilibrium has changed and that risk has increased on Italian bonds, while the opposite is true for a decrease in the premium.<sup>64</sup>

Italy's international financial position can be characterised using three different assets. First, the Rendita priced on the domestic market, henceforth the Rome Rendita. Second, the Rendita priced abroad, which was the same certificate but negotiated in foreign markets such as Paris, Berlin and London. Henceforth this shall be identified as the Paris Rendita, since Paris was the most important of the three markets where it was traded. The third asset is the British Treasury bond, which acts as a safe reference bond.<sup>65</sup> This will be referred to as the British Consol.

The price of the Rendita in Rome differed from that in Paris owing to the influence of two elements: (1) transport costs, information costs and so on, and (2) variations in the lira exchange rate with respect to gold.

The Rendita yield premium is defined as the difference between the Paris Rendita's implicit interest and the Rome Rendita's implicit interest. This provides a measure of currency risk, since the two prices refer to the same bond but differ in the currency in which interest payment took place (gold and lire respectively).

The nominal interest rate on the Rendita in Rome,  $i_{RRD}$ , is equal to the nominal interest rate on the Rendita paid in foreign currency (that is, gold, if collected in Paris),  $i_{RPt}^*$ , minus the difference between the spot exchange ( $S_t$ ) and the convertibility rate of exchange ( $S_t^G$ ). The exchange rate is defined as the price of foreign currency in terms of domestic currency. The equilibrium condition is:

$$i_{RRt} = i_{RPt}^* - (S_t - S_t^G)/S_t^G \quad (1.1)$$

where  $i_{RPt}^* - i_{RRt}$  measures the risk of the domestic currency in relation to the foreign currency (gold).  $S_t^G - S_t$  is equal to zero when exchange rate stability is not questioned and the spot exchange is equal to its convertibility value.

Domestic and foreign markets for the Rendita were very closely linked, and holders of Rendita in Italy could have their interest paid in gold by taking the Rendita coupon to Paris, and could then convert the proceeds to lira at the depreciated rate of exchange. Data observation shows that the Paris Rendita and the Rome Rendita price difference was fairly insignificant for half of the period under consideration, when the lira exchange rate was stable. Under these circumstances the gold clause was of no value and the tiny price difference was the result of transport and information costs. On each occasion that the lira depreciated, the Rendita price in Paris, in French francs, was relatively lower than the Rome price, and the Rendita yield premium paralleled exchange rate depreciation.

The affidavit was apparently not effective in checking capital flows and separating the Italian capital market from that of Paris. A wedge between the two markets should be reflected in the presence of asynchronies between the Rendita yield premium and exchange rate variations. A rather close movement between these two series, and the absence of discontinuity following the introduction of the affidavit in 1874 and 1893, as illustrated in Figure 1.7, suggest that controls on capital movements were difficult to enforce from the outset, or that people were able to circumvent these controls as soon as they were introduced.

The British Consol yield premium is defined as the difference between the Paris Rendita and the British Consol's implicit rate of interest,  $i_{CL}^*$ . Country risk relates to the bonds of different countries. The British Consol yield premium was positive during the entire period under consideration, varying between 0.20 per cent and 6.44 per cent.

Let us assume that, initially, the domestic and foreign interest rates were equal. Consider then the effect of a change in risk perception due to an expansionary monetary policy accompanying a budget deficit, followed by a lower rate of exchange, as was the case in the late 1860s. More pressure was exerted on the bond market, as more bonds were issued to finance the budget deficit, and the Rendita price decreased in both the domestic and foreign markets. The exchange rate depreciated due to excess money supply, and the Rendita price in Paris experienced a further reduction. Whenever the Italian domestic situation was perceived as very risky, holding Rendita in Paris did not provide any reasonable hedge against the risk of default (such as changes in tax treatment or suspension of interest payments). The gold clause was considered a poor safeguard by both foreign and domestic investors and did not prevent a widening of the spread. Those able to move funds in the international market therefore abandoned Italian bonds in favour of foreign government bonds, and the British Consol yield premium increased in the 1890s. Both currency risk and country risk measures moved in the same direction as the exchange rate.

Figure 1.7 plots the Rendita yield premium, the British Consol yield premium and the index of the effective rate of exchange. It illustrates a fair degree of synchrony among these three series over the entire period of this study.

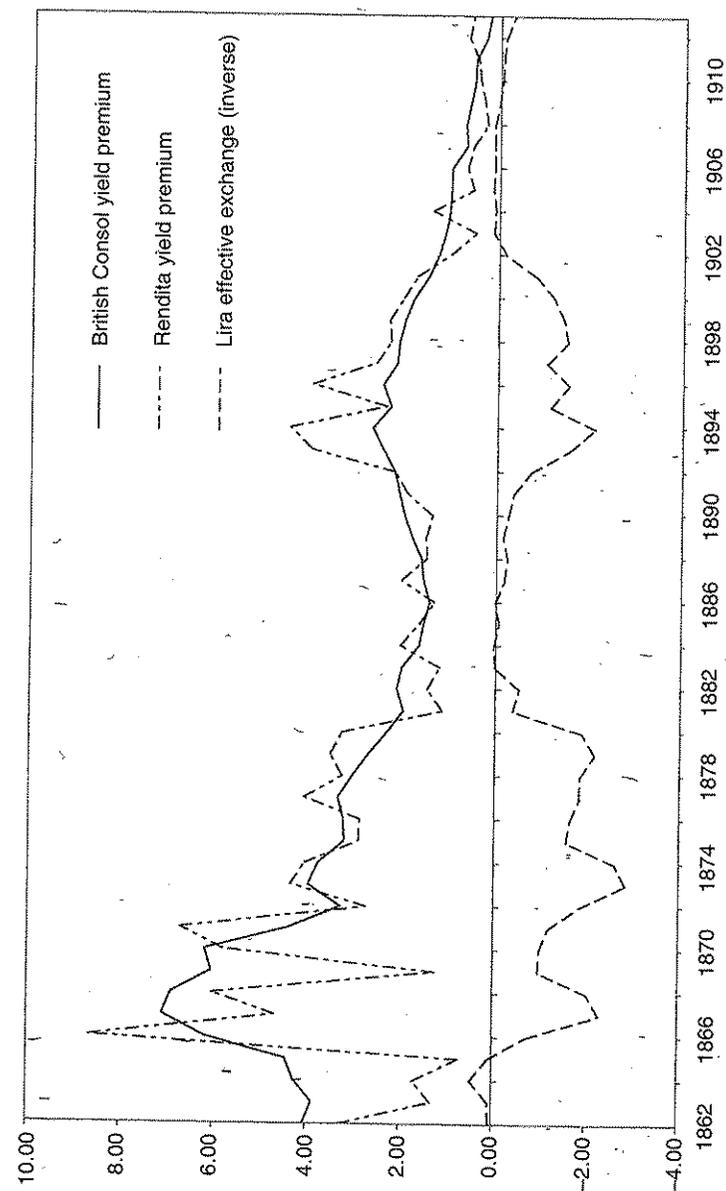
### The model

In order to test the relationships discussed in the previous sections, a model was constructed, based on the following propositions.

First, the domestic economy was small and foreign interest rates, national income, prices, and money supply and demand are exogenous. Second, the possibility of cashing the Rendita coupon abroad in gold at the official convertibility exchange,  $S_t^G$ , is assumed throughout the period. At maturity the Rendita coupon was cashed either for gold or for convertible currency and converted into lira at the current exchange rate, that is, either at a premium or at a discount in relation to the gold parity. Covered interest rate parity holds throughout. Rewriting Equation 1.1 gives

$$(S_t - S_t^G)/S_t^G = i_{RPt}^* - i_{RRt} \quad (1.1a)$$

Excluding the question of the Italian government's solvency, the Rendita yield is fixed in terms of foreign currency by competition in the international market. It can increase in domestic currency only



Source: Appendix 3, Tables A3.3 and A3.4. Effective exchange rate deviations were computed as deviations of the spot effective lira exchange rate from the effective exchange rate in convertibility years. The Rendita yield premium is divided by 5 for visual presentation purposes.

Figure 1.7 Lira effective exchange rate deviations from gold parity, British Consols yield premium and Rendita yield premium

Table 1.1 Effective nominal lira rate of exchange and interest yield premiums: correlation coefficients, 1872-1913

	Log lira exchange rate 1	Rendita yield premium 2	British Consol yield premium 3
1	1.000	-	-
2	0.912	1.000	-
3	0.861	0.881	1.000

Source: Appendix 3, Tables A3.3 and A3.4.

through an increase in the expected domestic price of foreign exchange (depreciation). The Rendita was a fully indexed bond.

Relation (1.1a) is approximated by expressing deviations between the expected exchange and the spot exchange through their difference in natural logarithms:

$$s_t - s_t^G = i_{RPI}^* - i_{RRt} \quad (1.2)$$

Henceforth all variables in lower case, except for the rates of interest, refer to natural logarithms.

Institutional arrangements that render the capital market more imperfect are strictly dependent on the perceived risk for the bondholder, and can be taken into account through the country risk, that is, the difference in risk between national and foreign bonds. Fear of discrimination increased the Rendita yield in foreign currency and was generally accompanied by a downward movement in the lira exchange rate, if only because of the higher cost of servicing the debt. Country risk is measured by British Consol yield premium and is added to the Rendita yield premium explanatory variable, at the right-hand side of Equation 1.2:

$$s_t - s_t^G = i_{RPI}^* - i_{RRt} + \alpha(i_{RRt}^* - i_{CLt}^*) \quad (1.3)$$

Movements in  $S_t$  rather closely reflect movements in both the Rendita premium and the Consol premium (Figure 1.7 and Table 1.1). Confidence in the level of the convertibility exchange rate is held stable throughout the period under investigation and parity is represented by a constant term. The regression equation is

$$s_t = a_0 + a_1(i_{RPI}^* - i_{RRt}) + a_2(i_{RRt}^* - i_{CLt}^*) + u_t \quad (1.4)$$

where  $u_t$  is a white noise disturbance,  $a_0$  = convertibility exchange,  $a_1 = 1$  for covered interest parity and  $a_2 = 0$  in a perfect capital market. Risk premium is introduced into the model by setting  $a_2 > 0$ , which measures capital market imperfection.

Money in relation to income can enter Equation 1.3 as a policy variable. Additional money creation depreciates the exchange rate, while additional income, through relative stringency in monetary conditions, causes it to appreciate. The comprehensive reduced form to be tested is thus

$$s_t = a_0 + a_1 m_t + a_2 y_t + a_3 K_t + a_4(i_{RPI}^* - i_{RRt}) + a_5(i_{RPI}^* - i_{CLt}^*) + a_6 p_t^* + u_t \quad (1.5)$$

where  $m_t$  is money stock,  $y_t$  is national income,  $p_t^*$  is foreign price and  $u_t$  is again a white noise disturbance.

From a different perspective, Equation 1.5 can be considered the reduced form of a more complex model that takes monetary equilibrium into account.<sup>66</sup> The signs of the expected coefficients are  $a_1 > 0$ ,  $a_2 < 0$ , and  $a_4, a_5 > 0$ .

The net capital imported ( $K_t$ ) during the period was a very powerful element in determining cycles in Italian construction activity and manufacturing. Adding this to the explanatory variables provides a correction to the rather approximate measure of Italian national income that is available.<sup>67</sup>

Some drastic assumptions, justified by our interpretation of economic events of the time, are required here. To begin with, foreign interest rates are considered exogenous on the basis of the small country assumption. Secondly, capital movements are assumed to be supply pushed into Italy<sup>68</sup> and are considered exogenous. They determine the current account balance through a push in domestic demand, taking into account a measure of export expansion. Thirdly, the long-term domestic interest rate was not managed by the central bank in order to stabilise the exchange, as has been explained. Rather it was completely determined by foreign interest rates, for each degree of risk. Fourthly, Equation 1.5 has been reparametrised in order to introduce an error correction mechanism (ECM), which captures the idea that individuals alter their behaviour according to signals that indicate to them that they are out of equilibrium. Lastly, it is assumed that deviations from the long-term value of the rate of exchange will lead to future changes in the rate in relation to the other independent variables, in order to move closer to the desired long-term position.

### The estimation procedure

Equation 1.5 allows us to test for the various elements that helped determine the lira's effective exchange rate, in particular the effects of expectation formation and the autonomous influence of money creation.

The technique for estimation is outlined only very briefly, and all technical points are omitted. First, the basic properties of the data-generating process, with reference to the variables entering the basic model 1.5, were investigated. The dynamic relationships between these variables were summarised by means of a full vector autoregressive process (VAR). The order of the VAR process was examined using various selection procedures, and according to the normality and the autocorrelation properties of the residuals the most appropriate order is 1.<sup>69</sup>

Considerable attention was given to the time invariance, or stationarity, of the data generation process. Stationarity is a property that ensures constant mean, variances and autocovariances of the process over time. The period under investigation was characterised by marked changes in economic conditions, particularly during the earlier years, mainly due to the extraordinary expenses associated with the formation of the new kingdom and the war against Austria-Hungary. Both these events can be considered as sources of possible structural change for the model.

A test for stationarity – structural change over the VAR(1) – was performed. This led to rejection of the stationarity hypothesis. To overcome this problem, the period under investigation was gradually reduced, and the starting point was brought forward to 1872. This allowed us to obtain very stable results (a forecasting horizon longer than ten years is accepted at the 5 per cent significance level). As a consequence the estimation procedure was reduced to cover the 41-year period from 1872 to 1913.<sup>70</sup>

The estimation of Equation 1.5 was then carried out. Exchange rate, yield premiums, foreign prices, capital flows and money are all non-stationary variables and are integrated (see Appendix 1.1). To assume meaningfully that there is an equilibrium relationship among these variables, one must assume that they move together and that deviations from the equilibrium are represented by a stationary variable. Variables are cointegrated if there exists a linear combination of them that is stationary.<sup>71</sup>

The order of integration of the series was tested and they are all integrated order 1, I(1). Augmented Dickey-Fuller statistics were

used and the null hypothesis that all series are I(1) for all level variables was accepted. Differentiated series were found to be I(0) (see Appendix 1.1).

Cointegration was tested assuming a VAR(1) model according to both lambda and trace tests. The cointegration tests were then repeated with different model specifications (including additional variables such as capital imports, money, foreign prices and so on) and the hypothesis of lack of cointegration among variables was rejected.

As variables cointegrate, we can distinguish, on the one hand, a long-term relationship between the exchange rate and the other explanatory variables in which the two sets of variables drift upward together; and on the other hand the short-term dynamics, that is, the relationship between the deviations of the variables from their long-term trend.

The linear combination of variables entering Equation 1.5 is stationary, so the difference between the series is constant and the usual stationary regression applies. In addition, OLS estimation of the cointegrating vectors will be a super-consistent estimate. Residuals of the cointegration relations were examined and found to be approximately symmetrically distributed around zero. They were used as an error correction term in the dynamic, first difference regression.<sup>72</sup> The following time series were employed:

- $s_t$ : log of the effective exchange rate of the lira, defined as units of lira per unit of foreign exchange.<sup>73</sup>
- $m3_t$ : log of money (M3).<sup>74</sup>
- $m1_t$ : log of money (M1).<sup>75</sup>
- $y_t$ : log of Italian national income.<sup>76</sup>
- $i_{RCL}^* - i_{CLI}^*$ : British Consol yield premium (from Table A3.4).
- $i_{RRR} - i_{RPI}^*$ : Rendita yield premium. The Rendita yield premium is computed as the difference between the yearly price in Rome and the yearly price in Paris (Appendix 1.2 and Appendix 1.3, Table A3.4).
- $K_t$ : inflow of foreign capital (current balance net of reserve variations: Tables A3.1 and A3.2) net of interest and debt service payments abroad.<sup>77</sup>
- $p_t^*$ : wholesale price index of Italy's trading partners.<sup>78</sup>
- $p_t$ : Italian wholesale price index.<sup>79</sup>

The Engle and Granger procedure was implemented. First, a long-term equilibrium relationship was estimated. Second, as the variables are cointegrated, the residuals from the equilibrium estimation were used to estimate the error correction model. The estimation runs as follows:

Table 1.2 Long-term lira effective rate of exchange function,  $s_t$ 

	constant	$i_{RPF} - i_{RRt}$	$i_{RRt} - i_{CLt}^*$	$K_t$	$p_t^*$	$m_t$	$m3_t$
1872-1913 period							
I	-4.70 (-832.41)	0.64 (13.44)					
II	-4.69 (-606.89)	0.63 (7.11)	0.11 (0.14)				
III	-4.70 (-549.32)	0.69 (12.24)		-0.010 (-1.40)			
IV	-5.05 (-63.12)	0.67 (14.45)		-0.014 (-2.42)	0.07 (4.37)		
V	-5.11 (-32.34)	0.69 (11.92)		-0.012 (-1.55)	0.07 (4.31)	0.006 (0.04)	
VI	-5.59 (-17.70)	0.59 (6.75)	1.46 (1.36)	-0.011 (-1.49)	0.04 (1.43)	0.09 (1.79)	
1872-1904 period							
VII	-4.70 (-547.03)	0.73 (11.13)					
VIII	-4.70 (-227.92)	0.60 (6.42)	1.78 (1.85)				

Notes: The  $t$ -statistics are given in brackets. In this context, the  $t$ -statistic is biased, but nevertheless provides a rough idea of the relative significance of the respective explanatory variables.

The long-term regressions III and IV have stationary residuals (see Appendix 1.1, the result is more definite for Equation IV). The residuals represent the stationary series obtained as a linear combination of the cointegrated series, that is, a long-term equilibrium position to which the proposed ECM adjusts.

Returning to the dynamics of the model, the short-term rate of exchange function has been estimated based on Equations III and IV in Table 1.2, and the final parsimonious functions are listed in Table 1.3, together with a set of diagnostic statistics.

### The results of the model

Figure 1.8 presents the plot of actual against fitted variables for the whole period, according to the first ECM equation in Table 1.3.

Considering first the long-term equilibrium solution, the money coefficient is hardly significant, and points towards a very weak influence of money (M1) on the exchange. The sign for the foreign price coefficient casts additional doubts upon the mechanism through which money influences the exchange – not the PPP.

Table 1.3 ECM of the lira effective rate of exchange function,  $s_t$ 

	Constant	$\Delta(i_{RPF}^* - i_{RPF})$	$\Delta(i_{RRt} - i_{CLt}^*)$	$\Delta K_t$	$\Delta p/p_t^*$	$\Delta p$	$res_{t-1}$	$R^2$	$adj R^2$
1874-1913 period									
IV	-0.007 (-0.37)	0.47 (9.68)						0.73	0.72
DW = 1.88 F.stat. = 51.47 Log lkh = 121.76									
III	-0.004 (-0.20)	0.46 (8.93)		-0.01 (-1.34)	-0.09 (1.64)			0.72	0.68
DW = 1.96 F.stat. = 22.09 Log lkh = 119.79									
IV	-0.006 (-0.30)	0.50 (9.94)		-0.01 (-1.20)	0.07 (1.37)			0.75	0.72
DW = 1.93 F.stat. = 27.26 Log lkh = 123.45									
1872-1904 period									
VI	-0.0018 (-0.07)	0.48 (8.84)		0.07 (1.38)				0.76	0.73
DW = 1.95 F.stat. = 30.42 Log lkh = 96.509									

Notes: Equation numbers refer to the numbers in Table 1.2. The  $t$ -statistics are given in brackets.

The low significance of the money variables and the divergent paths followed by M1 and M3 (Figure 1.2) support the view that money creation, in a small, open economy integrated into the world capital markets, is difficult to control. Open market purchase by domestic banks was mainly directed at the Rendita, and altered the composition of the banks' financial portfolios while having little influence on domestic money supply and bank interest rates. The risk element of the possible decline in net domestic yield is a minor factor in the exchange rate and increases the value of the interest yield premium.

The highly significant coefficient of the Rendita yield premium highlights the importance of foreign capital moving in tune with currency perception in the foreign exchange markets. The positive sign is very stable and consistent with the examples given in the earlier section on the outline of the Italian economy. As expected, variations in currency risk and in the lira exchange rate closely mirror each other, and the constant term (-4.70) is very close to the logarithm of the lira exchange rate during convertibility (-4.67).

The sign of the interest yield is rather stable in the face of marginal changes in the specification of independent variables in the period

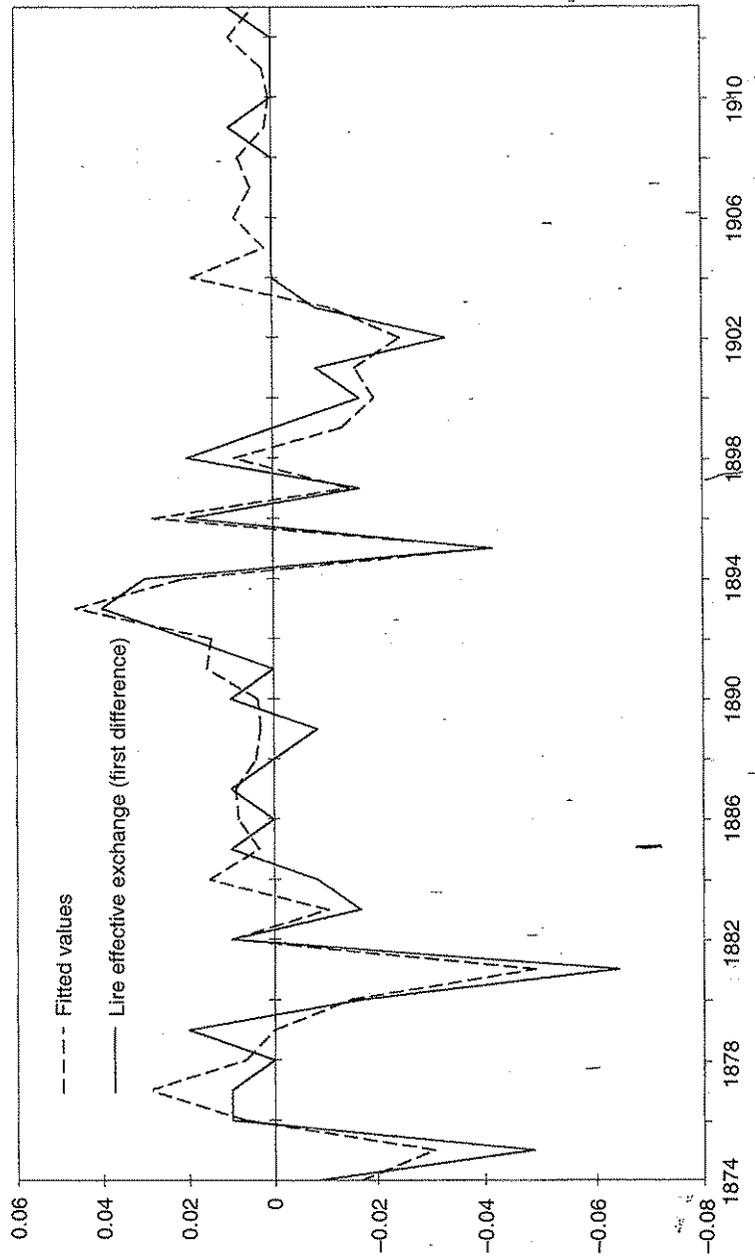


Figure 1.8 Yearly variations of the log of the lira effective exchange rate. Actual and fitted values.

under examination. The British Consol yield premium adds significance to the relationship, in particular before 1904, when, due to the high budget deficit and the banking crisis, country risk was a very important factor in foreign investors' confidence.

The coefficient of the net capital inflow has a negative influence on the exchange rate, measured as domestic currency per unit of foreign currency. The sign is fairly stable and resists all marginal changes in model specification.

The negative sign for the capital coefficient makes a contribution to the long-running debate on whether capital flows are demand-pulled or supply-pushed. Given a floating currency, capital flows induced by a deficit or surplus on the current account will be related directly to the exchange rate, defined as lira per unit of foreign currency. For example an increase in domestic activity due to a growth in export demand would be associated with an appreciating exchange rate (a decline in  $s_t$ ) and reduced capital imports (a lower trade deficit). On the other hand an increase in the demand for imports resulting from an autonomous increase in domestic activity would be associated with increased capital imports and a depreciation in the exchange rate (a rise in  $s_t$ ).

Capital flows and the rate of exchange will move in the opposite direction if capital flows determine the balance of trade. A financial disequilibrium induces capital imports due to a reduction in the perceived risk of investing in the Italian market, and particularly of investing in the Rendita. This induces an appreciation of the currency (positive sign of the yield and negative sign of the capital coefficient) and a rise in the deficit on the current account. The increase in the supply of capital stimulates a parallel increase in construction and in other domestic borrowing and investment activities.<sup>80</sup> This confirms, with the important example provided by the Rendita, the basic idea that swings in domestic activity and capital imports in the period in question were connected through the international market for financial assets, and not the commodity market.

Italian capital imports were correlated with British, French and, later, German capital exports. Evidence from Levy-Leboyer (1977) and Tilly (1990) seems to confirm that high rates of capital exports in the lending country tended to coincide with high rates of domestic economic growth and high demand for Italian exports. The same is true with respect to the United States, which shared the same timing as Italy as far as foreign capital and domestic cycles were concerned.<sup>81</sup>

To return to the ECM, the significant coefficients are those referring to the yield premium, foreign prices and foreign capital. The most important factor in the adjustment process is the risk factor, and on average the adjustment takes less than a couple of years. The signs reflect those of the long-term model, with a smooth adjustment procedure.

### Italy and the gold standard

Until the 1880s Italy shared much of the economic history of other European countries. Just after unification it adopted a bimetallic standard, as did the majority of countries in Europe. Faced with the decline in the price of gold, people tended to hoard silver and this meant that in effect Italy was on a gold standard. Along with France, Belgium and Switzerland, Italy was part of the currency area called the Latin Monetary Union.

During the course of the period under scrutiny, Italy reverted to convertibility for a second, very limited period in the mid 1880s. This occurred just after the collapse of the price of silver on the world market, when the Italian bimetallic regime in fact became a silver standard with gold flowing abroad.

At this point the lira took a rather different route from the general international norm. While other countries moved towards the gold standard, Italy suspended convertibility and returned to *corso forzoso*. Italian prices nevertheless moved according to the prices of competitors, and the lira enjoyed a relatively long period of exchange rate stability.

When, just a few years after adopting it, Italy abandoned bimetalism and declared *corso forzoso* (1866), it did so because of a large budget deficit and the necessity for the government to find finance through money creation. The problem of putting the state accounts in order had always been the preoccupation of Italy's rulers and has been a recurrent theme in Italian history. It was also considered the most important problem in the period immediately after the First World War, while during the nineteenth century it was the *leitmotiv* of Finance Minister Sella's speeches in 1866 and Minister Sonnino's and Minister Luzzatti's speeches in the 1890s.<sup>82</sup> References to the importance of a metallic standard and a stable level of exchange were also

frequent in statements issued by the government and other official sources, but were given far less prominence than the problem of the budget. Whenever a decision was made to abandon convertibility, the formal commitment by the government to return to the old parity went hand in hand with a rather lax attitude towards the level of the exchange rate. Credit remained expansionary and the government waited for the help of favourable external circumstances to stabilise the exchange rate.

Throughout the whole period, Italy was exposed to international capital flows of great magnitude. In the earlier part of the period, the large stock of Italian debt held abroad dominated the exchange market. When the price of Italian bonds fell on the Paris market, it became convenient to bring bonds back to Italy in order to sell them, while the reverse was true when the price of the bonds in Paris was higher than in Italy. The ups and downs of the exchange rate depended heavily on international arbitrage. Throughout this period the Banca Nazionale never operated an effective discount rate policy to counteract the outflow of reserves, because (1) this would have proved costly in terms of the stock of government debt and (2) it was not required by exchange flexibility. The discount rate remained fixed at 5 per cent from 1867 to 1877, dropped to 4.5 per cent for the following three years and then returned to 5 per cent, where it remained until 1883. Subsequently, it varied between 5.8 (1891) and 4.0 (1905).

In the twenty years prior to the First World War, the Italian trade balance benefited from two main sources of invisible earnings: tourism and emigrant remittances. These were accompanied by a permanent and visible trade deficit, but Italy nevertheless accumulated reserves and the lira was stabilised. After the financial crisis of 1893 the lira became a very credible member of what amounted to a gold exchange standard, even though legal convertibility had never been restored.

Considering the stability of the exchange rate throughout the period under consideration, there is a strong temptation to indulge in generalisation, and one might be led to affirm, along with Fratianni and Spinelli, that 'the Italian experience did not differ on the whole from what it would have been had the country adhered formally to the standard throughout'.<sup>83</sup> But despite superficial similarities, Italian history tells a fundamentally different story from that of the gold standard, and these differences must be acknowledged rather than denied.

At the start of the period, Italy experienced a rather loose process of domestic credit creation, which supported the building up of its financial infrastructure but did not develop into rapid inflation and exchange rate deterioration. At the end of the century the abundance of reserves made the rule linking metal and paper rather superfluous. The ultimate stability of the exchange rate was more the result of a series of institutional arrangements and fortunate circumstances than of deliberate policy measures or the operation of an 'automatic mechanism' of the gold standard type.

The Italian experience offers further evidence of securities arbitrage being an important element in exchange rate determination.<sup>84</sup> The close link between the bourses in Rome and Paris – that is, between the Italian bourse and the world capital market – is relevant to the idea that fluctuating exchange rates do not mean financial isolation, and that to have financial integration one does not necessarily need to have fixed exchange rates.

#### Appendix 1.1 Order of integration of time series 1872–1913

Table A1.1 Unit root tests: variables in levels

Variable	Constant without trend		Constant with trend			
	DF	L	DF	L	ADF(L)	ADF(L)
$s_t$	1.95	1	-2.67	-2.20	1	-2.53
$y_t$	0.44	1	0.19	-1.76	1	-2.08
$p_t/p_t^*$	2.23	1	-2.50	-0.70	1	-1.19
$p_t^*$	2.83	1	-2.67	-2.84	1	-2.86
$m1_t$	0.52	1	0.04	-0.38	1	-1.12
$m3_t$	2.33	1	1.30	-0.79	2	-1.19
$K_t$	1.13	1	-1.14	-2.66	1	-2.67
$i_{RPI}^* - i_{CL}^*$	0.30	2	-0.25	-1.63	2	-1.74
$i_{RPI}^* - i_{RR}$	2.12	1	-1.86	-3.15	1	-2.32

Notes: The null hypothesis is that the series has a unit root,  $I(1)$ . DF = Dickey–Fuller (tau) test, ADF = augmented Dickey–Fuller test, L = optimal lag. The statistics were computed using the response surface estimates given by MacKinnon (1990) (reported by Microfit 3.0). \*\*DF and ADF statistics fall into the 5 per cent rejection region, \* into the 10 per cent rejection region.

Table A1.2 Unit root tests: first difference of variables

Variable	No constant and no trend		Constant without trend			
	DF	L	DF	ADF(L)	L	ADF(L)
$\Delta s_t$	-5.94**	1	-4.81**	-6.77**	1	-4.99**
$\Delta y_t$	-5.19**	1	-5.15**	-5.48**	1	-5.81**
$\Delta(p_t/p_t^*)$	-4.68**	1	-3.59**	-4.66**	1	-3.34**
$\Delta p_t^*$	-6.10**	1	-6.07**	-6.10**	1	-6.52**
$\Delta m1_t$	-3.61**	1	-3.74**	-4.72**	1	-4.03**
$\Delta m3_t$	-3.46**	1	-3.80**	-4.31**	1	-5.16**
$\Delta K_t$	-6.22**	1	-5.28**	-6.39**	1	-5.31**
$\Delta(i_{RPI}^* - i_{CL}^*)$	4.76**	1	-4.88**	-7.10**	1	-4.28**
$\Delta(i_{RPI}^* - i_{RR})$	-9.97**	1	-7.27*	-8.86**	1	-6.07**

Notes: The null hypothesis is that the series has a unit root,  $I(1)$ . DF = Dickey–Fuller (tau) test, ADF = augmented Dickey–Fuller test, L = optimal lag. Statistics were computed using the response surface estimates given by MacKinnon (1990) (reported by Microfit 3.0). \*\*DF and ADF statistics fall into the 5 per cent rejection region, \* into the 10 per cent rejection region.

Table A1.3 Unit root tests: residuals (Table 1.2 equations)

Variable	DF
Res, eq. III	-3.80*
Res, eq. IV	-4.64**

Notes: The null hypothesis is that residuals have a unit root,  $I(1)$ . DF = Dickey–Fuller (tau) test. Statistics take into account the underlying regression model and were computed using the response surface estimates given by MacKinnon (1990) (reported by Microfit 3.0). \*\* DF statistics fall into the 5 per cent rejection region, \* into the 10 per cent rejection region.

#### Appendix 1.2 Estimate of the Rendita yield premium and net capital flows

##### Rendita yield premium

This is defined as the difference between the yearly Rendita 5 per cent average price in Rome and the yearly 5 per cent average price of the Rendita in Paris, divided by the Rome price times one hundred.<sup>85</sup>

*Net capital flows*

The starting point when estimating capital flows is the official estimate of the balance of commodity trade, which is reasonably reliable since it is obtained from the product of recorded quantities and the corresponding average values attributed annually by an expert committee to each traded item. The import values are c.i.f. and have been transformed into f.o.b. The official estimate of capital imports is obtained by adding the estimates of the service balance, labour and capital income and unilateral transfers to the commodity trade balance.

The measure of net capital is estimated by deducting from capital imports an estimate of interest payments abroad. This estimate is provided by ISTAT,<sup>86</sup> Fenoaltea has raised several questions about these estimates that cannot easily be dismissed, in particular the soundness and timing of data relating to tourism, emigrant remittances and capital income. At the end of his examination he concludes that

the aggregate gap between the balance, on one hand, and capital imports, on the other, appears to have grown more smoothly, and to a considerably smaller total, than the existing series would indicate. The level and cyclical path of actual capital imports were thus presumably altogether closer to the level and cyclical path of the merchandise deficit than the existing series allows.<sup>87</sup>

The ISTAT procedure, except for small adaptations, can be derived by deducting from the commodity deficit a quantity that grows proportionately through time according to a simple mechanism of the type  $a_t = a_{t-1} + a_{t-1}/10$  (from 1891 to 1910 the correlation between the ISTAT estimate and this rough and tentative one is close to 0.9. Thus ISTAT in fact distributes a total estimated amount, which is presumed to have entered the country over the whole period, in a roughly proportional way).

On the other hand, as far as the exchange rate estimation is concerned, an estimate of the measure of capital is not easily obtained from commodity trade. Commodity trade demonstrates a behaviour that is rather different from the ISTAT net capital estimates on trend. It is true that the divergence refers to the last twenty years of the period, but it turns out to be significant. Moreover the sign of the correlation coefficient between the effective exchange rate and the ISTAT measure of capital flows and between the exchange rate and the commodity deficit, which is the same in both cases, changes drastically, shifting from positive to negative. All the same, it is hard to believe that the main item making up the difference, namely emigrant remittances, had the same causes as capital flows, and can therefore be meaningfully added to them. Emigrants were sending their savings to Italy in order to feed their relatives, and had little concern for the rate of return on their savings or with limited movements in the exchange rate.

To summarise, the ISTAT series for capital movements appears unreliable and possibly overstates invisible items, but to rely on commodity trade means not taking into account the huge inflow as a result of emigrants' remittances during the latter part of the period, nor does it allow for significant capital repatriation,

and this can compromise the estimation. Certainly, as many contemporary observers have pointed out, capital was repatriated during the last twenty years of the period; and although the measure of this can be questioned, it must nevertheless be taken into account.

## Appendix 1.3 Italian data

Table A3.1 Italian metal reserves, M1 and M3 (millions of lire)

	<i>Metal</i>	<i>M1</i>	<i>M3</i>
1861	126.9	900	1 335
1862	111.5	1 007	1 468
1863	140.5	988	1 480
1864	139.9	983	1 459
1865	121.7	995	1 523
1866	107.9	1 438	2 015
1867	123.3	1 685	2 198
1868	203.3	1 728	2 243
1869	195.1	1 692	2 253
1870	210.8	1 854	2 525
1871	177.5	2 094	2 934
1872	157.0	2 331	3 445
1873	139.4	2 509	3 531
1874	161.5	2 524	3 599
1875	144.3	2 545	3 693
1876	150.0	2 554	3 789
1877	150.5	2 579	3 968
1878	151.8	2 562	4 037
1879	148.3	2 629	4 174
1880	178.3	2 619	4 275
1881	138.3	2 546	4 275
1882	159.1	2 286	4 101
1883	320.1	2 201	4 177
1884	371.1	2 244	4 414
1885	337.1	2 271	4 702
1886	344.9	2 310	5 084
1887	378.8	2 354	5 235
1888	435.5	2 336	5 239
1889	437.9	2 380	5 386
1890	409.8	2 390	5 332
1891	442.8	2 368	5 263
1892	447.2	2 405	5 438
1893	446.7	2 488	5 476
1894	510.7	2 482	5 417
1895	502.2	2 363	5 452
1896	511.2	2 347	5 371

Table A3.1 (cont.)

	<i>Metal</i>	<i>M1</i>	<i>M3</i>
1897	461.9	2 393	5 506
1898	476.8	2 419	5 668
1899	466.9	2 491	6 020
1900	457.3	2 454	6 163
1901	472.0	2 421	6 375
1902	491.6	2 442	6 560
1903	662.7	2 494	6 986
1904	687.6	2 520	7 470
1905	845.4	2 588	8 121
1906	974.6	2 776	8 363
1907	1132.5	3 013	9 202
1908	1151.4	2 947	9 643
1909	1174.3	2 984	10 297
1910	1198.1	3 032	10 792
1911	1247.7	3 218	11 481
1912	1287.2	3 221	11 600
1913	1355.5	3 307	11 958

Sources: De Mattia (1967), table 13, (1990), table 50.

Table A3.2 Italian current balance (millions of lire)

	<i>Commodity balance</i>	<i>Services</i>	<i>Capital and labour income</i>	<i>Current balance</i>
1861	-313	35	-48	-326
1862	-223	46	-68	-245
1863	-231	52	-77	-256
1864	-367	44	-88	-411
1865	-367	60	-87	-394
1866	-219	69	-114	-264
1867	-109	67	-118	-160
1868	-71	71	-119	-119
1869	-101	99	-114	-116
1870	-101	99	-96	-98
1871	152	101	-112	141
1872	35	100	-94	41
1873	-96	111	-56	-41

Table A3.2 (cont.)

	<i>Commodity balance</i>	<i>Services</i>	<i>Capital and labour income</i>	<i>Current balance</i>
1874	-264	109	-31	-186
1875	-132	115	-8	-25
1876	-62	127	-12	53
1877	-171	124	-31	-78
1878	6	126	-37	95
1879	-121	130	-46	-37
1880	-35	160	-43	82
1881	-27	161	-53	81
1882	-36	159	-62	61
1883	-51	165	-50	64
1884	-204	186	-66	-84
1885	-452	173	-86	-365
1886	-373	161	-89	-301
1887	-524	184	-121	-461
1888	-220	198	-120	-142
1889	-363	200	-42	-205
1890	-363	202	-54	-215
1891	-194	205	-14	-3
1892	-161	221	-30	30
1893	-172	224	-38	14
1894	-9	222	-33	180
1895	-84	216	12	144
1896	-68	207	43	182
1897	-18	205	76	263
1898	-101	194	133	226
1899	29	196	164	389
1900	-244	183	209	148
1901	-246	212	361	327
1902	-166	222	342	398
1903	-240	259	329	348
1904	-214	293	301	380
1905	-234	324	557	647
1906	-494	327	616	449
1907	-813	334	522	43
1908	-1059	436	442	-181
1909	-1098	409	396	-293
1910	-1028	451	514	-63
1911	-1035	414	544	-77
1912	-1155	364	530	-261
1913	-991	392	587	-12

Sources: Istat (1957), tables 38, 39, 40, 41.

Table A3.3 Italian exchange rate and relative prices (index numbers 1900 = 100)

	Real effective exchange rate	Nominal effective exchange rate	Lira/France nominal exchange rate	Wholesale prices: Italy/other countries
1861	112.74	95.06	93.81	84.3
1862	122.40	94.07	94.25	76.9
1863	130.38	93.98	94.16	72.1
1864	130.04	92.25	94.16	71.0
1865	125.00	93.90	94.16	75.1
1866	127.88	97.75	98.52	76.5
1867	135.87	105.82	105.37	77.8
1868	126.42	104.38	103.63	82.7
1869	126.74	98.91	98.14	78.0
1870	127.39	99.01	98.33	77.7
1871	127.71	99.90	99.50	78.2
1872	129.03	103.41	103.09	80.1
1873	129.70	109.05	107.87	84.1
1874	115.61	107.64	105.49	89.9
1875	123.46	101.83	101.83	82.5
1876	126.74	102.25	102.25	80.7
1877	114.42	103.31	103.20	90.3
1878	107.18	103.31	103.31	96.5
1879	111.98	105.04	105.15	93.9
1880	112.87	103.52	103.84	91.8
1881	110.62	96.06	96.25	86.8
1882	106.04	96.71	96.81	91.3
1883	106.50	94.25	94.25	88.6
1884	102.88	94.16	94.16	91.5
1885	93.37	94.61	94.61	101.4
1886	88.73	94.25	94.34	106.2
1887	94.61	95.15	95.33	100.6
1888	95.97	95.42	95.42	99.6
1889	93.90	94.97	94.79	101.2
1890	92.34	95.51	95.24	103.4
1891	96.25	95.97	95.69	99.7
1892	97.09	97.66	97.37	100.6
1893	106.04	101.83	101.52	96.00
1894	104.49	104.82	104.60	100.3
1895	92.76	99.70	99.60	107.7
1896	92.17	101.73	101.42	110.3
1897	93.20	99.30	98.91	106.5
1898	96.43	101.52	100.50	106.3
1899	97.75	101.11	100.81	103.4
1900	100.00	100.00	100.00	100.0
1901	94.43	98.14	98.04	103.9
1903	95.15	93.81	93.81	98.7
1904	100.40	93.98	93.90	93.5

Table A3.3 (cont.)

	Real effective exchange rate	Nominal effective exchange rate	Lira/France nominal exchange rate	Wholesale prices: Italy/other countries
1905	98.62	93.72	93.72	95.0
1906	99.70	93.81	93.63	94.0
1907	96.53	93.81	93.63	97.2
1908	94.61	93.81	93.72	99.2
1909	96.34	94.25	94.16	97.8
1910	100.40	94.52	94.25	94.1
1911	92.68	94.61	94.16	102.1
1912	91.24	94.88	94.61	104.1
1913	94.43	95.69	95.33	101.3

Source: Ciocca and Ulizzi (1990), tables 2, 4, 5.

Table A3.4 Long-term interest rates, Rendita yield premium and British consol yield premium

	British Treasury bond	Rome Rendita	Rendita yield premium	British Consol yield premium
1862	3.23	7.26	3.28	4.03
1863	3.24	7.10	1.33	3.86
1864	3.33	7.56	1.70	4.23
1865	3.35	7.84	0.75	4.49
1866	3.41	9.24	8.66	5.83
1867	3.23	9.67	4.67	6.44
1868	3.20	9.32	6.02	6.12
1869	3.23	8.96	1.26	5.73
1870	3.24	9.00	5.78	5.76
1871	3.23	99.6	6.71	3.98
1872	3.24	5.98	2.73	2.74
1873	3.24	6.26	4.36	3.02
1874	3.24	6.25	4.07	3.01
1875	3.20	5.89	2.91	2.69
1876	3.16	5.85	2.89	2.69
1877	3.15	5.88	4.08	2.73
1878	3.15	5.61	3.27	2.46
1879	3.08	5.16	3.53	2.08
1880	3.05	4.88	3.28	1.83
1881	3.00	4.88	1.15	1.88
1882	2.99	4.97	1.47	1.98
1883	2.97	4.98	1.21	2.01
1884	2.97	4.62	2.05	1.65
1885	3.02	4.57	1.65	1.55
1886	2.98	4.41	1.34	1.43

Table A3.4 (cont.)

	British Treasury Bond	Rome Rendita	Rendita yield premium	British Consol yield premium
1887	2.95	4.47	2.03	1.52
1888	2.97	4.52	1.50	1.55
1889	2.81	4.59	1.52	1.78
1890	2.67	4.60	1.39	1.93
1891	2.79	4.71	1.93	2.01
1892	2.65	4.76	2.20	2.11
1893	2.61	4.64	3.99	2.03
1894	2.52	4.59	4.45	2.07
1895	2.39	4.38	2.38	1.99
1896	2.28	4.86	3.97	2.58
1897	2.25	4.18	2.61	1.93
1898	2.28	4.16	2.30	1.88
1899	2.36	4.01	2.33	1.65
1900	2.54	4.03	2.04	1.49
1901	2.67	3.98	1.76	1.31
1902	2.66	3.91	1.05	1.25
1903	2.75	3.91	0.51	1.16
1904	2.83	3.90	1.43	1.07
1905	2.78	3.83	0.57	1.05
1906	2.83	3.87	0.71	1.04
1907	2.97	3.69	0.59	0.72
1908	2.90	3.64	0.28	0.74
1909	2.98	3.61	0.34	0.63
1910	3.08	3.61	0.44	0.53
1911	3.15	3.67	0.49	0.52
1912	3.28	3.60	0.69	0.32
1913	3.39	3.59	0.60	0.20

Sources: Fratianni and Spinelli (1991, pp. 84-5).

#### Notes

1. Maurizio Tiso and Stefano Bertelli have provided skilful computer assistance and I owe the various estimation procedures to them. The estimations were carried out using Mosconi-RATS, MuLti and TSP packages. A previous version of this chapter was discussed at a CNR Workshop in Venice in 1993, at the Workshop on 'International Monetary Arrangements' in Lisbon in 1993, and at the Economic History Workshop in Toronto; my thanks go to all participants. My particular thanks go to Pablo Martín Aceña, Giovanni Federico, Stefano Fenoaltea, Christopher Gilbert, Francesco Luna, Don Moggridge, Isabella Procidano, Jaime Reis, Andrea Ripa di Meana, Nicola Rossi and Mario Volpe for their comments.

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2. The myth of the self-adjusting gold standard was in fact created after the demise of the system, at the outbreak of the First World War. It became a universal doctrine among central bankers in the 1920s – at least before they tried to reestablish it – and found its way into many modern textbooks. In the last century things were probably very different, as many detailed studies have demonstrated. See Bloomfield (1959); Dam (1982), pp. 15-17; Drummond (1987), ch. 1; Raccas (1990), pp. 50-1; Triffin (1964), ch. 1.
3. See Dam (1982), ch. 1; Drummond (1987), ch. 1.
4. The gulden was convertible into silver. Conversion was subsequently abandoned and not resumed until 1892, although the price of silver on the world market had fallen to make the paper gulden worth as much as its legal equivalent in silver. See Yeager (1969), p. 61. On Spain, see Martín Aceña in this volume.
5. In comparison with other European capital exporters (the United Kingdom, France and Germany) at the turn of the century, Italy had a very backward economic structure with a very low per capita income, which makes such exportation of capital appear a rather unusual luxury.
6. Any definition of what constitutes a 'stable rate of exchange' is, of course, questionable, and had the country been on gold over the whole period the gold points would have provided much stricter margins. See Dam (1982), pp. 36-7; White (1933), table 49.
7. Equilibrium, in the literature on cointegration, means that such an observed relationship has, on average, been maintained for a long time.
8. This was in fact the essence of the gold standard classical mechanism, at least according to Triffin (1964). A balance of payments deficit led automatically to an outflow of gold, which the Bank of England, because of the decline in the reserve ratio, stemmed from a rise in the discount rate. This led to a fall in the gold outflow and possibly stimulated an inflow. Through rapid portfolio adjustments this in turn led to a new balance of payments equilibrium. Movements in the international monetary system had a modest impact on the process of domestic money and credit creation. See Drummond (1987), p. 22; Triffin (1964), p. 9 ff.
9. This ratio was not supported by the market, where silver was more valuable. This meant that silver coins tended to disappear from the market and Italy was effectively on gold. To prevent the outflow of silver, whose value in terms of gold on the international market was larger than on the domestic market, the state resolved not to coin the silver scudo and to lower the effective silver content of small coins to 850/1000. This was equivalent to reducing the ratio between silver and gold to the ratio fixed by the market. See Roccas (1990), p. 8.
10. Di Nardi (1953), p. 10, note 2, p. 29ff.
11. The bimetallic countries had each resorted to different debased ratios for silver coins in the face of the decline in the price of gold, with the result that coins with different silver contents circulated in each country at the

- same time. One of the aims of the Latin Union was to harmonise the rules governing the minting of coin. See Roccas (1990), p. 9.
12. Istituto Centrale di Statistica (hereafter ISTAT) (1957).
  13. Gille (1968), p. 212.
  14. Di Nardi (1953), pp. 76–7.
  15. Luzzatto (1968), p. 44.
  16. Fishlow (1985), pp. 392–400.
  17. This possibility applied to anyone taking Rendita certificates to a foreign bank, and thus also applied to Italians taking their Rendita abroad for this purpose. This possibility for Italian citizens was removed twice, once from 1874–81 and again from 1893–1904 with the introduction of the 'affidavit'. This was a sworn declaration required when collecting interest abroad that the bond in question did not belong to an Italian citizen.
  18. Fenoaltea (1988), table 4.1
  19. Di Nardi (1953), pp. 62, 82.
  20. The motivation behind these moves is a matter of dispute. Some authors claim that the real motive was to help the Credito Mobiliare di Torino e Firenze, the Banco di Sconto e Sete di Torino, the Cassa Generale di Genova and the Cassa di Sconto di Genova. These banks faced a huge withdrawal of their deposits and the Banca Nazionale was in need of fresh finance to refinance them without curtailing circulation. See Di Nardi (1953), p. 123 ff; for an opposite view, see Luzzatto (1968), ch. 3.
  21. The other banks of issue could enjoy the advantages of inconvertibility only in a rather indirect way because they were obliged to convert their paper money on demand into paper money of the Banca Nazionale. They were also much less important and had a much more limited territorial diffusion. An indirect but important effect of inconvertibility was to encourage the circulation of notes rather than coins.
  22. The regime was that of the old Piedmont state. See Martello and Montanari (1874), pp. 10–11. Before that, different banks of issue operating in different states had their own statutory rules: some had proportional backing, while others had to keep their circulation within a certain ratio to the value of their capital stock.
  23. Sella was in office in 1862, 1864–5 and 1869–73. The increase in circulation was mainly due to the financial needs of the state and this operation did not count for the calculation of the reserve requirement. The Banca Nazionale was allowed to include Treasury money orders among its metal reserves. In the meantime other banks were overissuing, even if only in limited amount. See Di Nardi (1953), pp. 138–60.
  24. During the periods 1866–8 and 1871–4 the requirements of the state prompted an increase in circulation without any backing at all. Reserves decreased because of a flight of metal and a high commodity deficit.
  25. This law decreed the old proportional backing, with an additional limit related to the banks' capital stock. It also reformed the banks of issue, putting them all on the same footing. The Minghetti law (from the name of the prime minister at the time) declared that circulation by the state was

- to be issued in the form of *biglietti consortili* by the six banks of issue. These *biglietti* were forced currency and could be part of the reserve backing. Banks of issue were allowed to print a different currency, which was legal tender and was convertible either into *biglietti consortili* or into metal. The attempt was made to limit the amount of circulation by the Treasury and to provide a guarantee to the public. See Luzzatto (1968), pp. 82–3; Di Nardi (1953), p. 200.
26. Di Nardi (1953), p. 149.
  27. There was also a very practical formal reason to prevent it: banks had to ask the prime minister's consent each time they wanted to vary the rate of discount. See Di Nardi (1953), p. 187.
  28. The Treasury, of course, had to pay interest on the stock of state debt, which was kept more or less constant during this period. On the possible discrepancies between the annual budget surplus and debt variations, see Fratianni and Spinelli (1991), pp. 59–60.
  29. Di Nardi (1953), p. 185.
  30. It was envisaged in the 1874 monetary law and then delayed three times – in 1877, 1878 and 1879. See Di Nardi (1953), p. 308.
  31. The 1874 law eliminated the advantage previously enjoyed by the Banca Nazionale over other banks of issue: forced currency was to be the privilege solely of the Treasury.
  32. The French market was in deep depression during the 1870s and recovered significantly only in the second half of the 1880s. See Levy-Leboyer (1977). The loan was underwritten by the Hambro and Baring groups, but the German banks immediately came to the forefront. The second tranche, issued in 1882, faced more problems. Ultimately it was the French who once again lent to Italy. See De Cecco (1990), p. 268, (1992), pp. 36–7.
  33. Some people tried to obtain silver in order to export it to other Latin Union countries (usually France), where silver was, in principle, exchangeable for gold. The Bank of France was not always willing, however, to convert silver into gold and the whole transaction was not clear-cut.
  34. Roccas (1990), pp. 11–12.
  35. For rumours of an alleged conspiracy against Italy, and the request for German banks' help in order to sustain the quotations of the Italian state bonds in Paris, see Luzzatto (1961), p. 439
  36. Di Nardi (1953), p. 383.
  37. See Fratianni and Spinelli (1991), p. 219. This, of course, 'completely hampered the role that one could expect prices would play [according to theory] in easing our exports and discouraging our imports' (Benini, 1894, p. 305).
  38. According to Maddison's recent revision (1991, table 7), this amounted to 3.9 per cent at constant prices.
  39. See De Cecco (1990), p. 39; Lindert (1969), table 1, p. 10. The ratio between reserves (bullion and foreign currency) and circulation, reached a remarkable 78 per cent in 1908. See Fratianni and Spinelli (1991), p. 235.

40. The Banca d'Italia was the largest of the three, and by that time had achieved absolute leadership in the capital market. See Ciocca (1978), p. 181.
41. B. Stringher (at the time general director of the Bank of Italy) to L. Luzzatti (Minister of the Treasury) 18 April, 1906, doc. 202, claiming freedom of action for the bank on foreign liabilities so as to intervene effectively on the exchange market. See De Cecco (1992).
42. Walter Bagehot was explicitly quoted as a theoretical reference in the Bank of Italy's annual report to shareholders; the same document nevertheless continued to stress the importance of movements in the price of the Rendita on the exchange—see Fratianni and Spinelli (1991), pp. 230–9. Large reserves were not necessarily a sign of power. In fact much of the strength of the Bank of England lay in its capacity to regulate the flow of gold through the rate of discount, without the need for big exchange reserves. Britain later abandoned this policy in favour of more direct intervention in the exchange, as noted in Scammel (1965), p. 109. Other countries that wished to model themselves on Britain, mainly debtors of dubious repute, had to rely on large holdings of foreign exchange for use as reserves. See Dam (1982), p. 29; Ford (1960), p. 143; Scammel (1965), p. 112.
43. Some evidence is provided in the collection of archive material published by the Bank of Italy and edited by De Cecco (1992). An example is doc. 190, letter from B. Stringher to O. Joel, Rome 13.2.1904, p. 907, stressing the necessity to support the exchange directly and the uselessness of raising the rate of discount.
44. On the Italian situation during the 1907 financial crisis, see Bonelli (1971), p. 43 ff. Excellent descriptions of the working of the French system can be found in White (1933), p. 198, and in Scammel (1965), p. 112. The level of reserves and not the rate of discount was the real insulating mechanism for the domestic money supply.
45. Dick and Floyd (1987).
46. Before that date there were large variations both in the bilateral dollar exchange and in the Reichmark exchange, although their impact on the overall effective exchange rate of the lira appears rather modest.
47. The effective rate computed by the Bank of Italy for the entire period, taking into account Italy's four most important trading partners, has a correlation coefficient of 0.986 with the bilateral lira–pound exchange and 98.6 with the lira–franc exchange. The maximum yearly deviation between the series is always below 2 per cent.
48. Fratianni and Spinelli (1984).
49. It mainly performs the function of a descriptive device since they do not incorporate this index in the estimation of their PPP model.
50. The Italian wholesale price index diverged significantly from the British one and, in general, also from Italian trading partners' indices in the first part of the period, possibly, as suggested by Sylla (1984), because of high transport costs. One should also bear in mind that Italian imports were protected by significant import duties, which were increased moderately in 1878 and rather more severely nine years later. See Luzzatto (1968), pp. 173–5.

51. Originally developed by Fleming (1962) and Mundell (1963). It is also clear that in a situation like this, the way for a stock of assets to change is, in the final stage, through current account surpluses or deficits. Depreciation of the lira exchange rate will in fact reduce domestic 'absorption' and produce a current account surplus, but the causal link went from assets to the current account and not the other way round. See Kouri (1984).
52. See Boccardo (1879), pp. 52–73. He criticises the Ricardian view of the quantity theory of money expressed by the Bullion Committee.
53. Stringher (1894), p. 32; Luzzatto (1968), pp. 129, 160.
54. Amongst the relevant documents is 'Esposizione storica delle vicende e degli effetti del corso forzoso in Italia' by A. Romanelli on behalf of the Minister of Agriculture, Industry and Commerce, 15 March, 1875, doc. 123, p. 624, in De Cecco (1992). The same collection includes other items relevant to the same problem: doc. 126, doc. 128, doc. 154, doc. 155 and doc. 162.
55. Italy lacked institutions capable of mediating between domestic financial sources and industrialists. This role had to be assumed by the state, which was required to enter directly into debt and to build industries and infrastructures, or to lend resources to banks, which would in turn lend them to private entrepreneurs. See De Cecco (1990). According to Di Nardi (1953, p. 284) the origin of the problem lay in the Treasury, which always put banks and savers in competition on the loan market, kept interest at high levels and restrained the development of a financial system.
56. De Cecco (1992), pp. 634–5.
57. De Cecco (1990), p. 269. The causal link from capital imports to the current account balance was proposed by Williamson in his pioneering study of American growth. Williamson (1964) speculates that swings in capital imports were caused by swings in domestic construction through upward pressure on the level of interest rate. Fenoaltea (1988) argues that what was valid for the countries of the Atlantic economy also held for Italy.
58. The same point is made, for the 1870s, by Romanelli in 'Esposizione storica', in De Cecco (1992), doc. 123, p. 633, and by Benini (1894), pp. 313–14 with reference to the 1880s.
59. De Cecco (1992), docs. 123, 134, 155.
60. Arbitrage, with the aim of stabilising the exchange, was frequently organised by the Treasury and also concerned, marginally, other kinds of bond, such as railway bonds, and other markets, that is, Berlin and London. See Benini (1894), pp. 314–15, and 'Memoria' from C. Cantoni (the Treasury's general director) to L. Luzzatti, doc. 154, De Cecco (1992). Ferraris (1898), p. 163, describes various occasions on which variations in the Rendita quotations abroad determined arbitrage on the Rendita. He remarks that foreign markets, 'are more fearful and suspicious' than the domestic market. Ferraris (1899, 1901). See also the letters from G. Grillo to L. Luzzatti, 31 July 1891, doc. 155, from G. Grillo to R. Imelmann (of the Bleichroder house), 22 May 1891, doc. 153 and several letters from G. Grillo to F. Fournier. The letter dated 21 November 1891 is published as doc. 159 in De Cecco (1992).

Flora (1896, p. 7ff.) describes various situations that occurred during the three-year period 1892-95.

61. Fratianni and Spinelli (1991), p. 234. Rendita arbitrage was still, according to some, a big problem for the exchange. See letter from O. Joel to B. Stringher, Milan, 12 February 1904 - 'I buy Rendita, worried about the large margin allowed by yesterday's Rendita quotations to arbitrageurs to buy in Paris and sell in Italy, with the danger of strong demand for foreign exchange' - in De Cecco (1992), doc. 188, p. 903 ff.; or the letter from G. Castelbolognesi (vice president of Credito Italiano) to B. Stringher, Milan, 20 February 1904, where, in relation to the feared lira depreciation, the former suggested that 'instead of selling exchange, it would be better to buy Rendita in Paris and sell it in Italy'. *Ibid.*, doc. 193, p. 916.
62. Fenoaltea (1988, p. 622) raises strong doubts about the level and time path of the Italian capital import series.
63. De Cecco (1990), p. 52; Fratianni and Spinelli (1991), p. 236.
64. Fenoaltea (1988) p. 624 ff.; Dick and Floyd (1992), ch. 3.
65. Following Fenoaltea (1988), p. 629.
66. A conventional demand for money, the logarithm of which is linear in the logarithm of real income and interest rate, is assumed. Monetary equilibrium is

$$p_t = m_t + k i_{RRt} - g y_t \quad (1.6)$$

where  $m_t$  is the natural log of the money stock,  $y_t$  the natural log of national income,  $g$  the money demand elasticity with respect to income,  $k$  the semi-elasticity of money demand with respect to the interest rate, and  $p_t$  the domestic price level. Purchasing power parity holds in the long run and influences people's expectations:

$$s_t^e = p_t - p_t^* \quad (1.7)$$

where  $p_t^*$  is the level of foreign prices.

$$s_t - s_t^e = i_{RPt}^* - i_{RRt} + \alpha(i_{RRt} - i_{CLt}^*) \quad (1.8)$$

From Equations 1.6-1.8 the following reduced form is derived:

$$s_t = m_t - g y_t + i_{RPt}^* - (1 - \alpha - k) i_{RRt} - \alpha i_{CLt}^* - p_t^* \quad (1.9)$$

Monetary equilibrium is expected to hold for the rest of the world as well, but the equilibrium condition is omitted because of the small country assumption.

67. It can also be considered a wealth effect index.
68. Fenoaltea (1988), pp. 607, 627.
69. The plots of the residuals for the different VAR orders nevertheless point to some problems during the first decade of the sample, where residuals are much bigger. This will turn out to be a rather important problem as far as stability is concerned. The reference for all these points is Lutkepöhl (1993). The coefficients of the assumed VAR process have been estimated from time series. The consequences of using such estimation for economic

analysis have been investigated, although the major interest of the VAR procedure is limited, in my opinion, to the properties of the data.

70. It is quite clear that the sample period is not very long as far as time series analysis is concerned. Nonetheless the availability of a large sample is not only an issue of 'quantity of observations'. It also requires numerous observations over a long period of time, with no structural break. Such conditions are difficult to obtain in economics and are rather satisfactorily fulfilled by the present data. See Bodo *et al.* (1990), p. 427.
71. Intuitively, if the theory is correct, it should be expected that the specific set of variables suggested by the theory would be related to each other and would not drift increasingly further apart over time. Only in such a case can one assume that there is a tendency for some linear relationships to hold between them. See Cuthbertson *et al.* (1992).
72. Engle and Granger (1987) have demonstrated that once OLS has been used to estimate the cointegrating vector, then the other parameters of the ECM can be consistently estimated by imposing the first-stage estimates of the cointegrating vector in a second-stage regression. This is done simply by including the residuals from the first-stage regression in a general ECM. They have also demonstrated that the OLS standard errors obtained at the second stage are consistent estimates of the true standard errors. See Cuthbertson *et al.* (1992), p. 135.
73. Computed in Ciocca and Ulizzi (1990), table 2.
74. Computed in De Mattia (1990), table 50.
75. Computed in *ibid.*, table 50.
76. Computed in ISTAT (1957), table 46.
77. *Ibid.*, table 41.
78. From Ciocca and Ulizzi (1990), table 3.
79. *Ibid.*
80. Fenoaltea (1988), pp. 624-6.
81. The basic idea is that Italian capital imports took place when foreign economies were booming, and that this also dragged Italian exports. It does not necessarily imply that the Italian trade balance was in surplus, since Italian imports also grew very rapidly as income increased. The sign of the coefficient for export quantities seems to fit less well if causality is reversed. In such a case, one would expect the usual positive relation between exported quantities and the exchange.
82. S. Sonnino was treasury minister from 1893 to 1896, while Luzzatti was in charge of the same ministry in 1891-2, 1896-8, 1903-5 and 1906. He was subsequently prime minister from 1910-11.
83. See Fratianni and Spinelli (1984), p. 431. In the same vein, Bloomfield (1968, p. 32) considered that the exchange rate of the lira was fixed from 1900 onwards.
84. In addition to the evidence provided by Yeager (1969).
85. Source: Gille (1968), ISTAT (various years)
86. ISTAT (1957).
87. Fenoaltea (1988), p. 623.

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## 2

The Gold Standard in Portugal,  
1854-91

Jaime Reis

## Introduction

In 1854 Portugal became the first country in Europe after Britain to adopt the gold standard.<sup>1</sup> As it remained attached to this monetary regime without interruption until 1891, it can also claim to have had one of the longest continuous experiences of this kind. Its 37 years of adherence to gold monometallism exceeded the duration of the 'classical' gold standard (from 1880 to 1914), and only a handful of the more developed nineteenth-century economies functioned for longer time spans under this arrangement.

Portugal's monetary history during this period commands our attention for several other reasons. To begin with, although a poor country and an international debtor, its monetary system conformed to the principles of the gold standard in their fullest sense: With the largest part of the country's gold in the hands of the public and gold coin representing by far the most important component of the money supply, this was hardly the 'limping' version of the gold standard to which many countries resorted during these years (Bloomfield, 1959). Secondly, in spite of its status as small and peripheral, with an export specialisation in primary products and a considerable degree of openness to outside economic influences, the Portuguese economy does not appear to have suffered the severe fluctuations that are considered to have been the bane of countries operating under this regime. Finally, the advent of inconvertibility in 1891 and its persistence thereafter (except for a brief, four-month spell back on gold in 1931) may seem remarkable after such a long and successful experience. This is especially so because many other countries were moving in the opposite direction

# Monetary Standards in the Periphery

Paper, Silver and Gold, 1854–1933

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