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THE GOLD STANDARD AND THE GREAT DEPRESSION IN ITALY

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ABSTRACT

Italy was in the Gold Standard between December 1927 and its de facto exit in December 1934. Furthermore from the late 1929 it was affected by an economic crisis comparable to those of other European countries, from which it started to recover significantly only in 1935.

Hence, it would seem that as long as its currency was pegged to gold, the country was not able to recuperate from the Depression.

In this study, the credibility of the commitment to the gold peg in the eyes of the international financial markets and the consequences of the crisis and thus also of the exchange rate policy in the industrial labour market have been investigated, also in the attempt to highlight the implications of the country's dictatorial political regime.

It has been found that international financial markets anticipated a devaluation of the Italian currency from the autumn 1929. These estimated expectations seem consistent with the evidence gathered from documents of the time (both from archival sources and from the financial press). However these opinions do not appear to have been based on the usually considered macroeconomic variables. It has been argued that it may have been the dictatorial nature of the political regime to induce this markets' behaviour.

Moreover despite the fact that during the Depression real labour costs do not seem to have increased beyond productivity in the industries more sheltered from international competition, further substantial reductions in nominal wages both in these industries and in those more exposed to international competition appear to have been needed to keep labour demand at its pre-crisis peak.

It has been argued that the Fascist government may have refrained from using more its powers to cut wages at least partly because the industries it was more interested in were less affected by problems of rising real labour costs and because it could have been worried that further decreases in factory workers' living standards could have generated social instability.

Both the evidence on financial markets' expectations on the Italian lira-gold parity and that on the industrial labour market support the assertion that an earlier currency devaluation, accompanied by expansionary polices, could have been beneficial.

I hereby declare that the work presented in this thesis is entirely my own

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INTRODUCTION

After World War I, the belief that a reintroduction of the Gold Standard was needed for a return to the stability and prosperity of the pre-war years (1870-1913) was very widespread (see, for example, Eichengreen, 1992b). Most countries therefore implemented policies needed to facilitate the repegging of their currencies to gold, and by 1929 almost all developed market economies had achieved this objective.

Thus when the world crisis begun, at the end of 1929, the policy choices open to these governments were constrained by the commitment to remain in this international monetary system. Furthermore the strength of this commitment differed across countries, depending, among other things, on: their previous experiences of inflation and currency depreciation; the costs of the policies undergone to re-enter the system; and the perceived effect that this commitment had on the country's international reputation.

In the last twenty five years a literature has developed on the relation between the Gold Standard and the world economic crisis, which includes, among the most influential contributions, Choudhri and Kochin (1980), Eichengreen (1984, 1992a, and 199b), Eichengreen and Sachs (1985), Hamilton (1988), Temin (1989), Bernanke and James (1991), and Bernanke (1995). These authors have argued that the constraints on national policies imposed by Gold Standard membership first prevented other countries from insulating themselves from the shock generated by the contractionary monetary policy implemented in the US in 1928, and then continued to make the unilateral adoption of expansionary policies impossible while the gold peg was maintained. The Gold Standard is therefore argued to have contributed not only to spreading the depression across countries, but also to prolonging and deepening it.

Italy was in the Gold Standard between December 1927 and its *de facto* exit in December 1934 (the official currency devaluation happened later in October 1936). The re-pegging of its currency to gold was the successful outcome of policies aimed at ending a period of inflation and currency depreciation and was considered by the Fascist dictatorship to be a means to improve the country's international reputation. Furthermore, Italy was in its turn affected by an economic crisis comparable to those of other European countries, from which it started to recover only in 1935, at the time of rearmament for the Ethiopian war (see, e.g., Toniolo, 1980). Hence, the Italian case would seem to be consistent with the argument put forward by the literature cited above that as long as a country was committed to remain in the Gold Standard it could not unilaterally implement expansionary policies.

In this study, the credibility of this commitment in the eyes of the international financial markets and the consequences of the crisis and thus also of the exchange rate policy for the labour market are investigated. In doing so we also highlight the implications of the country's dictatorial political regime.

In Chapter 1 the first of these two issues is considered. As is discussed more extensively there, the choice of the parities at which the various currencies re-entered the Gold Standard after World War I and its consequences have been object of much debate. The case of the Italian lira can be considered in this context as one of a parity which around the time of the pegging was considered too high, but that was nevertheless maintained for quite some time.

An analysis of the opinions and expectations of the international financial markets concerning the Italian lira-gold parity can supply evidence that is useful in assessing the difficulties experienced by the government in abiding by its commitment to remain in the Gold Standard, on the extent to which the constraints imposed by it on its policies were binding, and therefore also on the possible advantages of an earlier devaluation. Moreover, a study of the determinants of these expectations also provides information on the scope for the government to change them via its policies, as opposed to the role played in their formation by its dictatorial nature.

There could have been a number of ways in which the lack of democracy of the political regime may have influenced expectations formation. To begin with, a lower level of transparency in decision making could have made it harder for foreign observers to correctly weigh the relative importance of conflicting policy objectives. Furthermore, the censorship exerted by the Fascist regime could have increased the difficulties encountered by agents in international financial markets in assessing not only the reliability of published information (in particular of economic data supplied by official sources), but also the stability of the political regime itself. Finally, the less than complete autonomy of the central bank from the executive, in particular in discount rate setting, could have led financial markets to think that there was more scope for this rate to be manoeuvred so as to satisfy also other government's objectives, possibly conflicting with that of keeping the gold parity.

The financial markets expectations on the Italian lira-gold parity are estimated under the maintained assumption that the exchange rate regime can be interpreted as a target zone (at least during the period when also the British pound was pegged to gold, that is until September 1931); as highlighted in the next chapter a similar interpretation of the classical and inter-war Gold Standards is also employed by a number of other authors. The results are then compared with evidence obtained from documents of the time (both from an archive and from the international financial press).

In Chapter 2 the issue of whether Italian factory workers' nominal wages were flexible enough to fully react to the large price changes and demand reductions characterising the economic crisis is investigated. The possibility that nominal wages did not react enough to price falls during the Great Depression has been considered by many scholars as one of the possible mechanisms through which nominal shocks could have affected real variables. Among the recent contributions to this literature are a study which considers twenty-two countries

(Bernanke and Carey, 1996), one which concentrates on the US economy (Bordo, Erceg and Evans, 1997), and two on Italy (Mattesini and Quintieri, 1997, and Perri and Quadrini, 2002).

A similar focus is that of the literature that studies the role of insufficiently flexible nominal wages in explaining unemployment, of late using models with imperfect competition hypotheses for goods and labour markets. The analysis presented in Chapter 2 is also related to this literature. Furthermore it could contribute to understand the mechanisms that prevented a full adjustment of nominal wages to price falls in Italy.

For all countries this is an issue of interest and debate in both strands of the literature. Bernanke (1995), for example, has argued for the need to explain this phenomenon in the light of the fact that it would seem to imply irrational economic behaviour, because both employers and employees seem to have an incentive to renegotiate their contracts when facing unanticipated deflation.

When dealing with the labour market, the Italian government could use also policies that were not available to democratic ones. In particular, the Fascist executive could (and actually did on more than one occasion) cut all wages and salaries at once and by an amount specified by the executive itself. A priori it would seem that this facility could have been used to eliminate possible sources of insufficient nominal wage flexibility such as coordination failures (mentioned for example by Eichengreen, 1992b), or institutional arrangements similar to those represented by Taylor's (1980) overlapping contracts (and used to model nominal wage sluggishness during the Depression in the US by Bordo et al., 1997). It is part of the object of the analysis presented in Chapter 2 to understand which were the constraints limiting not only the possibility of making use of these powers, but also the labour market policies of the Italian government more generally.

Furthermore, an assessment of the degree to which nominal wages failed to keep pace with price and demand reductions and of the effects of these inflexibilities on labour demand could contribute to understanding the possible benefits which could have derived from an earlier abandonment of the gold peg and the reflationary policies which would have then been made feasible.

Finally, this study can be seen as contributing to the extant literature on the Italian labour market during the Great Depression, in particular by the incorporation of the assumption of imperfect competition in output markets into the labour demand model, and by the distinction between industrial sectors more exposed to and more sheltered from international competition. This last feature would seem interesting due not only to the very different patterns of output prices for the two sets of industries, but also to the fact that the relevance they had in the eyes of the government, and hence its policies towards them, were not the same.

Chapter 1
THE ITALIAN LIRA IN THE INTER-WAR GOLD STANDARD: WAS THE DECEMBER 1927 PARITY CREDIBLE?

1.1. Introduction

On 18 August 1926 Mussolini announced his determination to stabilise the lira and introduce gold exchange convertibility. The exchange rate of the Italian currency stood then at 148 with respect to the British pound. The target lira-gold parity was announced in May 1927 to be 90 lira to the pound.

A set of policies was implemented to achieve this objective, including the agreements on the repayment of war debts with United States and United Kingdom, the restriction of the right to issue legal tender to the Bank of Italy only, strict monetary and fiscal policies, the forced consolidation of the short term public debt and cuts by authority to all wages and prices.

The markets reacted by generating a strong nominal appreciation of the lira: the lira/UK pound exchange rate appreciated to 108 at the end of December 1926; it was still 107 at the end of March 1927, but then, after the stabilisation target had been declared, at the end of May, the lira appreciated further, reaching a low of 84 at the end of June 1927; from then on it stayed around 89 until just before 21 December 1927 (see Einzig, 1937, Appendix I).

In this date the Italian currency was officially pegged to gold, at a parity of 92.46 lira to the UK pound.

However the general opinion expressed at the time was that such a parity would have been unsustainable. Among the others, it was manifested by Bank of England and New York Federal Reserve Bank officers (see, respectively, De Cecco, 1993, p. 67, and doc. 21 therein), the Morgan's Bank (see doc. 148 in De Cecco, 1993). Furthermore it was widespread among the financial communities in London and New York (see, for example, the reports by the Bank of Italy's delegates there, respectively in doc. 17 in De Cecco, 1993, and Bank of Italy's Historical Archive,[1] Carte Stringher, cart. 23, 402/3/01), and manifested also by the Italian business community.

Nevertheless it was only in December 1934 that the lira convertibility was *de facto* ended (when the monopoly in foreign exchange transactions was granted to a public law institution, the Italian National Institute of Foreign Exchange). Then, in July 1935, the 40 per cent backing of Bank of Italy's sight liabilities with gold and gold exchange reserves requirement was suspended. Finally, the Italian currency was devalued *de jure* on 5 October 1936.

A contradiction between the opinions held by influential institutions and economic agents on the chosen lira-gold parity at the time of its setting, on the one hand, and the actual capability

[1] Henceforth ASBI.

of the Fascist regime to defend this parity beyond the devaluations of the UK and US currencies, on the other, seems to have been there.

In this chapter, the effects of the chosen Italian lira-gold parity not only on the exchange rate stability, but also on financial markets' agents' expectations on its sustainability are studied.

The issue of the appropriateness of the gold parities at which the various currencies re-entered the Gold Standard after World War I was not only crucial at the time, but also object of a number of studies afterwards. Lively debates have developed on whether the British return to the pre-war gold parity caused an overvaluation of the currency, and whether the French inter-war parity was lower than prices would have allowed (see, for example, Keynes, 1925 and 1926, Wolfe, 1951, Sayers, 1970, Eichengreen, 1982, Sicsic, 1992, Redmond, 1984, and Matthews, 1986 and 1989). The effects of the likely misalignment of these two currencies manifested themselves, for example, in the gold movements from the United Kingdom to France, which caused the famous contrasts between the two central banks' Governors, Montagu Norman and Emile Moreau (see, for example, Sayers, 1976, and Eichengreen, 1992b).

The case of Italian lira studied here can therefore be considered in this context of controversial choices of the appropriate parities as one where prima facie the set parity seems to have been too high, but it was maintained until a quite late date.

In Section 1.2 a technical summary of how Italy's gold exchange standard actually worked, based also on some new estimates of gold points, is presented to verify the hypothesis that it was a target zone. In Section 1.3, the credibility of the Italian lira-gold parity in the eyes of the financial markets' agents is assessed, by comparing the expected change in the parity, estimated in a target zone framework, with the evidence contained in archive documents written at the time. In Section 1.4, an analysis of the determinants of devaluation expectations is conducted, based on models of balance of payments and exchange rate determination. Section 1.5 concludes the chapter.

1.2. Was the Italian Lira Exchange Rate Regime a Target Zone?

Recent studies have interpreted the classical and the inter-war Gold Standards as target zones, that is as exchange rate regimes where each exchange rate could fluctuate only within a band. The target zone model has been initially proposed by Krugman (1988) to describe exchange rate regimes such as the ERM of the EMS, where the band is determined by the member countries and is constant over time.[2] In both the classical and the inter-war Gold Standards, the band was the spread between gold import and export points and therefore varied

[2] However, references to target zones had already been made by Keynes (1930). For a description of a base line target zone model, see also Krugman (1991) and Miller and Weller (1991). The explicit reference to the ERM does not appear in Krugman (1988), but it does appear for example in Miller and Weller (1991).

with time. Furthermore, the gold parity was not necessarily equal to the mean of the gold import and export points. Recent studies where the classical or inter-war Gold Standard have been interpreted as a target zone are Flood, Rose and Mathieson (1991), Giovannini (1993), Hallwood, MacDonald and Marsh (1996, 1997) and Bordo and MacDonald (1997).

In particular, Hallwood, MacDonald and Marsh (1996, 1997) have studied various exchange rates (but not those of the Italian lira) during both the classical and inter-war Gold Standard, to assess whether the gold parities were credible or changes were expected and what were the determinants of these expected changes. They have employed the method proposed by Bertola and Svensson (1993) to estimate the time-varying expectations of gold parity changes. This method is that used also in this chapter, and briefly described in the following Section.

From Section 1.1 it would seem that the Italian lira was in a gold exchange standard and hence in a target zone regime, from December 1927 to December 1934.

To check that this hypothesis actually held, it is necessary to obtain at least some estimates of the market determined gold points, with respect to as many currencies as possible, and then to measure the size of gold point violations.

The gold points are the exchange rates beyond which it becomes profitable to buy gold in one country and transport it to the other for sale. The gold transfer can happen as a substitute for, or as a complement to, a foreign exchange transaction. The gold points are determined by the costs involved in the gold transfer (and in the possible foreign exchange transaction in the opposite direction).[3]

Furthermore, they are affected by the existence of limits to capital movements and to the possibility of obtaining gold rather than foreign currencies convertible into gold in exchange for the domestic currency. Both these types of restrictions increase gold export costs. If limits to capital export exist, agents wishing to exploit the profit opportunities from gold export may be unable to do so legally. In this situation, gold export costs include the costs that need to be incurred in getting round the law and so they are higher than under free capital movement. If a central bank restricts the agents' possibilities of obtaining gold, rather than foreign currencies convertible into gold, in exchange for the domestic currency, an agent wishing to exploit the profit opportunities of gold export may have to go to the central bank issuing the foreign currency to exchange it for gold before being able to transfer the gold into the final destination country for sale to its central bank. The additional transactions involved raise total gold export costs.

Official Bank of Italy's documents stated that the convertibility of the Italian lira would have been limited to foreign currencies only (Storaci, 1989, p. 283).

[3] For a detailed analysis of the costs involved in the gold transfers and on how the gold points should be calculated, see Officer (1996).

Furthermore, until March 1930, the convertibility of the lira into foreign currencies was further limited by restrictions on foreign exchange transactions introduced before the gold peg.

These restrictions on convertibility imply that, throughout the entire period when the lira was pegged to gold, the gold export points were at a greater distance from the parities than they would have been had convertibility been full. The additional costs are difficult to estimate, but it would seem sensible to argue that they decreased after the restoration of full capital mobility in March 1930 and that they may have progressively increased again after September 1931, when the authorities tried to make it more difficult to buy foreign currencies via guidelines to the banks. During the entire period when the lira was in the gold exchange standard, gold exports needed to involve three countries. In addition, before March 1930 and maybe also after September 1931, gold export costs included also the costs of getting round the law restricting the availability of foreign currencies.

On the basis of the data on costs of gold transfers to and from Italy found in ASBI documents and of interest rates, estimates of gold points for the lira exchange rates with respect to US dollar, UK pound and French franc have been calculated (as it is reported in detail in Appendix A.1).

None of these estimates take into account the additional costs arising because of convertibility restrictions, so the estimated gold export points should be considered as lower bounds for the actual values.

The estimates of gold points for the lira/dollar exchange rate (whose parity was 19 lira to one dollar) have been calculated on the basis of data on the costs of gold transfers between Italy and New York in the early 1928 and in late 1932 or early 1933, found in ASBI documents (in particular, in ASBI, Introna Ispettore, pratt., n. 3, fasc. 1 and ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8). The gold import point estimates lie in the range [18.888; 18.918], while the gold export point estimates lie in the range [19.083; 19.114].

The lira/pound gold points have been estimated at 92.17 and 92.75 lira to the pound on the basis of only one document, written in September 1928 (ASBI, Rapporti con l'Estero, cpl., n. 143).

A series of documents (found in ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8), written during 1933 and containing the elements of cost relative to gold transfers between Paris and Rome, has allowed the calculation of gold import and export point estimates for the lira/French franc lying respectively in the ranges [72.870; 74.321] and [74.560; 76.004] (the central parity being equal to 74.44 lira to 100 French francs).

These gold point estimates have been compared with end-of-month data on spot, one-month-ahead and three-month-ahead forward exchange rates (obtained from Einzig, 1937, Appendix I).

For all three exchange rates, gold points estimates were at most violated by small percentages (below one) in the period January 1928-August 1931. However, after the pound abandoned the gold peg the lira was very often substantially weaker than the estimated export points with respect to the dollar and the French franc.

Therefore, it would seem possible to argue that before September 1931 the violations of the gold points do not impair the interpretation of the lira exchange rate regime as a target zone. All the more so in the light of the observation that very small extra costs of gold export due to the convertibility restrictions would be enough for the conclusion that no violation of the export points occurred to be warranted.

However, the target zone hypothesis does not seem to have held after September 1931.

Hence, the period December 1927-August 1931 is that on which the analysis of the credibility of the lira-gold parity in the framework of a target zone is conducted.

The hypothesis that the lira exchange rate regime changed after September 1931 is consistent with the characterisation of it given by the Governor of the Bank of Italy in his report to the Bank's shareholders in 1932, where he wrote that since the sterling devaluation the lira was on a "tempered Gold Standard" and "the period of effective application of the gold exchange standard" was to be considered "closed" (see Banca d'Italia, *Adunanza generale degli azionisti*, Rome, March 1933, pp. 37-38, and the references to it in Cotula and Spaventa, 1993, p. 187, and in Raitano, 1995, note 144, p. 318).

It is also consistent with De Cecco's (1993) description of how Italian authorities reacted to the pound crisis. In particular, he has written that "Italian authorities tried [...] to protect their reserves by widening the lira fluctuation band against the dollar well beyond the gold points [...]. Many contemporary sources gave testimony about such a policy" (p. 101).

Furthermore, the hypothesis that the international inter-war Gold Standard was modified by the pound crisis has been made by Hallwood et al. (1996). They have argued that "the pound-dollar exchange rate was still dominant in the interwar period" and therefore have restricted their analysis of the credibility of the inter-war Gold Standard to the period May 1925-August 1931, even for the dollar exchange rates with currencies that remained pegged to gold for longer, such as the French franc.

The hypothesis of a change in the international exchange rate regime, after the sterling crisis of September 1931, can be rationalised by observing that for each country, the costs and benefits of being inside or outside an exchange rate regime depend on the number and the importance of the other member countries. In September 1931, not only was the pound no longer pegged against gold, so that the target zone regime of the pound/dollar rate, the most important exchange rate in the system, came to an end, but twenty-five currencies (including those of Empire countries, but also Scandinavia, Eastern Europe and Latin America) followed the pound in leaving gold. Hence, it would seem reasonable to argue not only that the countries

remaining in the Gold Standard experienced an increase in the economic costs of sticking to the gold parity (e.g. because of the negative effect of the other currencies' depreciations on their external trade balance), but also that the political costs of suspending the convertibility simultaneously decreased.[4]

1.3. Assessing the Credibility of the Lira-Gold Parity

1.3.1. The Method

The credibility of the Italian lira-gold parity between 21 December 1927 and 20 September 1931 is assessed by studying whether agents in the financial markets expected the implied parities of the Italian currency with respect to the US dollar, the UK pound and the French franc to change in the following one month and three months. Agents' expected changes in these implied parities are estimated via the Bertola and Svensson's (1993) 'drift-adjustment' method which is as follows.

Let s_t be the natural logarithm of the current spot exchange rate and c_t the natural logarithm of the central parity, then x_t, defined as

(1.1) $$x_t := s_t - c_t,$$

is the proportionate deviation of the exchange rate from c_t (x_t is commonly referred to as the exchange rate within the band). The rationally expected total change in the exchange rate ($E_t[\Delta s_t]/\Delta t$) can therefore be decomposed into the expected fluctuation within the band ($E_t[\Delta x_t]/\Delta t$) and the expected change in the central parity, or expected realignment ($E_t[\Delta c_t]/\Delta t$):

(1.2) $$E_t[\Delta s_t]/\Delta t = E_t[\Delta x_t]/\Delta t + E_t[\Delta c_t]/\Delta t,$$

where E_t indicates the expectation conditional on the information available at time t. Therefore, the expected realignment can be calculated by subtracting an estimate of the expected fluctuation within the band from the total expected change in the spot rate.

This method has been applied to investigate the credibility of recent target zones, in particular by Rose and Svensson (1991), Lindberg, Svensson and Söderlind (1991), Svensson (1993), Giovannini (1993) and Caramazza (1993); but also that of the classical and inter-war Gold Standards, in particular by Giovannini (1993), Hallwood et al. (1996, 1997, 2000a, 2000b) and, in a variant, by Hsieh and Romer (2001).

Under the assumption of uncovered interest parity, $E_t[\Delta s_t]/\Delta t$ is equal to the differential between the domestic and the foreign interest rate on similar assets, maturing at $t+\Delta t$.

[4] Similar arguments have been put forward to explain currency crises, in particular by Obstfeld (1994, 1996).

Furthermore, the forward exchange premium over the interval Δt can also be used as a measure of $E_t[\Delta s_t]/\Delta t$, even when there is risk aversion and the covered interest parity holds, but the uncovered interest parity does not.

The credibility of the Italian lira-gold parity is tested here using forward exchange premia to measure $E_t[\Delta s_t]/\Delta t$, because of the lack of data on suitable Italian short term interest rates.

In Bertola and Svensson's (1993) target zone model, $E_t[\Delta x_t]/\Delta t$ can be estimated by the fitted values of the following regression:

$$(1.3) \qquad (x_{t+\Delta t} - x_t)/\Delta t = \alpha_0 + \alpha_1 x_t + u_{t+\Delta t}.$$

However, more general specifications have also been considered in tests of the credibility of recent target zones.

In this chapter, the following equation for $E_t[\Delta x_t]/\Delta t$ is used:

$$(1.4) \qquad (x_{t+\Delta t,i} - x_{t,i})/\Delta t = \alpha_{0,i} + \alpha_{1,i} x_{t,i} + \alpha_{2,i} f_{t,\Delta t,i} + \alpha_{3,i} s_{t,j} + \alpha_{4,i} s_{t,k} + u_{t+\Delta t,i}$$

where i, j and k indicate the three lira exchange rates, and $f_{t,\Delta t,i}$ is the forward exchange premium at t, for the period ending at $(t+\Delta t)$, and the exchange rate i. The forward exchange premium is used as a measure of interest rate differential. The inclusion of other contemporaneous exchange rates is tried to account for an interpretation of the inter-war Gold Standard as a multilateral, rather than bilateral, system. The multilateral interpretation is consistent with the evidence that the September 1931 crisis also negatively affected the currencies that remained pegged to gold. Two systems of seemingly unrelated regressions (SUR), one for each forecasting horizon, are specified and estimated by FIML. This estimation method is more efficient than OLS regressions equation by equation, because it makes use also of the information contained in the high cross-correlations among the residuals of the three equations for each forecasting horizon.

Devaluation expectations are then calculated by subtracting from the estimate of $E_t[\Delta s_t]/\Delta t$ given by the forward premium the estimate of $E_t[\Delta x_t]/\Delta t$ obtained from the SUR models. The resulting measure can be interpreted as the product of the average frequency of devaluation (i.e. the ratio of the probability that a devaluation will occur within the forecasting horizon to the length of this forecasting horizon) and the expected devaluation size conditional on a devaluation occurring. A confidence interval for devaluation expectations can then be obtained by subtracting from the estimate of $E_t[\Delta s_t]/\Delta t$ a confidence interval on the estimate of $E_t[\Delta x_t]/\Delta t$. A change in the gold parity can be said to be expected with x% confidence if this x% confidence interval does not contain zero.

The width of the confidence interval depends on an estimate of the standard deviation of the error term in the equation for $E_t[\Delta x_t]/\Delta t$. If the residuals of this equation are homoskedastic, then the standard error of the regression can be used to calculate the confidence interval. However, if these residuals are heteroskedastic, a time-varying measure of their standard

deviation is needed. In this study, the hypothesis that the residuals are ARCH is tested, and where it cannot be rejected, an estimate of the time-varying standard deviation based on the ARCH model for the residual variance is used to calculate the confidence interval.

1.3.2. The Estimation Results

The data on spot and forward exchange rates are end-of-month quotations for the period January 1928-August 1931, based on Einzig (1937, Appendix I). The same source has been used by Hallwood et al. (1996, 1997). Moreover, the data later reported by Einzig had already been used by Demaria (1928), in his seminal study on the Italian lira forward exchange premia between 1921 and 1928.

As already indicated, $E_t[\Delta s_t]/\Delta t$ is measured by the forward exchange premium, with Δt equal to one month or three months.

The estimation results relative to equation (1.4) for the three exchange rates and the two forecasting horizons are presented in Table 1.1.

It can be seen that, on the one-month-ahead horizon, the only regressor that appears as statistically significant, or near to statistical significance, is x_t, for all three exchange rates. On the three-month-ahead horizon also some of the additional regressors become statistically significant. A Wald test of the null hypothesis that all the coefficients of the additional regressors included in equation (1.4) with respect to (1.3) are zero in all three equations is rejected on the longer but not on the shorter horizon.

For all three exchange rates and for both forecasting horizons, the series of the point estimates of $E_t[\Delta c_t]/\Delta t$ is calculated by subtracting from the forward exchange premium the point estimate of $E_t[\Delta x_t]/\Delta t$ obtained with the SUR systems.

For each exchange rate, at the one-month-ahead horizon, a 95% confidence interval for the estimated $E_t[\Delta c_t]/\Delta t$ is determined using the standard error of the relevant SUR equation and the 5% critical value of a N(0,1) distribution. For each exchange rate, at the three-month-ahead horizon, an ARCH model for the variance of the error term is estimated and the 95% confidence interval calculated using the resulting estimate of the time-varying standard deviation of the error term and the 5% critical value of a N(0,1) distribution. Table 1.2 presents the estimated ARCH models.

Figures 1.1 to 1.3 present the point estimates and the 95% confidence intervals for $E_t[\Delta c_t]/\Delta t$ for each of the three exchange rates on the three-month-ahead horizon. They consistently indicate that the financial markets were confident that the lira-gold parity would have been maintained only for the first few months after December 1927; that they started to doubt the sustainability of the parity from the late spring of 1928; and that they consistently expected a devaluation of the Italian currency in the following three months from late 1929. However, the

expected change in the parity in the following month almost never became significantly different from zero.

The presence of a target zone seems to have exerted a substantial stabilising effect on expectations in the first few months of the lira gold peg, while later this effect became smaller and eventually negligible or even destabilising from late 1929. Furthermore, the larger size of the forward exchange premium at the longer horizon made the target zone effect on expectations more important in determining the expected change in the parity on the shorter horizon.

The result of significantly positive expectations of a lira devaluation in the following three months from late 1929 depends on higher forward premia and less stabilising or even destabilising effects on expectations arising from the target zone.

In the next Section, the consistency of these results with the documentary evidence is discussed.

1.3.3. Are the Estimation Results Consistent with the Documentary Evidence?

The econometric evidence that the very first months after the official gold peg in December 1927 were characterised by relative confidence in the lira-gold parity would appear to be consistent with the interpretation that the documentary and historiographic sources would support. Cotula and Spaventa (1993, p. 154), for example, have written that "[a]t the beginning, the lira [held] the new parity well". Furthermore, the Italian authorities considered their position strong enough to allow for three successive reductions by 0.5 per cent of the discount rate in the spring 1928.

The interpretation based on the estimation results that the situation began to worsen after maybe four or five months also seems to be consistent with other sources of historical evidence.

It would seem possible to argue that the lira's weakness may have been associated with a progressively strengthening awareness in the markets in the late spring 1928 that the French franc would have been soon pegged to gold at the *de facto* parity (see Sicsic, 1992, Mouré, 1991, pp. 4-5, Asselain and Plessis, 1995), as it actually happened on 25 June 1928.

The negative effect of the official gold pegging of the franc on the confidence in the lira was highlighted in the letter written by the Bank of Italy's Governor, Stringher, to Mussolini on 12 July 1928 (published as doc. 210 in De Cecco, 1993).

At the same time, a second event reduced the confidence in the Italian currency: on 9 July 1928, Mosconi became Finance Minister in place of Volpi. The *New York Herald Tribune* commented that Volpi had been dismissed because the Italian situation was disastrous: not only the gold parity was too high, but business failures and dishonoured bills were rapidly increasing, so that a deepening of the political crisis was possible.

The weakening of lira's quotations led to violations of the gold export point of 19.10 lira to the dollar set by the government in February 1928,[5] a circumstance that fuelled expectations that the lira-gold parity would have been abandoned (see, in particular, ASBI, Rapporti con l'Estero, cpl., n. 143 and 144; ASBI, Direttorio Stringher, cart. 27, fasc. 2; ASBI, Segreteria Particolare, pratt., n. 1, fasc. 2; doc. 211, 212 and 215 in De Cecco, 1993).

At the same time, reserves were decreasing. Foreign currency reserves began to decrease as early as in March 1928, but gold reserve increases were more than compensatory, so that total reserves began to decrease only three months later. The decline continued until the end of April 1929.

The low confidence in the lira's prospects persisted: in autumn 1928 Italian agents were reported buying in advance the foreign currencies they expected to need, because they feared that the trade balance deficit would have forced a lira devaluation (see ASBI, Rapporti con l'Estero, pratt., n. 20, fasc. 5).

The beginning of 1929 did not bring any respite to the Italian authorities. The reserve losses continued to be of great concern, not only in the eyes of the Bank of Italy and the Italian government, but also in those of the Bank of England (see ASBI, Rapporti con l'Estero, cpl., n. 144). Stringher even tried (unsuccessfully) to negotiate a new loan (after the stabilisation one's expiration) with Morgan's Bank in April 1929 (see doc. 154, 155 and 156 in De Cecco, 1993).

The estimation results presented in the previous Section consistently indicate that the confidence in the lira experienced a sudden decline from autumn 1929. Despite the fact that such a pattern would seem to be not so clearly identifiable in the documentary and historiographic sources, these latter sources continue to supply evidence of a low confidence in the lira-gold peg after autumn 1929.

In the late 1929 documents, rumours that a speculative attack was to be launched on the lira and that the lira would have been devalued were reported. Among such documents, Mussolini's letter to Stringher on 13 November 1929 can be mentioned. The dictator suggested that the rumours' resurfacing could have been due to the tensions between Italy and France at the preliminary negotiations for the London Conference on the reduction of naval weaponry (see doc. 135 in Cotula and Spaventa, 1993). The Italian authorities officially denied any plan to devalue the currency, but the rumours did not disappear.

In the British and US financial press the possibility of a different source of such rumours was suggested: the difficulties experienced by the Italian financial, industrial and business communities because of the long lasting deflation and credit restrictions (see ASBI, Direttorio-Introna, cart. 23, fasc. 1).

[5] The administratively set boundaries to the lira/dollar exchange rate fluctuations are not to be confused with the market determined gold points, which depended on gold transfer costs. However, the above mentioned estimates of lira/dollar gold points contain the administratively set ones, 18.90 and 19.10.

The existence of a number of other documents suggesting the external origin of the low confidence in the lira (see ASBI, Rapporti con l'Estero, pratt., n. 26, fasc. 1) would seem to indicate that the domestic and the external problems may have been compounding their effects.

The Italian authorities seemed to be confident in their ability to defend the lira-gold parity when, on 12 March 1930, they abrogated the controls on foreign exchange transactions. This liberalisation was applauded by the international press (see ASBI, Direttorio Introna, cart. 23, fasc. 1). However, more negative comments on the Italian situation were to follow soon (see ASBI, Rapporti con l'Estero, pratt., n. 26, fasc. 1 and n. 66, fasc. 1). In particular, rumours that the Italian financial situation was so precarious to require a large external loan, and on the attendant secret negotiations taking place, continued to be reported in the foreign press throughout the late 1930, despite repeated official denials by the Italian authorities (see, for example, ASBI, Rapporti con l'Estero, pratt., n. 66, fasc. 1).

The only positive comments came after general cuts in wages and salaries in both the private and public sectors were decided in late November and early December 1930 (see the letter of the Bank of Italy's delegate in London to Stringher, on 29 November 1930, in ASBI, Rapporti con l'Estero, cpl., n. 145).

1931 began with the publication of Moody's *Yearbook*, where doubts on the stability of the Fascist regime were expressed (see ASBI, Rapporti con l'Estero, pratt., n. 26, fasc. 3). Rumours on negotiations for a loan from France continued to be reported in the press, together with the official denials by the Italian authorities (see various documents in ASBI, Rapporti con l'Estero, pratt., n. 26, fasc. 3 and in ASBI, Segreteria Particolare, pratt., n. 69, fasc. 2). Often, these rumours connected the alleged pattern of negotiations for the loan with that of the tensions between Italy and France on naval weaponry.

It would thus seem possible to argue that the documents suggest that there were reasons for a less than complete confidence in the lira-gold parity since (approximately) the official gold peg of the French franc in late June 1928.

However, a rationalisation of the econometric evidence that markets' confidence in the lira fell in autumn 1929 could also be made by noting that an event such as the Wall Street crash, in addition to worsening confidence in the entire Gold Standard system in general, was also likely to affect more strongly those currencies already perceived as weak. Furthermore, it can be argued that the economic crisis that affected also the Italian economy from late 1929 increased the costs of defending a parity that had always been considered too high and therefore also increased the uncertainty about the Fascist regime's willingness and capability of maintaining its commitment to it.

In this regard, some more general considerations can also be made on the likely role played by the peculiar nature of the Italian political regime and the institutional arrangements concerning the Bank of Italy in determining the low level of confidence of financial markets in

the lira-gold parity. First, the Fascist government's decision making was likely to be less transparent than those of democratic counterparts, a circumstance which could have made it harder for foreign observers to correctly weigh the relative importance of conflicting policy objectives. Second, the Bank of Italy was less independent from the government (notably, in setting the discount rate) than was the case for example for the Bank of England, an issue that had been considered at length during the negotiations leading up to the lira gold peg, in particular by Strong and Norman (see De Cecco, 1993, in particular pp. 64-83 of the "Introduction" and the various documents mentioned therein). Third, the data officially published by the Italian authorities were not always considered to be fully reliable. See, for example, the various occasions in which the delegate of the Bank of Italy in New York, Podestà, signalled that some US newspapers warned their readers that the information on Italy was not reliable enough to allow a sound judgement to be formed (see, for example, ASBI, Direttorio Introna, cart. 23, fasc. 1).

Hence, it may have been that, when in late 1929 the economic crisis began in Italy, agents in the financial markets, aware of the fact that the Fascist regime would have gone to any length to prevent news of difficulties surfacing at the very moment when problems increased and uncertain about whether the crisis was diminishing the importance of the commitment to defend the gold peg with respect to increasingly conflicting policy objectives, began to give greater credence to rumours of lira devaluation, disorders in some Italian cities, possible political instability, financial difficulties and consequent need for an external loan, and less importance to the official denials. The assumption that financial markets could be informed of the increasing economic difficulties in Italy, on which this argument relies, does not seem implausible given the evidence of detailed reports on the subject in the foreign press found in ASBI (see in particular the numerous and long quotations of such reports in the foreign press in the memoranda periodically sent to Rome by the delegates of the Bank of Italy abroad, in particular by those in London and in New York).

Moreover, the low degree of autonomy of the Bank of Italy may have contributed to lower agents' confidence in the lira during the economic crisis. Agents may have thought that in those hard circumstances the pressure from the government for violations of the so-called rules of the game would have been stronger, and the Bank of Italy did not have the independence needed to oppose such pressure.

These observations suggest that financial markets may have encountered peculiar difficulties in correctly interpreting the Italian situation. Hence they could give some insights into why discrepancies arose between markets expectations and actual outcomes, about not only the sustainability of the lira-gold parity, but also the stability of the Fascist regime: while articles suggesting that the difficulties of the Italian economic situation were so great as to justify the formulation of the expectation of an even violent political regime change appeared recurrently in the foreign press (see again the memoranda by the delegates of the Bank of Italy

in London and in New York, in ASBI), the Fascist regime was enjoying the years of its largest consensus (see De Felice, 1974).

It would seem interesting to contrast the discrepancy between expectations and the actual situation in the Italian lira case with that, in the opposite direction, during the last year of the gold peg of the British pound. In this case, the Bank of England was able to prevent a substantial decrease of financial markets' confidence in the currency until July 1931, while the Bank itself (together with the British Treasury, the New York Federal Reserve Bank and the Bank of France) had started being worried that a devaluation of the pound might become inevitable from the late 1930 (see Cairncross and Eichengreen, 1983, and Hallwood et al., 1997). It would seem that the reputation of the Bank of England itself had a major role in facilitating this outcome. In particular, the Bank of England was able to persuade markets that it would have not deviated from the so-called rules of the game (despite its record pointing to the contrary, see, e.g., the seminal study by Bloomfield, 1959) and to have them believe that the data on its balance sheet, published with the very purpose of misleading the markets, were instead a truthful representation of the situation (see Sayers, 1976, and Garrett, 1995)! Hence the Bank of England was able to concentrate agents' attention on gold movements, rather than on the pound quotations, by repeating its commitment to the Gold Standard rules, by preventing gold exports when the pound was weak through dollar sales, and by publishing data showing gold reserves generally just above what was considered as the minimum safe level (i.e. 150 million pounds, the value originally indicated by the Cunliffe Committee in 1918) even when they were much larger (see Moggridge, 1972, and Garrett, 1995).

Finally, another element that could have contributed in shaping agents expectations on the Italian lira after the autumn 1929 was the diplomatic tension with France on naval disarmament.

During the first seven years of the Fascist regime (1922-1929), there had been recurrent tensions between Italy and France, mainly due to the fact that Italy was knowingly creating difficulties to the French system of European hegemony, with the purpose of becoming indispensable to French security. However, the relations between the two countries had been relatively calm in the first two years of the lira gold peg. As already mentioned, the tension increased in the last months of 1929, during the negotiations preceding the London Conference on naval disarmament. The contrast was mainly due to the difficulties that the Italian position caused to the French desire of increasing its military power. The relations between the two countries remained difficult throughout the Conference (21 January-22 April 1930) and in the following months, until the one year moratorium on weapon production proposed by the Italian Foreign Affairs Minister, Grandi, was approved in September 1931 (for a detailed analysis of the Italian foreign policy in those years, see De Felice, 1974, Ch. IV).

It has been noted earlier that the rumours of Italy's financial difficulties and its consequent need for an external loan were often related to the state of its diplomatic relations with France.

Hence, it would seem that the existence of tensions between the two countries may have played a role in the weakening of the confidence in the lira.

1.4. Determinants of Devaluation Expectations

In this Section, we complement the earlier econometric and documentary analysis by estimating an econometric model for the determinants of devaluation expectations. We do this by regressing the devaluation expectations obtained earlier using the Bertola and Svensson's method on a set of possible explanatory variables, generally considered as relevant in standard models of balance of payments and exchange rate determination (see MacDonald, 1988).

Such an analysis has been suggested, amongst others, by Bertola and Svensson (1993), Rose and Svensson (1991) and Svensson (1993). Lindberg et al. (1991) have conducted it for the Swedish Krona; Caramazza (1993) for the French franc/Deutschmark in the ERM; and Chen and Giovannini (1993) have estimated the determinants of realignment expectations in the ERM together with the expectations themselves. Hallwood et al. (1996, 1997) have been the first to conduct a similar study for the classical and inter-war Gold Standards, but the set of currencies they have considered does not include the Italian lira.

In this chapter, the following benchmark model for the determinants of the Italian lira devaluation expectations is considered:

$$E_t[\Delta c_t]/\Delta t = \beta_0 + \beta_1 (r - r^*)_{t-1} + \beta_2 (\pi - \pi^*)_{t-1} + \beta_3 (m - m^*)_{t-1} + \beta_4 (ca - ca^*)_{t-1} + \beta_5 (y - y^*)_{t-1} + \beta_6 dm2911 + \varepsilon_t \quad (1.5)$$

where: r is the growth rate of central bank's reserves; π is the inflation rate; m is the growth rate of a monetary aggregate; ca is the logarithm of the exports over imports ratio (that is a measure of the increase in reserves due to the excess of exports over imports); y is the growth rate of an output measure; "*" indicates foreign variables; and dm2911 is a step-dummy variable, equal to zero until October 1929 and to one from November 1929 until the end of the sample. The one-period lag in the explanatory variables (apart from the dummy) is due to the fact that when forming their expectations on Δc in month t agents only had information on the explanatory variables up to month (t-1). The step dummy is included because there is evidence (confirmed by formal tests), that in November 1929 a once-and-for-all increase occurred in the mean of the estimated $E_t[\Delta c_t]/\Delta t$.

This model is deliberately very similar to those in Hallwood et al. (1996, 1997), so that any peculiarities of the Italian case can be highlighted.

Generalisations of the specification in equation (1.5) that could account for some peculiarities of the Italian situation that may have had a bearing on the financial markets' confidence in the lira-gold peg are also considered. In particular, the increasing immobilisation problems of the main Italian banks, due to worsening repayment prospects of their loans as the

depression hit Italian industry and the falling quotations of the shares of companies in the industrial and service sectors held in large quantities in their portfolios (see Toniolo, 1980, Ch. 5, and Toniolo, "Il profilo economico", in Guarino and Toniolo, 1993), have been considered. This illiquidity could have contributed to weaken the financial markets' confidence in the lira-gold peg because it could have put the Italian authorities in a quandary similar to that experienced by the US Federal Reserve System (see, among the others, Eichengreen, 1992b, and Hallwood et al., 1997): on the one hand, to avoid bank runs it could have become necessary to rescue the illiquid banks by granting them easy credit access and thus expanding money supply more than the Gold Standard constraint would have allowed; on the other hand, if the authorities were expected to prefer bank failures to excessive money growth, capital flight could have ensued that in its turn would have undermined the capability of the central bank to defend the currency.

The public seems to have had some knowledge of the existence of immobilisation problems in the mixed banks' balance sheets, even if not of their full extent, due to the swift and secret way in which the rescues were carried out by the Italian authorities (see Toniolo, 1980, Ch. 5). The Bank of Italy was able to continue to reduce banknote circulation despite the increased credit granted to the banks in difficulties, mainly because it decreased the credit to other banks (see Cotula and Spaventa, 1993).

To account for the banks' immobilisation problems, the rates of change of bankruptcies, protests and two stock market indices (a general one and one relative to banks' shares only) have also been considered as possible regressors in the equation for the determinants of devaluation expectations. Bankruptcies and protests have been included as measures of the difficulties experienced by the companies financed by the banks and hence as proxies for the decreasing probability of repayment of banks' loans. The general stock market index has been included as an indicator of the problems that banks experienced due to the decline in the values of their portfolios of shares; the banks' stock market index because banks' financial difficulties may have been compounded by decreasing quotations of their shares.

The fact that the Italian stock market quotations could not be considered as very representative of the actual values and prospects of the quoted companies would seem not to undermine the rationale behind the inclusion of the two stock market indices' growth rates: when the prices of their shares or of shares in their portfolios fell, the banks' balance sheets weakened, no matter how much stock market prices were representative of the prospects of industrial or service companies or of the banks' themselves.

Equation (1.5) is considered as the benchmark model of devaluation expectations for each of our three lira exchange rates and at both forecasting horizons. The three equations for each of the forecasting horizons are jointly estimated by seemingly unrelated regressions (SUR). The standard errors are calculated via White's (1980)

formula, hence they are consistent with respect to heteroskedasticity, but not autocorrelation. The sources and construction methods of the data set used in the estimations are described in Appendix A.2.

The estimation results are presented in Table 1.3.

The dummy variable appears as by far the most significant regressor in all six equations. Almost the only other significant regressor is the rate of change of reserves, for all the equations with the exception of that for the lira/dollar rate on the three-month-ahead horizon. In all the other five cases the estimated effect of a reserve growth larger in Italy than in the other country on the confidence in the lira-gold parity is positive (i.e. it decreases the expected devaluation of the lira, $E_t[\Delta c_t]/\Delta t$), consistent with what economic theory would suggest.

Figures 1.4 to 1.6 present the actual and fitted values for the three equations for the three-month-ahead horizon (the corresponding graphs for the one-month ahead horizon are very similar). They show that the break in the mean of the estimated $E_t[\Delta c_t]/\Delta t$ is well captured by the dummy variable. Furthermore, the endogenous variable pattern seems to be better approximated during the first part of the sample period, ending in late 1929, than afterwards. Therefore it would seem possible to argue that the role of macroeconomic variables in the expectations' formation is small in the entire sample period (the most significant regressor is in fact a dummy variable), and even more so from late 1929 onwards.

The case of the Italian lira would seem peculiar with respect to those studied by Hallwood et al. (1996, 1997), because a substantial and long lasting confidence loss would appear to have taken place from late 1929, that does not seem to be explained by the paths of the macroeconomic variables included as regressors in the estimated equations. However, agents in the financial markets seem to have continued to hold such expectations, despite no devaluation occurring.

These features appear different from those of the cases examined by Hallwood et al. (1996, 1997), where either there were expectations of devaluation based on macroeconomic variables and preceding an actual crisis (see the pound case), or expectations became significantly different from zero for few months and then reverted to be non significantly different from zero (see the French franc and reichsmark cases, for which, on the basis of the information contained in the 1996 paper, it is difficult to judge whether the emergence of brief periods of low confidence was explained by macroeconomic variables' paths).

Hence, the estimation results described so far would not seem to contradict the interpretation of the evidence of significant devaluation expectations given at the end of Section 1.3. In particular, they would seem to be consistent with the argument that agents did not trust the macroeconomic data published by the Italian authorities sufficiently to base on them their expectations on the lira-gold parity, particularly from the onset of the economic crisis.

As a test of the robustness of this conclusion, we estimate a generalisation of equation (1.5) including among the regressors also the four variables mentioned above (bankruptcies, protests,

and the two stock market indices) and intended as indicators of immobilisation problems in the banking sector:

(1.6)

$$E_t[\Delta c_t]/\Delta t = \beta_0 + \beta_1(r - r^*)_{t-1} + \beta_2(\pi - \pi^*)_{t-1} + \beta_3(m - m^*)_{t-1} + \beta_4(ca - ca^*)_{t-1} +$$
$$+ \beta_5(y - y^*)_{t-1} + \beta_6 bnkrpt_{t-1} + \beta_7 prtst_{t-1} + \beta_8 gensm_{t-1} + \beta_9 bnksm_{t-1} + \beta_{10} dm2911 + \varepsilon_t$$

where bnkrpt, prtst, gensm and bnksm are the rates of change in, respectively, bankruptcies, protests, the general and the banking sector nominal stock market indices.

The estimation results obtained for the SUR systems for the two forecasting horizons are presented in Table 1.4. The results for the three lira exchange rates appear more differentiated than those for equation (1.5), but the dummy variable remains the most important regressor in all six cases. For the lira/dollar exchange rate on the three-month-ahead horizon an additional regressor, the rate of change in the general stock market index, appears as significant and with the expected sign (a more rapid increase in the index strengthens the confidence in the lira, arguably via its positive effects on banks' balance sheets). For the lira/pound rate, not only the same index, but also the rate of change in protests appears as additional significant regressor with respect to equation (1.5). However, this second variable shows an unexpected sign (a more rapid increase in protests would appear to strengthen the confidence in the lira). Finally, only the dummy variable appears to have significantly affected the lira/French franc rates in these estimates. The standard errors of the regressions decrease for the lira/dollar rate on the three-month-ahead horizon, and for the lira/pound rate on both horizons.

Figures 1.7 to 1.9 present the actual and fitted values for the three-month-ahead horizon equations. As expected from the analysis of the estimated regressions, the fitted values pattern is nearer to that of the estimated $E_t[\Delta c_t]/\Delta t$ for the lira/dollar and lira/pound exchange rates, but not for the lira/French franc one. However, in both the lira/dollar and lira/French franc cases the fitted values seem to be more similar to the estimated $E_t[\Delta c_t]/\Delta t$ in the first sub-period, ending in October 1929, than afterwards. This evidence is therefore still consistent with the hypothesis that the Italian situation became more difficult to interpret for the financial markets after the onset of the economic crisis, when agents may have started to rely less than before on macroeconomic variables for their expectation formation.

Therefore, the analysis of the determinants of the estimated devaluation expectations would seem to support the assertion that the conviction that the lira-gold parity was unsustainable, held by the markets from late 1929 onwards, was mainly based on factors different from macroeconomic variables: these variables cannot explain the sudden increase in the mean of the estimated $E_t[\Delta c_t]/\Delta t$; furthermore, at least in two out of the three considered cases, they seem to be less capable to explain the pattern of estimated $E_t[\Delta c_t]/\Delta t$ in the second

sub-period. In this sense the analysis in this Section does not contradict the conclusions drawn at the end of Section 1.3.

This peculiarly small role of macroeconomic variables in determining expectations on the exchange rate may be related to a less than full reliance of agents in the financial markets on the data published by the Italian authorities. Hence, these agents had to use other types of information. The analysis of the contemporary documents presented in Section 1.3 would seem to suggest that they may have been driven by rumours of negotiations of a foreign loan (hinting at a financial situation more precarious than that described by the official data), diplomatic tensions (that, if leading to a military confrontation, may have forced the Fascist government to sacrifice the lira-gold peg), or political instability, disorders and even the possibility of a violent regime change (that could have implied the abandonment of the Fascist commitment to defend the lira-gold peg). All these factors may have played a stronger role after the onset of the economic crisis, as argued in Section 1.3.

On the other hand, if the data published by the Italian authorities are to be considered as reliable, they may explain why the Fascist government was able to maintain the lira-gold peg and why this result was achieved without any substantial consensus loss for the Fascist regime: these data do not indicate that the main macroeconomic variables deviated enough from the paths consistent with the gold peg constraint to support the opinion that the lira-gold parity became unsustainable from late 1929.

It would seem that the results described in this Section for the estimation of a model for devaluation expectations are consistent with the interpretation of the expectations' worsening based on the difficulties experienced by financial markets' agents in correctly assessing the Italian situation, due to the peculiarities of the country's political and institutional framework (namely its dictatorial regime, the low level of transparency in decision making, the censorship, and the limited autonomy from the government of the Bank of Italy), presented at the end of Section 1.3.

1.5. Conclusions

We have studied the participation of the Italian lira in the inter-war Gold Standard, focusing on the sustainability of its gold parity in the eyes of financial markets' agents and the possible determinants of agents' expectations.

The possibility of interpreting the lira exchange rate regime during its gold pegging as a target zone has been explored, in particular on the basis of new estimates of the gold points with respect to the US dollar, the UK pound and the French franc, and by examining their violations. The conclusion that the lira exchange rate regime was a target zone between the lira gold

pegging on 21 December 1927 and the abandonment of the gold peg by the pound on 21 September 1931 has been reached.

We have then applied Bertola and Svensson's (1993) method to estimate expected parity changes in the context of a target zone to the lira exchange rates with respect to the dollar, the pound and the French franc. The estimation results have indicated that on the whole markets were confident that the lira would have remained pegged to gold at the December 1927 parity until autumn 1929, but that they expected a devaluation afterwards. This development was due to higher forward premia and less stabilising or even destabilising effects on expectations arising from the target zone. These econometric results seem to be broadly consistent with the evidence contained in contemporary documents.

The estimated devaluation expectations have then been regressed on a set of macroeconomic variables including those generally considered as relevant in models of exchange rate and balance of payments determination and some representing the increasing immobilisation problems of Italian banks. It has been found that the estimated substantial loss of confidence from late 1929 can be replicated only via the inclusion among the regressors of a step-dummy variable equal to one from November 1929 onwards: not only the macroeconomic variables cannot account for it, but their capability to explain the fluctuations of the estimated $E_t[\Delta c_t]/\Delta t$ appears to be smaller in the second sub-period.

These results seem consistent with an interpretation of the worsening of the confidence in the lira-gold parity in late 1929 based on the argument that the peculiar nature of the Fascist regime made the Italian economic situation, and thus also the sustainability of the lira-gold peg, peculiarly difficult to understand for the financial markets. It would seem that the dictatorial nature of the Fascist regime, the low level of transparency in its decision making, the censorship that it exerted, its consequences on the institutional setting (in particular the fact that the Bank of Italy was not independent from the government) may have played a role in diminishing the reliability of the macroeconomic data published by the Italian authorities and the credibility of their commitment to the gold peg in the eyes of the financial markets. They may have then given more importance when forming their expectations to rumours of financial and political instability that they would have been more ready to disregard had the Italian political regime been a democratic one. This is more likely to have happened after the economic crisis started also in Italy, when the incentives for the Fascist regime not only to depict the situation as rosier than it was but also to abandon the gold peg increased.

Furthermore, this interpretation would seem to shed some light on why the government was able to honour its commitment to maintain the lira-gold peg: if the published macroeconomic data are to be considered reliable, they do not indicate that from the late 1929 onwards the main macroeconomic variables deviated enough from the paths consistent with the gold peg constraint to support the opinion that the lira-gold parity had become unsustainable.

Table 1.1: FIML Estimates of SUR Models of Equation (1.4) for $E[\Delta x]/\Delta t$ (t-values in parenthesis)

	lira/dollar ($\Delta t=1$)	lira/dollar ($\Delta t=3$)	lira/pound ($\Delta t=1$)	lira/pound ($\Delta t=3$)	lira/F.franc ($\Delta t=1$)	lira/F.franc ($\Delta t=3$)
Constant	-1.0052 (-1.2598)	-0.59637 (-2.1129)	0.10886 (0.3881)	-0.087777 (-0.8016)	0.21887 (0.1893)	0.55523 (1.0384)
x_t	-0.28588 (-2.8099)	-0.23747 (-5.7927)	-0.43932 (-1.9008)	-0.44197 (-4.2964)	-0.24266 (-1.4348)	-0.16779 (-1.8650)
Forward premium	-0.15223 (-0.6646)	-0.041710 (-1.1943)	-0.32748 (-0.8509)	-0.092984 (-1.4930)	-0.075208 (-0.1973)	-0.0025790 (-0.0286)
ln (lira/pound)	0.21892 (1.3609)	0.12879 (2.2252)			-0.019563 (-0.0750)	-0.16460 (-1.1331)
ln (lira/dollar)			-0.022157 (-0.2178)	0.043303 (0.9715)	-0.043680 (-0.3700)	0.064898 (1.0797)
ln(lira/FFr)	-0.051900 (-0.5744)	-0.049258 (-1.9040)	0.14375 (0.9977)	0.13156 (2.1926)		
Std.Error	0.00112961	0.00037426	0.0013154 3	0.00050146	0.00188372	0.00082612

Table 1.2: Estimates of ARCH Models

	lira/dollar ($\Delta t=3$)	Lira/pound ($\Delta t=3$)	lira/F.franc ($\Delta t=3$)
Chosen ARCH order and tests	p=2 $\chi^2(2)=7.9151$ [0.0191] F(2,27)=3.4375 [0.0468]	p=1 $\chi^2(1)=4.0091$ [0.0453] F(1,29)=3.2304 [0.0827]	p=1 $\chi^2(1)=3.7377$ [0.0532] F(1,29)=2.9891 [0.0945]
Constant	4.699e-008 (1.1439)	1.571e-007 (2.2003)	4.305e-007 (2.7075)
lag 1	0.2577 (1.3983)	0.3156 (1.7973)	0.3032 (1.7296)
lag 2	0.2828 (1.5437)		
SE	1.9943e-007	3.81207e-007	7.49954e-007

NOTES:

In each case, the order of the estimated ARCH process has been chosen as that at which the strongest evidence of ARCH was found, with a test of the null hypothesis of ARCH(0) against the alternative of ARCH(p).

The probabilities that the distributions of the test statistics under the null hypothesis take a value larger than the sample ones are indicated in square brackets. The estimated coefficients are presented together with their t-values (in parenthesis).

The relative weakness of the ARCH effects is known to be common on monthly data.

Table 1.3: Determinants of Devaluation Expectations: SUR Estimates of the Specification in Equation (1.5) (t-ratios in parenthesis)

	lira/dollar ($\Delta t=1$)	lira/dollar ($\Delta t=3$)	lira/pound ($\Delta t=1$)	lira/pound ($\Delta t=3$)	lira/F.franc ($\Delta t=1$)	lira/F.franc ($\Delta t=3$)
Constant	-0.0000021 (-0.0059)	0.0010576 (2.2788)	0.00019167 (2.1833)	0.0012451 (6.1955)	0.00025516 (1.4609)	0.0012733 (4.0866)
$(r-r^*)_{t-1}$	-0.0090734 (-2.3611)	-0.0054189 (-1.4770)	-0.0043800 (-3.4426)	-0.0069506 (-3.6985)	-0.0002521 (-1.9597)	-0.0006935 (-3.9564)
$(\pi-\pi^*)_{t-1}$	-0.0033572 (-1.5483)	0.0025695 (0.5756)	0.00021208 (0.0979)	0.0025779 (0.6248)	-0.0020649 (-0.6786)	-0.0022039 (-0.5059)
$(m-m^*)_{t-1}$	0.0012532 (0.3147)	0.00078010 (0.2509)	0.0019491 (0.7270)	-0.0009029 (-0.2639)	0.00072022 (0.3356)	-0.0019298 (-0.5036)
$(ca-ca^*)_{t-1}$	0.00024669 (0.3606)	0.0010651 (1.8502)	-0.0002711 (-0.4873)	-0.0011328 (-2.1755)	0.00027043 (0.4969)	-0.0005010 (-0.5112)
$(y-y^*)_{t-1}$	-0.0000509 (-0.0311)	0.0030542 (1.1774)	0.00059431 (0.4888)	0.0018538 (0.9982)	0.00070026 (0.4206)	0.0059865 (2.1663)
dm2911	0.0014863 (7.6685)	0.0034008 (9.8754)	0.0012705 (7.1889)	0.0025550 (9.9096)	0.0016306 (9.3508)	0.0030987 (10.4552)
Std.Error	0.00056405	0.00099743	0.00036092	0.00082736	0.00043963	0.00077697
N	38	36	38	36	38	36

Table 1.4: Determinants of Devaluation Expectations: SUR Estimates of the Specification in Equation (1.6) (t-ratios in parenthesis)

	lira/dollar ($\Delta t=1$)	lira/dollar ($\Delta t=3$)	lira/pound ($\Delta t=1$)	lira/pound ($\Delta t=3$)	lira/F.franc ($\Delta t=1$)	lira/F.franc ($\Delta t=3$)
constant	-0.0001962 (-0.5477)	0.00097654 (2.0996)	0.0002068 (2.4822)	0.0012682 (6.7554)	0.00021739 (1.2032)	0.0012120 (3.7005)
$(r-r^*)_{t-1}$	-0.0094178 (-2.5338)	-0.0050966 (-1.2822)	-0.0036893 (-2.7052)	-0.0058531 (-2.8450)	-0.0003234 (-0.9729)	-0.0000691 (-0.1359)
$(\pi-\pi^*)_{t-1}$	-0.0032003 (-1.2749)	0.0039184 (0.8239)	0.00029946 (0.1301)	0.0023749 (0.5283)	-0.0011371 (-0.3694)	-0.0019996 (-0.3983)
$(m-m^*)_{t-1}$	0.00042856 (0.1148)	0.00034691 (0.1040)	0.0027969 (1.0462)	-0.0008880 (-0.2035)	0.00044393 (0.1797)	-0.0054259 (-1.2727)
$(ca-ca^*)_{t-1}$	-0.0000797 (-0.1221)	0.00090427 (1.4386)	-0.0006823 (-1.0999)	-0.0017736 (-2.7372)	0.00015095 (0.2567)	-0.0006847 (-0.5993)
$(y-y^*)_{t-1}$	0.00043632 (0.2649)	0.0031476 (0.9747)	0.00027890 (0.1834)	0.0013813 (0.5412)	0.00096911 (0.5726)	0.0054816 (1.8740)
$bnkrpt_{t-1}$	-0.0005192 (-1.0461)	0.00000774 (0.0098)	0.00051071 (1.1624)	0.00059311 (0.7988)	0.00028146 (0.6300)	0.00017464 (0.2443)
$prtst_{t-1}$	-0.0014435 (-1.1384)	-0.0017346 (-0.8262)	-0.0020523 (-2.9453)	-0.0041721 (-2.4040)	-0.0006691 (-0.5839)	-0.0006010 (-0.2965)
$gensm_{t-1}$	-0.0063353 (-1.2564)	-0.021405 (-3.1657)	-0.0061149 (-2.3305)	-0.015685 (-3.1531)	-0.0063276 (-1.4760)	-0.0080832 (-1.2800)
$bnksm_{t-1}$	0.0030697 (0.4764)	0.016224 (1.5839)	0.0035649 (1.3388)	0.0094686 (1.2439)	0.0046021 (0.8237)	-0.0018828 (-0.1974)
dm2911	0.0014033 (7.2235)	0.0030701 (9.7622)	0.0012596 (5.9683)	0.0024595 (9.1005)	0.0015384 (8.6685)	0.0029298 (9.1863)
Std.Error	0.00056352	0.00093571	0.00033694	0.00075966	0.00044407	0.00077498
N	38	36	38	36	38	36

Figure 1.1: lira/US dollar: point estimate and 95% confidence interval for E[dc]/dt (dt= 3 months)

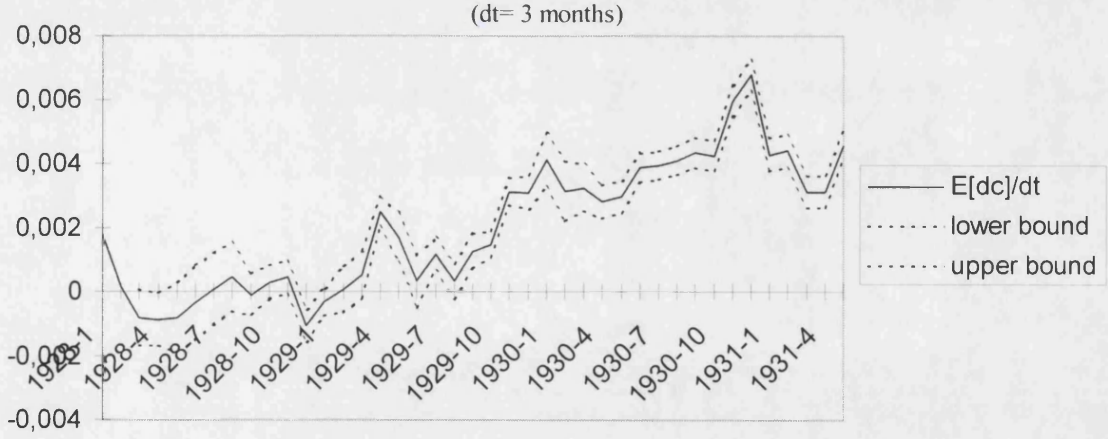


Figure 1.2: lira/UK pound: point estimate and 95% confidence interval for E[dc]/dt
(dt= 3 months)

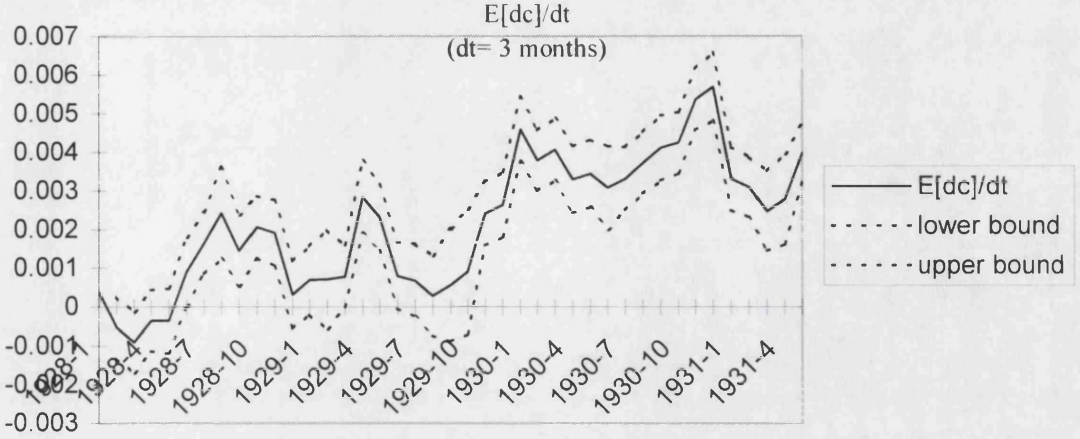


Figure 1.3: lira/French franc: point estimate and 95% confidence interval for E[dc]/dt
(dt= 3 months)

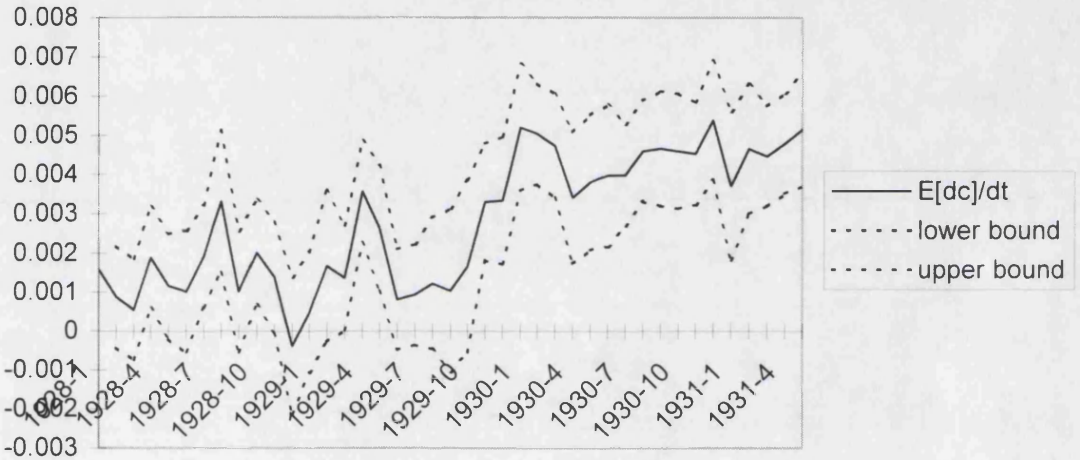


Figure 1.4: Italian Lira/US Dollar Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (5)

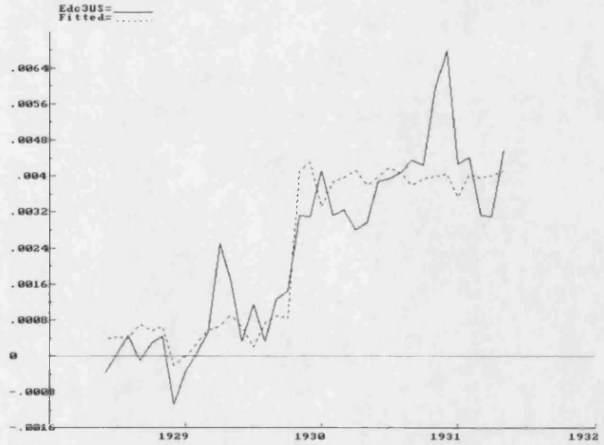


Figure 1.5: Italian Lira/UK Pound Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (5)

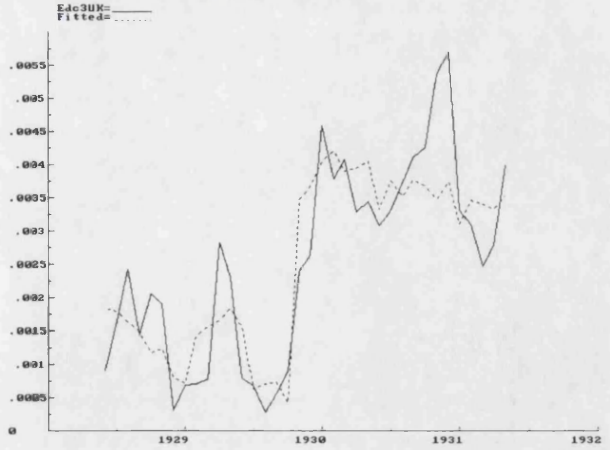


Figure 1.6: Italian Lira/French Franc Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (5)

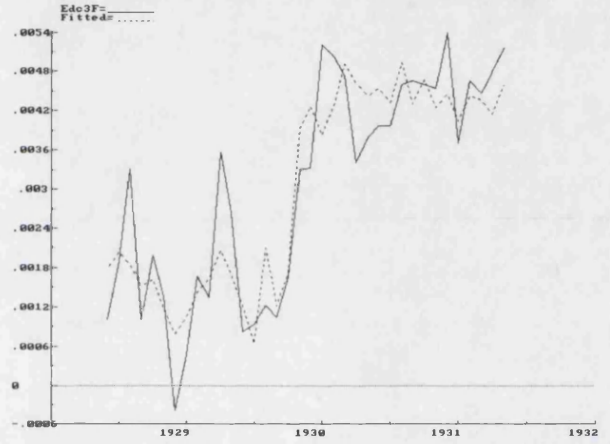


Figure 1.7: Italian Lira/US Dollar Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (6)

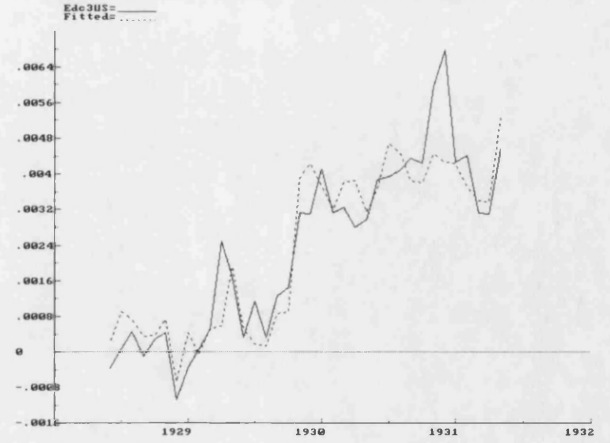


Figure 1.8: Italian Lira/UK Pound Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (6)

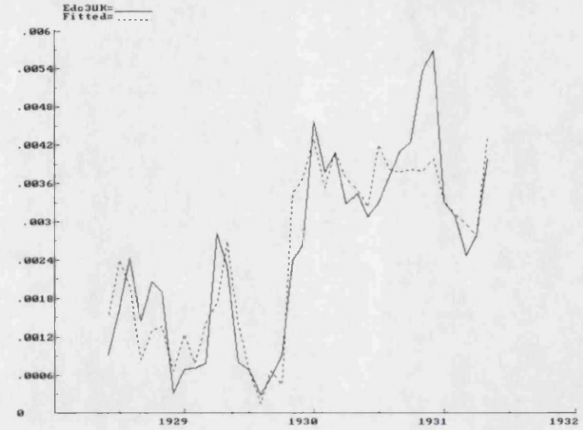
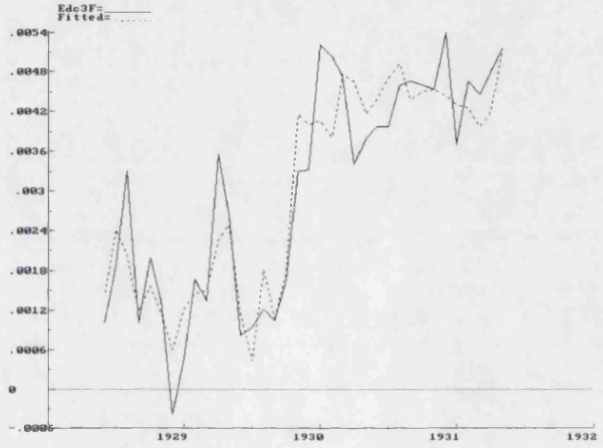


Figure 1.9: Italian Lira/French Franc Exchange Rate: Three-Month-Ahead Estimated Devaluation Expectations and Fitted Values from Equation (6)



Chapter 2

THE ITALIAN INDUSTRIAL LABOUR MARKET DURING THE INTER-WAR CRISIS: WERE WAGES FLEXIBLE ENOUGH?

2.1. Introduction

In the last fifteen years, the literature on the causes of unemployment during the economic crisis which started at the end of the 1920s has been enriched by the use of labour market models based on assumptions of imperfect competition in the goods and labour markets, such as those used to describe the post-war British economy by Layard an Nickell (1985, 1986). This literature has considered again in particular the British case (see Dimsdale, 1984, Dimsdale, Nickell and Horsewood, 1989, Beenstock and Warburton, 1986 and 1991, and Turner and Bowden, 1995, but also, for example, Dimsdale and Horsewood, 2002, on Australia).

The Italian labour market between the wars has however so far not been investigated with these models.

The only study where labour demand functions for the Italian industries in that period have been estimated is that by Toniolo and Piva (1988), where a first attempt to consider the effects of both real wages and demand factors on employment has been made. Their results have supplied more evidence in support of a classical rather than a Keynesian unemployment interpretation, but have been commented by their authors with the suggestion that the wage level that could have cleared the labour market could have been so low as to be politically unacceptable. However, their model does not include variables (such as world and domestic demand conditions, and prices of a further variable production factor) which could have had an important effect on labour demand. Furthermore, it would seem that these authors have failed to consider the possibility that some of the regressors in their equations may have been endogenous, a circumstance which, if verified, may have made their coefficient estimates inconsistent.

Furthermore, Mattesini and Quintieri (1997) have considered the issue of whether industrial wages were flexible enough to prevent deflation from having depressive effects on output in their study of the Italian economy between 1929 and 1936, and found evidence for the contrary. However, it would seem that their result has been obtained using either a cost of living index or a general wholesale price one as wage deflator. Hence, there would seem to be some scope for doubting that their real labour costs measure was accurate.

Finally, Perri and Quadrini (2002) studied the possibility to replicate the fall in Italian GDP within the context of a two-sector (tradable and non tradable products) open economy lifetime utility maximisation model for the Italian non farm sector. They found that fixed hourly real wages could explain one fourth of the decline between 1929 and 1932. They chose to focus on the entire non farm sector and on the distinction between tradable and non tradable products,

hence they did not distinguish within the manufacturing sector between industries more exposed to the international competition and those more sheltered from it. Furthermore, they did not allow for degrees of imperfect competition in any market.

In this chapter, after a description of the Italian industrial labour market on the basis of the existing literature (Section 2.2), the relevance of the choice of a deflator for nominal wages is studied in the context of a preliminary analysis of the issue of wage flexibility, which also distinguishes between industries more exposed to international competition and those more sheltered from it (Section 2.3). This investigation is continued by a comparison of actual wages with those which could have been feasible, on the basis of a measure of the trend productivity increase (Section 2.4). A model of labour demand based on an assumption of imperfect competition in the goods market but not in the labour one is then derived (Section 2.5), specified and estimated for industries exposed to international competition and those sheltered from it (Section 2.6), and its implications for wages and labour allocation between industrial sectors are drawn (Section 2.7). Section 2.8 concludes the chapter.

2.2. A Description of the Italian Industrial Labour Market in the Inter-War Years on the Basis of the Existing Literature

This chapter focuses on the industrial section of the Italian labour market in the inter-war crisis. This is the sector of the economy for which there is a relatively good data availability. Its labour force stayed around one fourth of the total for the entire inter-war period.

A number of its characteristics can be identified on the basis of the existing literature.

The labour supply was very elastic, due to the widespread underemployment in agriculture, (with the crisis) the large unemployment, and the significant mobility of the labour force (testified by the movements out of agricultural employment and into industrial employment at times of industrial expansion and backwards at times of industrial crisis; and by labour migration both outside and within the country, despite the attempts by the regime to discourage workers from leaving the countryside) (Toniolo and Piva, 1988).

Both skilled (industrial) and unskilled (not just industrial) workers appear to have been subject to rapid turnover, and long spells of unemployment, or employment in low paid, less-skilled jobs. Both in agriculture and in manufacturing few workers were employed during an entire year or over a long span of years (these remarks are based on the evidence described in a limited number of studies on individual firms, and an industrial district, as reported by Toniolo and Piva, 1988). Hence it would seem that it was relatively easy for employers to hire and fire workers. However, at least from April 1926, workers had very little chances of being hired if not holders of a Fascist union membership card. This requirement somehow limited the effective labour supply.

Workers could receive unemployment benefits only if previously continuously employed for at least 48 weeks; payment of benefits lasted up to 90 days (or up to 120, if previous continuous employment had lasted at least 72 weeks). Monthly unemployment benefits reached the equivalent of 5-6 days' pay; for a full year, an unemployed worker would receive a sum equivalent, at best, to 18 to 20 days' pay (Musso, 1981). The number of people benefiting from them could not have exceeded 625,500 in 1932 (i.e. 55% of registered unemployed workers). These data are at the basis of Toniolo and Piva's (1988) affirmation that such benefits could not induce any unemployment.

The structure of the labour market during the inter-war crisis years was the result also of the institutional changes which took place in the first few years of the Fascist regime. It is worth mentioning in particular the Palazzo Chigi Pact (December 1923), that favoured a strong and privileged cooperation between the Fascist trade unions and the confederation of the industrialists, and the Palazzo Vidoni Pact (October 1925), that banned the non Fascist trade unions thus officially granting the monopoly to the Fascist one (see, e.g., Toniolo, 1980, Ch. 2).

After these pacts, wages were set, together with working hours, disciplinary sanctions, etc., in agreements between officials of the employers' organisation and Fascist union, at the provincial or national level. Then the agreements had to be approved first by the governing boards of the employers' and workers' confederations and finally by a (provincial or national) government authority (see, e.g., Salvemini, 1936). The government intervened directly in the negotiations if the parties could not reach an agreement on their own (see, e.g., Salvemini, 1936, and De Felice, 1974, Ch. 2).

It would not seem that, in general, the contracts for all sectors were bargained and signed simultaneously (see, e.g., De Felice, 1974, Ch. 2). However, the government could decide general cuts in all wages and salaries, as it did in three occasions: November 1927, November 1930 and April 1934 (in January 1933 a tax reform was enacted which in fact meant another general wage cut).

The high degrees of coordination and inflexibility that seem to have been induced by the just described procedure were actually reduced by the large discretionary powers that employers could enjoy, in fact if not by law. The single employers were able to autonomously reduce wages, even below the minimum ones set in the collective contracts. Sometimes this was brought about by an increase in the number of working hours but not in the weekly wage. Furthermore, employers could reduce their wage bills by moving a worker to a job only formally less demanding, or by substituting less experienced and hence less paid workers for more experienced and hence more paid ones (see, e.g., De Felice, 1968, Ch. 3, and 1974, Ch. 2, and Mortara, 1978).

The opinions expressed on the Italian industrial labour market by the scholars who have studied it differ deeply.

The Fascist unions, for example, have been considered by Salvemini (1936) as organs of the Fascist regime, rather than democratic organisations aimed at representing and defending workers' interests. Furthermore, he has stressed how workers were not effectively protected from contracts' violations by the employers.

These unions have been characterised as one of the instruments through which consensus for the regime was organised even by De Felice (1974, Ch. 3). However, he has qualified this statement arguing that, within the constraints of the dictatorship, the unions carried on a role somehow useful for workers, and that the protection of workers' rights in the Labour Courts was effective.

This last assessment has been disputed by Castronovo (1975), who has underlined the considerable length of the processes in these Courts. Moreover, he has argued that the Fascist unions lacked any effective bargaining and political powers, a circumstance which allowed the government to implement a stern policy of wage cuts. These measures, according to the author, contributed to decrease the impact of the crisis on the Italian economy while making the workers endure it.

The regime's wage policy has been an object of analysis also in Toniolo (1980), who has pointed out how it was forced to mediate between 'law and order' requirements and those of industrial efficiency, and has argued that it did not succeed in achieving either the target of effectively sustaining employment (pursued by reducing the number of worked hours per employee) or the increase in productivity. Furthermore, it inevitably discriminated between workers of 'protected' sectors and those of sectors (such as textiles) to which no high priority was assigned. Toniolo has concluded that with the crisis part of the Italian industry proceeded towards autarchy, helped and supported by the state, while the sectors producing non durable or export goods, in order to survive, had to rely on ever lower wages and ever faster working rates (p. 175).

2.3. Nominal and Real Factory Workers' Wages: A Preliminary Data Analysis

The richest source of data on the Italian industrial labour market in the inter-war years is the series of surveys conducted initially every month and then every two months by the confederation of industrialists (then called Confederazione Generale Fascista dell'Industria Italiana) from 1928 onwards, and published in ASSONIME, *Bollettino di notizie economiche*, Rome, various issues, and in ISTAT, *Bollettino mensile di statistica*, Rome, various issues. This source contains monthly data on the number of employed factory workers, the total number of hours worked by these employees, the total amount of wages paid to them, and also data, obtained from the just mentioned ones, on the average hourly wage and the average number of hours worked monthly by each employee. These data refer to a sample of firms including

between 16 and 24 per cent of those belonging to the industrialists' confederation, and employing more than 50 per cent of registered factory workers. As observed by Zamagni (1994), these enterprises, being the largest, were also likely to pay the highest wages. The data were presented not only in an aggregated form, but also segmented by industry, and by region.

The sample of firms changed each time the surveys were conducted (due to the entry in and exit from the market of some of them at any time). However, each time the data were also collected again for the last month covered by the previous survey on the new firms' sample. This meant that there was an observation on two different samples every month or two months, a fact which could be used to obtain time series, e.g. of the average nominal hourly wage of factory workers.

Zamagni (1994) has employed a method suggested by Barbieri (1938), and afterwards widely used, to solve the problem of the time-varying sample. Barbieri described this method as based on simple averages of the double observations (that is of the two observations of a certain variable for a certain month obtained on two different samples in two successive surveys) when they were very similar, and on proportional adjustments when they were more far apart. He said to have chosen it because it should allow to obtain time series similar to the survey observations' averages. This did not happen with the method previously employed by ISTAT, based on proportional adjustments starting from the two observations for March 1928, which were unusually far apart.

However, if the series of average nominal hourly industrial wages obtained by Barbieri (see Table IV in his paper) is compared with the raw data of the confederation of industrialists' surveys, it seems that his criterion for choosing between averaging or proportionally adjusting the double observations is very subjective, and that some of the data of Barbieri's series cannot be replicated with either of these techniques.

Furthermore, as already noted by Barbieri on a longer sample period (February 1928-December 1937, see Table II in his paper) than the one considered here (April 1928-August 1935), the largest part of the double observations are very similar.

Table 2.1 shows that this is true also on the shorter sample period considered here, and not only for the aggregate industrial sector, but also for the two subsectors (more precisely defined in the following) of the industries exposed to international competition and of those sheltered from it.[6]

The drawbacks of Barbieri's series and the very small discrepancies between double observations support the method followed here to obtain time series from the confederation of industrialists' surveys. This method consists in averaging double observations and not modifying the single ones.

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[6] From Table 2.1, 75% of the aggregate industrial sector discrepancies are between 0.00 and 0.02 Italian lira; for the exposed sectors, almost 73% of the discrepancies are no larger than 0.03 lira, and 81% no larger than 0.04 lira; for the sheltered sectors, 77% of the discrepancies are no larger than 0.03 lira, and almost 90% are no larger than 0.04 lira.

However, the so obtained series for nominal hourly wages of factory workers is very similar to that published by Zamagni (1994), as it can be seen in Figure 2.1. The same observation could be made also for nominal monthly wages.

The first thing that can be noted is that the decrease in nominal hourly wages of factory workers was not large enough to prevent an increase in real hourly wages. As it can be seen in Figure 2.2, both the workers' purchasing power (i.e. the wage divided by the cost of living index calculated by ISTAT, *Bollettino mensile di statistica*, Rome, various issues) and a first approximation of the real cost of labour (i.e. the wage divided by the general wholesale price index in Tav. A.15 in Cotula and Spaventa, 1993) increased from 1929. The greater fall in wholesale than in retail prices implied a larger increase in this measure of the real costs born by the employers than in the workers' purchasing power.

A similar nominal rigidity can be observed also in monthly real wages, in particular when they are calculated as real labour costs, as shown in Figure 2.3.

In the following, the attention is focused on hourly wages, as they seem to supply a more adequate measure of labour costs for the employers.

To obtain more accurate measures of real hourly labour costs, other price indices are considered. In particular, to avoid deflating industrial wages with price indices including agricultural products, two measures of manufactured goods wholesale price indices are used, together with an index of prices of exports of manufactured goods. The index denoted (CPEMI)manufWPI is an index of wholesale prices of finished goods, calculated by the Provincial Economic Council in Milan and based on the prices of 12 goods observed in Milan. The index denoted (Bachi)manufWPI is an index of wholesale prices of finished goods calculated by Bachi, and based on the prices of 18 to 21 goods observed in Milan, Genoa, Turin and Rome. Both these indices were published in ISTAT, *Bollettino mensile di statistica*, Rome, various issues, until December 1934. Finally, the index denoted manufexP is an index of prices of exports of manufactured goods, calculated by the confederation of industrialists and published in the same bulletin, starting from 1926. It is based on the prices of 206 goods, representing no less than 90 per cent of the exports of manufactured goods.

Figure 2.4 shows the measures of real wages obtained with these deflators. The index calculated by the Provincial Economic Council in Milan for finished goods behaved very similarly to the general wholesale price index: with both of them real labour costs are measured to have increased by around 50 per cent, thus seeming to indicate that nominal industrial wages were somehow insufficiently flexible. However, the index calculated by Bachi does not support this conclusion: it leads to a measure of real labour costs which increases by only around 15 per cent, hence by a percentage which could be not too dissimilar from the productivity rise. Finally, it is clear that real labour costs in the exporting sectors increased significantly: the ratio of hourly wages over the index of prices of exports of manufactured goods rose by more than 100 per cent.

Bachi index seems to be more reliable than the Provincial Economic Council of Milan one, for two main reasons. The first is that it was based on a larger number of goods, and that their prices were observed in all the main industrial cities, rather than just in one. The second is that it would seem quite unlikely that, at a time when prices of agricultural goods decreased significantly with respect to those of manufactured ones (see e.g. Toniolo, 1980), an index of wholesale prices excluding agricultural goods could behave very similarly to one including them. Therefore, it would seem possible to conclude that, if the entire industrial sector is considered, nominal wages are likely to have been flexible enough to prevent employers from having to face significant increases in real labour costs.

However, the very large rise in the ratio of hourly wages over prices of exports of manufactured goods seems to indicate that a significant problem of increasing real labour costs may have existed in the exporting sectors.

To explore this issue, the industrial sector has been divided in two subsectors, one made by the industries which were more exposed to international competition, and the other by the industries which were more sheltered from it. The possible relevance of this partition has already been highlighted by Toniolo (1980), as mentioned at the end of the previous Section.

As already indicated, the confederation of industrialists' surveys supplied not only aggregate data for the entire industrial sector, but also a disaggregation of these data for ten industrial subsectors: agricultural and food industry; extractive industry and quarries; construction industry; construction materials industry; mechanical and metallurgical industry; textile and clothing industry; chemical and related industry; paper and printing industry; wood industry; utilities.[7]

These are the industries that are aggregated into the two subsectors, one more exposed to international competition and one more sheltered from it.

To identify these two subsectors, the opinions expressed in the existing literature on the Italian industry at the time and the extent to which it was protected have been considered, in particular those contained in Tattara and Toniolo (1976), Paradisi (1976), Tattara (1980), Toniolo (1980) and Federico and Tena (1998, 1999). It should be noted that the concept of protection on which the following classification has been based is a broad one, including various forms of government intervention in favour of a certain industry, the most important of which were not only custom duties, but also its active support of syndicates and resource transfers.

On the basis of this information, the subsector of industries exposed to international competition is identified as made by agricultural and food industries, extractive industry and quarries, textile and clothing industry, and wood industry. Hence the subsector of sheltered

[7] Data were also supplied for an eleventh aggregate, called various industries, of all the firms not included in the previous ten. However, the smaller and more fluctuating percentages of firms surveyed (and hence of their employees) with respect to the existing ones for this last aggregate than for the other ten has suggested to exclude it from the analysis.

industries includes construction industry, construction materials industry, mechanical and metallurgical industry, chemical and related industry, paper and printing industry, and utilities.

The percentage of factory workers recorded in the confederation of industrialists' surveys as employed in the subsector of industries exposed to international competition decreased from around 53 in 1928 to around 47 in 1934. The percentage of worked hours for the same subsector of industries declined similarly, from around 52 in 1928-1929 to around 45 in 1934-1935.

In the following the data on nominal and real hourly wages of factory workers in the two industrial subsectors are analysed.

As it can be seen in Figure 2.5, the average nominal hourly wage of factory workers in the exposed sectors was always lower than that in the sheltered sectors by around 0.70 Italian lira. Wages in both industrial subsectors decreased by around 0.40 lira between early 1928 and early 1935, an amount which corresponds to 22 per cent of the initial wage in the exposed sectors, but to only 16 per cent of the initial wage in sheltered ones.

The measure of real labour costs in the exposed industries obtained by deflating nominal wages by the above described index of prices of manufactured goods' exports shows a 150 per cent increase in the considered period (see Figure 2.6).

However, if exposed or sheltered sectors' wages are deflated by the above described wholesale price indices of manufactured goods results very similar to those for the whole industrial sector are obtained, as it can be observed by comparing Figures 2.4, 2.7 and 2.8.

The main conclusion that can be drawn from this preliminary data analysis is therefore that nominal wage decreases were large enough to prevent a significant rise in real labour costs in the sheltered industries, but not in the exposed ones, which were affected by much larger falls in their output prices.

Until now the attention has been mainly focused on measures of hourly real labour costs. However to understand why the government did not intervene to prevent the increases in these costs which occurred at least in the exposed sectors it can be useful to consider more carefully workers' purchasing power.

As it can be seen also comparing Figures 2.2 and 2.3, the hourly measure of real wages that can be obtained if wages are deflated by a cost of living index and annual averages are considered increases by 12 per cent between 1929 and 1934, while the corresponding monthly measure rises by only 6 per cent, due to contemporaneous fall in the number of hours worked monthly.

However, monthly real wages during these years were up to 18 per cent lower than in the first half of the 1920s (see Table 8, p. 368, in Zamagni, 1994).

Furthermore, if daily real wages are considered, they can be observed to have been below what Zamagni (1976) has called a minimum subsistence level which was considered as 'acquired', identified at 15 1938 lira, between 1928 and 1932, temporarily just above this level

in 1933 and 1934 (respectively at 15.18 and 15.26 1938 lira), but then again below it between 1935 and 1939 (see Tables 3 and 4, pp. 339 and 342, in Zamagni 1976). Also according to this measure workers' purchasing power was lower in the period 1929-1934 than in the previous years: the real daily wage had been between 15.84 and 17.34 1938 lira in the years 1920-1927 (see Tables 2 and 3, pp. 331 and 339, in Zamagni, 1976).

Furthermore, the idea that living standards of factory workers worsened from the late 1920s until at least the mid-1930s is consistent with the evidence on per capita private consumption, whose levels declined in these years (see Table 9, p. 349, in Zamagni, 1976).

Finally, it is worth noting that this evidence means that in the considered period workers' purchasing power was around 15-20 per cent lower than when Mussolini came to power in 1922.

This has led Toniolo and Piva (1988, p. 241) to affirm that further wage cuts in the early 1930s 'would have entailed a probably unbearable decrease in the already low standard of living of the working class', and that 'even an established dictatorship in the years of its greatest domestic consensus', as the Fascist regime was at the time, 'could hardly disregard the implications' of such a policy.

Despite the fact that the government allowed workers' purchasing power to fall, there is some evidence that it tried to prevent too large a fall. For example, De Felice (1974, pp. 69-71) described how, in the late 1931 Mussolini, faced with pressures from industrialists for more wage cuts, chose not to impose a general reduction, but did nothing to prevent autonomous ones by single employers, even beyond the minimum levels set in the collective contracts. At the same time however he acted so as to decrease the spread between consumer and wholesale prices and the lag of the adjustment of the first to the latter ones.

The other main objectives of the government's labour market policies seem to have been: keeping employment levels high among the adult male labour force (pursued for example by public works; the substitution of adult male workers for women, boys and older men; and wage cuts: Toniolo and Piva, 1988, p. 234, have argued that the 1930 wage cut was aimed at sacrificing workers' purchasing power to maintain employment levels); sustaining production levels (again via wage cuts); defending the competitiveness of Italian products with respect to foreign ones (again via wage cuts).

All these objectives pushed for wage reductions during the crisis, and would have been best pursued by preventing own price real wages from increasing beyond productivity.

To the above mentioned reasons backing a government's interest in preventing excessive real labour costs increases a fourth one can be added: too high real labour costs were bound to negatively affect the sustainability of the Italian lira-gold peg, to which the regime attached a high priority.

The preliminary analysis of the industrial labour market data would seem to support the idea that the government did not directly cut wages by more or did not try to make employers

cut more their wages because real labour costs were not substantially increasing in the industrial sectors the government was more interested in. Furthermore, workers' purchasing power in the sectors where real labour costs were indeed increasing was already lower than in the sheltered ones. Therefore not only wage cuts were probably not necessary in the sheltered sectors, but they could have also increased the risk of social instability.

However, such a policy was not consistent with all the above listed government's objectives. In particular, it did not defend the competitiveness of Italian exports and the sustainability of the lira-gold parity.

2.4. Labour Productivity and Wage Flexibility

In the previous Section, the increases in real labour costs in the entire industrial sector and in the sheltered industries' subsector have been argued to have been insignificant, in particular once the labour productivity rise is taken into account. In this Section a measure of this rise is determined.

The main sources of data on labour productivity in Italy during the inter-war period are Fuà (1972), Maddison (1991) and Broadberry (1997). All of them agree that productivity per worker increased although they do not give perfectly matching figures on the magnitude of this phenomenon. Fuà (1972, Tab. 5.1) has measured the average annual rate of growth of gross product per industrial sector worker, between 1921 and 1938, at 1.7%. On the basis of Maddison (1991, Table C.11, p. 275), the annual average compound growth rate of GDP per man-hour in the entire economy can be measured at 2.4% between 1913 and 1938, a figure which it should be possible to consider as a lower bound for that for the industrial sector only. Finally, on the basis of Broadberry's (1997) data on productivity levels in Italian manufacturing as a fraction of the British ones (Table 4.5 p. 56), and his indices of output and employment in British manufacturing (Table A3.1(a), pp. 44-46), the average annual growth rate of productivity per worker in Italian manufacturing can be calculated as having been equal to 1.9% over the period 1921-1938.

Hence, it would seem possible to argue that a prudent measure of the average annual increase in productivity per worker in the Italian industrial sector between 1921 and 1938 could be 1.5%.

Furthermore, all the available sources agree that the average number of hours worked by each industrial sector employee decreased in the same years. According to Tattara and Toniolo (1976) and Toniolo (1980), the average working day in manufacturing decreased from 7 hours 17 minutes in 1929 to 6 hours 43 minutes in 1932 (i.e. by an average annual rate of 2.7%). On the basis of Zamagni (1976), the number of daily working hours in the industrial sector decreased at an average annual rate of 1.26% between 1921 and 1938. Finally, on the basis of

Maddison (1964, Tables G-1 and G-2), the average annual rate of change of the number of annual working hours per person between 1913 and 1938 can be measured at -1.09%.

Therefore, it would seem possible to argue that the number of working hours in the Italian industrial sector declined on average by at least 1.0% a year between 1921 and 1938.

Thus the just described figures seem to support the hypothesis that productivity per man-hour increased on average by at least 2.0% a year between 1921 and 1938.

This is the figure used here to assess whether real wage increases were allowed by productivity ones, under the assumption that average productivity was proportional to marginal one, which holds for a Cobb-Douglas production function.

This comparison needs a starting point, that is a date at which it can be assumed that the industrial labour market was in equilibrium. This is identified as the most recent business cycle peak for which there is a good data availability. On the basis of quarterly data on employment, Toniolo (1980, pp. 24-28) has argued that business cycle peaks occurred in March-June 1926 and the summer 1929. Here the second one is used, because the confederation of industrialists' surveys started only in 1928. Hence the data available for 1926 are not readily comparable with those for the 1928-1935 period on which our attention in this chapter is focused.

In Figures 2.9 and 2.10 the actual hourly wage for the entire industrial sector is compared with the trend productivity feasible one, obtained by assuming that the labour market was in equilibrium in August 1929 and that it was feasible to increase the real wage at the trend productivity per man-hour rate, that is by 2.0% a year. Bachi's index of wholesale prices of manufactured goods is used as deflator.

Despite the prudent estimate of productivity increases which has been used, it seems that the industrial sector as a whole did not suffer from a too rapid real wage growth. In other words, nominal wages appear to have been flexible enough with respect to falls in output prices, at least when the data for the entire industrial sector are considered.

Therefore it would seem possible to argue that, if there was a problem of insufficient nominal wage flexibility, this affected only the industries more exposed to international competition, but not the sheltered ones, that is one eighth of the labour force.

2.5. A Labour Demand Model for Exposed and Sheltered Industries: Derivation

The previous Section has supplied further evidence that the main problem of the Italian industrial labour market would not seem to have been one of insufficient nominal wage flexibility, at least in the aggregate.

However, the industrial labour market was subjected from the mid-1929 not only to a generalised price fall, but also to a change in relative prices, in particular those of the manufactured goods which were exported with respect to those of goods which were not.

Therefore the adjustment towards a new equilibrium should have involved not only a general fall in wages, but also labour reallocation from the industries exposed to international competition to the sheltered ones.

In this Section a labour demand model for exposed and sheltered industries is presented, which is then used to study labour allocation and to verify the preliminary conclusion that there was enough wage flexibility in Sections 2.6 and 2.7.

A model of a representative profit maximising firm which faces imperfect competition in the goods market but not in the labour market is considered to derive the labour demand function. This model differs from that proposed by Layard and Nickell (1985, 1986) because it does not incorporate the assumption that also the labour market was imperfectly competitive. This does not seem a useful characterisation of the Italian labour market in the period 1929-1934, because the existence of unemployment meant that firms could hire people without bidding up their wages. This is the same motivation used by Turner and Bowden (1997) in constructing their model for the UK industrial sectors during the period 1921-1938. The model used here however differs from theirs because it allows for the presence of a second variable production input besides labour: raw materials, also bought in a perfectly competitive market.

The assumption of imperfect competition in the goods market implies that the firm faces a downward sloping demand curve for its output:

$$x = A\left(\frac{p}{p^*}\right)^{-\gamma} z^{\delta}, \tag{2.1}$$

where: x is the quantity demanded of the firm's output; p the own product price; p* the price of competing goods; z are demand pressure variables; A, γ and δ are parameters ($\delta > 0$ and $\gamma > 1$ by hypothesis).

Thus the inverse demand curve is:

$$p = A^{\theta} p^* x^{-\theta} z^{\phi}, \text{ where } \theta := 1/\gamma, \text{ and } \phi := \delta/\gamma. \tag{2.2}$$

The production function is assumed to take the following form:

$$x = e^{Bt} n^{\alpha} (rm)^{\beta} \tag{2.3}$$

where: n is the quantity of employed labour and rm the quantity of employed raw materials; t is time and the term that contains it represents technical progress and possibly also changes in the capital stock, in their turn not explicitly accounted for; B, α, β are parameters, all >0 by hypothesis.

The demand functions for labour and raw materials are obtained by equating the marginal revenue for each of these production inputs to its marginal cost (which is equivalent to maximising the firm's profits with respect to each of the two inputs).

The marginal costs for labour and raw materials are, respectively, the nominal wage, w, and the price of raw materials, p_m.

The marginal revenue with respect to labour is:

$$\frac{\partial(p(x)x)}{\partial n} = \left[p(x) + \frac{\partial p(x)}{\partial x} x \right] \frac{\partial x}{\partial n} =$$

$$= (1-\theta)\alpha e^{Bt} n^{\alpha-1} (rm)^{\beta} p(x).$$

Thus the marginal labour revenue equals the marginal labour cost when:

(2.4) $$w = (1-\theta)\alpha e^{Bt} n^{\alpha-1} (rm)^{\beta} p(x).$$

By substituting the inverse output demand function for p(x) and then the production function for x the above condition becomes:

(2.5) $$w = (1-\theta)\alpha A^{\theta} e^{Bt(1-\theta)} p * z^{\phi} n^{\alpha-\alpha\theta-1} (rm)^{\beta-\beta\theta}.$$

The marginal revenue with respect to raw materials is:

$$\frac{\partial(p(x)x)}{\partial m} = \left[p(x) + \frac{\partial p(x)}{\partial x} x \right] \frac{\partial x}{\partial m} =$$

$$= (1-\theta)\beta e^{Bt} n^{\alpha} (rm)^{\beta-1} p(x).$$

Thus the marginal raw materials revenue equals the marginal raw materials cost when:

(2.6) $$p_m = (1-\theta)\beta e^{Bt} n^{\alpha} (rm)^{\beta-1} p(x).$$

By substituting the inverse output demand function for p(x) and then the production function for x the above condition becomes:

(2.7) $$p_m = (1-\theta)\beta A^{\theta} e^{B(1-\theta)t} p * z^{\phi} n^{\alpha-\alpha\theta} (rm)^{\beta-\beta\theta-1}.$$

Thus the demand functions for labour and raw materials can be obtained from the following system:

(2.8) $$\begin{cases} w = (1-\theta)\alpha A^{\theta} e^{B(1-\theta)t} p * z^{\phi} n^{\alpha-\alpha\theta-1} (rm)^{\beta-\beta\theta} \\ p_m = (1-\theta)\beta A^{\theta} e^{B(1-\theta)t} p * z^{\phi} n^{\alpha-\alpha\theta} (rm)^{\beta-\beta\theta-1} \end{cases}.$$

From the first equation of the system:

(2.9) $$(1-\theta)A^{\theta} e^{B(1-\theta)t} p * z^{\phi} = w\alpha^{-1} n^{1+\alpha\theta-\alpha} (rm)^{\beta\theta-\beta}.$$

From the second equation of the system:

(2.10) $$(1-\theta)A^{\theta} e^{B(1-\theta)t} p * z^{\phi} = p_m \beta^{-1} n^{\alpha\theta-\alpha} (rm)^{1+\beta\theta-\beta}.$$

Because the left hand sides of (2.9) and (2.10) are identical, the two right hand sides have to be identical as well. By equating them, the following equation is obtained:

(2.11) $$rm = \frac{\beta}{\alpha} \frac{w}{p_m} n.$$

The right hand side of (2.11) can now be substituted for rm in the first equation of the system (2.8) to obtain the labour demand function (the raw materials demand function can then be obtained by substituting the labour demand one for n in the right hand side of this last equation):

(2.12) $$w = (1-\theta)\alpha A^{\theta} e^{B(1-\theta)t} p * z^{\phi} n^{\alpha-\alpha\theta-1} \left(\frac{\beta}{\alpha} \frac{w}{p_m} n \right)^{\beta-\beta\theta}.$$

Then solving for n:

$$n^{1-(\alpha+\beta)(1-\theta)} = (1-\theta)\alpha^{1+\beta\theta-\beta}\beta^{\beta-\beta\theta}A^{\theta}e^{B(1-\theta)t}\left(\frac{w}{p^*}\right)^{-1}\left(\frac{w}{p_m}\right)^{\beta(1-\theta)} z^{\phi}. \tag{2.13}$$

This equation is equivalent to:

$$n^{1-(\alpha+\beta)(1-\theta)} = (1-\theta)\alpha^{1+\beta\theta-\beta}\beta^{\beta-\beta\theta}A^{\theta}e^{B(1-\theta)t}\left(\frac{w}{p^*}\right)^{\beta(1-\theta)-1}\left(\frac{p_m}{p^*}\right)^{\beta(\theta-1)} z^{\phi} \tag{2.14}$$

or

$$n = \left[(1-\theta)\alpha^{1+\beta\theta-\beta}\beta^{\beta-\beta\theta}A^{\theta}\right]^{1/[1-(\alpha+\beta)(1-\theta)]} e^{B(1-\theta)t/[1-(\alpha+\beta)(1-\theta)]} * \\ * \left(\frac{w}{p^*}\right)^{[\beta(1-\theta)-1]/[1-(\alpha+\beta)(1-\theta)]}\left(\frac{p_m}{p^*}\right)^{\beta(\theta-1)/[1-(\alpha+\beta)(1-\theta)]} z^{\phi/[1-(\alpha+\beta)(1-\theta)]} \tag{2.15}$$

where the real wage and the real raw material price, rather than the real wage and the relative price of the two production inputs, appear among the determinants of labour demand. This last equation is the formulation of the labour demand function that will be considered in the following.

As a model for the demand pressure variables to be included in this labour demand function, the following one, very similar to that used by Turner and Bowden (1997), is considered:

$$z = (wt)^{\phi_1}\left(\frac{m}{p'}\right)^{\phi_2}(rdisc)^{\phi_3}e^{u}, \tag{2.16}$$

where wt is a quantity of world trade index, m/p' is a measure of real money supply, rdisc the real discount rate (this last variable was not considered by Turner and Bowden, 1997), and u is a random sector specific disturbance term. All parameters are positive.

It remains to be checked whether the signs of the model parameters are plausible.

The demand pressure variables parameters have the same sign as $\phi/[1-(\alpha+\beta)(1-\theta)]$. For this parameter to be positive, as it would seem reasonable, $[1-(\alpha+\beta)(1-\theta)]$ has to be positive (because $\phi>0$). $[1-(\alpha+\beta)(1-\theta)]>0$ when $\theta>1-1/(\alpha+\beta)$. In the only relevant case, that is when $(\alpha+\beta)<1$, $1-1/(\alpha+\beta)<0$ and all values of θ in the interval $]0, 1[$ make the demand pressure parameters values positive (because $\gamma>1$ by hypothesis, then $\theta<1$).

When the demand pressure variables coefficients are positive, then the coefficient of (w/p^*) is negative when $[\beta(1-\theta)-1]<0$, that is when $\theta>1-1/\beta$. Therefore, because $[1-1/(\alpha+\beta)]>(1-1/\beta)$, this coefficient is always negative when the demand pressure variables coefficients are positive.

Moreover, when the demand pressure variables have a positive coefficient, then for the time trend to have a positive coefficient as well $(1-\theta)$ has to be positive, which happens when $\theta<1$.

In this case the coefficient on (p_m/p^*) becomes negative.

Because $[1-1/(\alpha+\beta)]<1$, there can be values of θ in the interval $]1-1/(\alpha+\beta);\ 1[$, that is values of θ which make the parameters on demand pressure variables and that for the time trend positive, and those on (w/p^*) and (p_m/p^*) negative.

2.6. Labour Demand Functions for Exposed and Sheltered Industries: Specification and Estimation

The labour demand equation estimated here for exposed and sheltered industries is obtained from the one derived above, considered in conjunction with the model for demand pressure variables, by taking the logarithms of both sides and allowing for some delay in the process of adjustment of actual employment levels to the desired ones:

$$\ln(n_{i,t}) = b_0 + b_1\ln(w_{i,t}/p_{i,t}) + b_2\ln(p_{m,t}/p_{i,t}) + b_3\ln(wt)_t + b_4\ln(m/p')_t + \\ + b_5\ln(rdisc)_t + b_6\ln(n_{i,t-1}) + b_7 t + v_{i,t} \tag{2.17}$$

where: $n_{i,t}$ is the number of employed workers in sector i at time t; $w_{i,t}$ the nominal hourly wage they are paid; $p_{i,t}$ a wholesale price index, used as a measure of the price of competing goods (i.e. the price denoted as p^* in Section 2.5); $p_{m,t}$ an index of wholesale prices of raw materials; wt a quantum index of world trade; m a measure of money supply; p' a cost of living index; rdisc the real discount rate; t a linear time trend; $v_{i,t}$ an error term; and the index '$_i$' stands either for exposed, '$_e$', or sheltered, '$_s$', industries. The demand pressure variables, wt, m/p' and rdisc, are measured as indices with value equal to 100 in August 1929, so that they measure the demand conditions at each point in time with respect to a benchmark. Finally, the estimated equations include also seasonals among the regressors.

Both the real wage and the real raw material price variables are considered as endogenous in the previous equation. This is because, as Turner and Bowden (1997) have highlighted, if the goods market is imperfectly competitive, then the output price is likely to be modified together with output and employment levels when the firm reacts to demand changes.

Each of these two endogenous variables is instrumented by its first lag, even if there can be theoretical reasons to think that these are not the best instruments, because they are here the most suitable choice conditionally upon the available data.

The above labour demand model differs in many respects from that estimated on the industries identified in the confederation of industrialists' surveys by Toniolo and Piva (1988). In their model the endogenous variable is the number of worked hours rather than that of employed workers, and the only regressors are a measure of the own product wage and the quantity of imported raw materials as a proxy for industrial production (plus a constant and seasonals). This specification leaves out the demand pressure variables used here and the real

price of the second variable production input, but fails also to account for the possibility that the own product wage is endogenous, a circumstance which would make the estimates inconsistent.

The above equation is estimated for exposed and sheltered sectors.

The data used are the following. For $n_{i,t}$: average number of factory workers employed daily in exposed and sheltered industries, as from the confederation of industrialists' surveys. For $w_{i,t}$: nominal hourly wage paid to factory workers in exposed and sheltered industries, from the same source. For $p_{i,t}$: for exposed industries, the index of prices of exports of manufactured goods denoted as manufexP in Section 2.3; for sheltered ones, the wholesale price index of manufactured goods denoted as (Bachi)manufWPI in Section 2.3. For $p_{m,t}$: the index of wholesale prices of raw materials calculated by Bachi on the basis of 37-40 items observed in the same industrial cities as for (Bachi)manufWPI, and published in ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues. For wt: the series obtained by interpolating the quarterly one published in League of Nations, *Monthly Bulletin of Statistics*, Geneva, transformed into an index with value equal to 100 in August 1929. For m: the series on banknote circulation published in Cotula and Spaventa (1993, Tav. A.9, pp. 846-848, col. B) (no broader monetary aggregate used at the time is available at a frequency higher than the year). For p': the ISTAT cost of living index used in Section 2.3. As already mentioned, the real money supply variable used in the regressions is obtained by transforming into an index with value equal to 100 in August 1929 the series obtained as ratio of the just indicated ones. Finally, rdisc is in its turn the transformation into a similar index of the real discount rate measure obtained by subtracting from the nominal private discount rate (published in Cotula and Spaventa, 1993, Tav. A.12, pp. 853-855) a measure of inflation based on the ISTAT cost of living index. All these series are monthly and refer to the period February 1929-December 1934.

The estimation of the labour demand equations for exposed and sheltered sectors has been preceded by an investigation into whether the employment variables are cointegrated with various subsets of regressors. The rationale behind it is that the ADF unit root tests conducted on employment variables and explanatory ones all fail to reject their null hypothesis. However, no cointegration relation has been found. Therefore, the labour demand equations for exposed and sheltered industries have been estimated in the specification written above, via the instrumental variables method. The estimation results are presented in Table 2.2.

The residuals of the two estimated equations show no sign of autocorrelation (due also to the inclusion of the additional lag of the employment variable for sheltered industries) or heteroskedasticity, but those for sheltered industries appear as non normal.

The analysis in the next Section on the adjustment needed to reach a new equilibrium is based on the static long run versions of the estimated equations, which are:

(2.18)

$$\ln(n_{e,t}) = 11.09 - 0.8572 * \ln(w_{e.t} / p_{e,t}) + 0.1689 * \ln(p_{m,t} / p_{e,t}) + 0.6751 * \ln(wt)_t +$$
$$\text{(SE)} \quad (2.285) \quad (0.9577) \qquad (0.4429) \qquad (0.3283)$$
$$- 0.8945 * \ln(m / p')_t - 0.04663 * \ln(rdisc)_t + 0.007206 * t + 0.3179 * seasonal$$
$$(1.402) \qquad (0.05254) \qquad (0.0114) \quad (0.4507)$$

and

(2.19)

$$\ln(n_{s,t}) = 10.29 - 0.8286 * \ln(w_{s.t} / p_{s,t}) + 0.3164 * \ln(p_{m,t} / p_{s,t}) + 0.6861 * \ln(wt)_t +$$
$$\text{(SE)} \quad (5.998) \quad (1.059) \qquad (0.3992) \qquad (0.5748)$$
$$- 0.7036 * \ln(m / p')_t - 0.04041 * \ln(rdisc)_t + 0.00465 * t + 2.009 * seasonal$$
$$(0.9608) \qquad (0.06148) \qquad (0.00383) \quad (0.7973)$$

Only few of the included regressors are significant in each equation. However, the point estimates of labour demand elasticities with respect to the real wage seem plausible. Furthermore, the main difference between the two static long run equations seems to be the fact that the world trade index significantly affects employment in the exposed but not in the sheltered industries.

Figures 2.11 and 2.12 show that the fitting of both equations is very good.

An attempt has been made to exploit the correlation between disturbances for exposed and sheltered industries to improve the estimation efficiency by considering the equations for the two sectors as a system of seemingly unrelated regressions. However, no substantial improvement has been obtained. Therefore, the analysis of the adjustment towards a new equilibrium in the next Section is based on the estimates equation by equation presented above.

2.7. Labour Demand Functions for Exposed and Sheltered Industries: Implications for Equilibrium Wages and Labour Allocation

As already mentioned, the estimated equations are used to measure the adjustments in wages and labour allocation between exposed and sheltered industries needed to bring the industrial labour market back to equilibrium, after the general price falls, the changes in relative prices, and the demand reductions during the economic crisis.

These calculations are made under the assumption that the market was in equilibrium in August 1929. The date at which the adjustments towards equilibrium are measured is February 1934, just before the April 1934 general wage cut. Furthermore, the total number of employed factory workers is required to be the same in the new equilibrium as in old one.

The equilibrium in February 1934 is identified by the following vector of variables: ($w_{e,34}$, $w_{s,34}$, $n_{e,34}$, $n_{s,34}$), where the index '$_{34}$' indicates the value of the variable in February 1934.

The equilibrium conditions are:

- $w_{e,34} = w_{s,34} - 0.70$;
- $n_{e,34} + n_{s,34} = n_{e,29} + n_{s,29}$ (where '$_{29}$' indicates the value of the variable in August 1929);
- $w_{e,34}$ is given by the exponential of the inverse labour demand function for exposed sectors (or, the equivalent condition for sheltered sectors).

The equilibrium is found by equating the exponential of the inverse labour demand function for exposed industries to the exponential of the inverse labour demand function for sheltered ones minus 0.70 (where for both demand functions, the estimated static long run versions presented above are used); by substituting in this equation the expression for $n_{s,34}$ given by the second equilibrium condition (i.e. $n_{s,34} = (n_{e,29} + n_{s,29}) - n_{e,34}$); by giving to all the variables in this equation apart from $n_{e,34}$ their values in February 1934 and to all the parameters their estimated values; and by numerically solving for the only remaining unknown $n_{e,34}$ the so obtained equation.

The equilibrium thus found is: $w_{e,34} = 0.93$ Italian lira; $w_{s,34} = 1.63$ Italian lira; $n_{e,34} = 768,597$; $n_{s,34} = 596,163$.

The equilibrium $w_{e,34}$ and $w_{s,34}$ are 0.55-0.56 Italian lira (or, respectively, 38 and 25%) lower than the actual wages at that time (respectively, 1.49 and 2.18 lira). The equilibrium $n_{e,34}$ and $n_{s,34}$ are higher by, respectively, 296,488 and 121,777 employed factory workers (or, respectively, by 63 and 26%) than the actual figures at that time (respectively, 472,109 and 474,386).

These equilibrium wages seem to indicate that the price shocks and demand decline between mid-1929 and early 1934 would have required much larger wage cuts than the implemented ones for industrial employment to remain at its earlier level, even if the order of magnitude rather than the precise values of the calculated equilibrium wages is considered. This result differs from the provisional conclusions drawn at the end of the analysis in Sections 2.3 and 2.4, which however have not taken into account the demand variables or the raw material prices.

In April 1934 the Fascist government decreed a further (and last) general cut in all wages and salaries. However, this decreased nominal hourly wages in exposed and sheltered industries in the following months by no more than 0.10 lira, that is by less than a fifth of what would have been required according to the calculations presented above.

It would seem possible to conclude this analysis arguing, in agreement with Toniolo and Piva (1988), that among the reasons why the government did not act to cause larger wage reductions may have been the idea that such cuts could have been non socially feasible.

Finally, it has to be mentioned that the calculated equilibrium allocation of labour would require a larger share of workers to be employed in exposed industries than it was the case in August 1929 (768,597 workers rather than 708,601 out of a total number constant by

hypothesis), a result which would seem non fully consistent with the nature of the changes in prices and demand pressure variables, or with the government policies.

2.8. Conclusions

In this chapter a study of the Italian industrial labour market between the late 1920s and the mid-1930s has been conducted.

The main features of this market as described in the previous literature have been recalled.

Then it has been investigated the extent to which real wages increased when prices fell, and how these measures depend on which prices are used to deflate wages. This preliminary analysis has led to affirm that nominal wage decreases were large enough to prevent a significant rise in real labour costs in the industries more sheltered from international competition, but not in those more exposed to it, which were affected by much larger falls in their output prices.

This preliminary conclusion has been reinforced when a measure of the trend productivity increase per man-hour has been considered and the wage increases made feasible by it calculated.

When however the estimates of labour demand equations for exposed and sheltered industries (formally derived within a model of a profit maximising representative firm, facing imperfect competition in the goods market but not in the labour one) have been used to calculate the equilibrium wages and labour allocation between industries at the beginning of 1934, further wage falls have appeared as needed to keep industrial employment at its pre-crisis level in the face of the demand and absolute and relative price shocks of the period.

These results would seem to confirm those previously obtained by Toniolo and Piva (1988). Moreover they seem to be consistent with an interpretation of why nominal wages were not cut by more based not only on the risk that these further cuts could have created social instability, but also on the circumstance that real labour costs were not increasing in the industries the government was more interested in.

Furthermore, this chapter's results appear to be consistent also with Mattesini and Quintieri's (1997) ones, albeit the evidence presented here on the relevance of the wage deflator's choice would seem to suggest that it could be interesting to verify the robustness of their conclusions with respect to different and possibly more suitable wage deflators.

Moreover, the results obtained here on the role of labour costs in the decline in industrial labour demand are consistent also with Perri and Quadrini's (2002) ones for the entire non farm sector.

Finally, it is worth underlining that there was an alternative policy available to the government: to abandon the Italian lira-gold parity set in December 1927, to which Mussolini attached a great symbolic value, and which was kept despite the devaluations of the UK pound,

in September 1931, and the US dollar, in April 1933. This policy has been advocated as a way to exit from the economic crisis in the recent literature (see for example the seminal Eichengreen and Sachs, 1985); and its possible relevance in the Italian case has been argued, for example, by Toniolo (1980). It was only in December 1934 that the Fascist government eventually effectively suspended the convertibility of its currency.

Table 2.1: Average Nominal Hourly Wage of Factory Workers: Discrepancies Between Two Observations for the Same Months in the Confederation of Industrialists' Surveys (April 1928-August 1935)

Absolute value of the discrepancy between 1st and 2nd observation (Italian lira and cents)	*Number of occurrences in the aggregate industrial sector*	*Number of occurrences in the industrial sectors exposed to international competition*	*Number of occurrences in the industrial sectors protected from international competition*
0.00	6	15	6
0.01	20	10	9
0.02	10	7	10
0.03	3	3	12
0.04	3	4	6
0.05	1	2	3
0.06	3	2	
0.07			
0.08		2	2
0.09			
0.10		1	
0.11	1	1	
0.12		1	
0.13			
0.14			
0.15			
0.16			
0.17	1		
Total number of months for which there are double observations	48	48	48

Table 2.2: Estimation Results for Exposed and Sheltered Industries: IVE on the Periods 3/1929-12/1934 and 4/1929-12/1934 Respectively

Exposed Industries	*Exposed Industries*	*Sheltered Industries*	*Sheltered Industries*
Variable	*Coefficient (and t-value)*	*Variable*	*Coefficient (and t-value)*
constant	4.4928	constant	2.6366
	(2.914)		(1.690)
$Ln(w_e/p_e)$	-0.34739	$ln(w_s/p_s)$	-0.21226
	(-0.983)		(-0.747)
$Ln(p_m/p_e)$	0.068458	$ln(p_m/p_s)$	0.081055
	(0.375)		(0.816)
Ln(wt)	0.27631	ln(wt)	0.17577
	(1.660)		(1.164)
Ln(m/p')	-0.36252	ln(m/p')	-0.18024
	(-0.908)		(-0.799)
Ln(rdisc)	-0.018898	ln(rdisc)	-0.010352
	(-0.898)		(-0.610)
$Ln(n)_{-1}$	0.59473	$ln(n)_{-1}$	0.95203
	(5.175)		(7.729)
		$ln(n)_{-2}$	-0.20821
			(-2.055)
T	0.0029203	t	0.0011913
	(0.678)		(1.310)

NOTE: seasonal dummies are included in the regressions but not reported.

Figure 2.1: Nominal Hourly Wages of Factory Workers (Indices with Average over 1929 Equal to 100): Comparison Between the Series Obtained Here and That Published by Zamagni (1994)

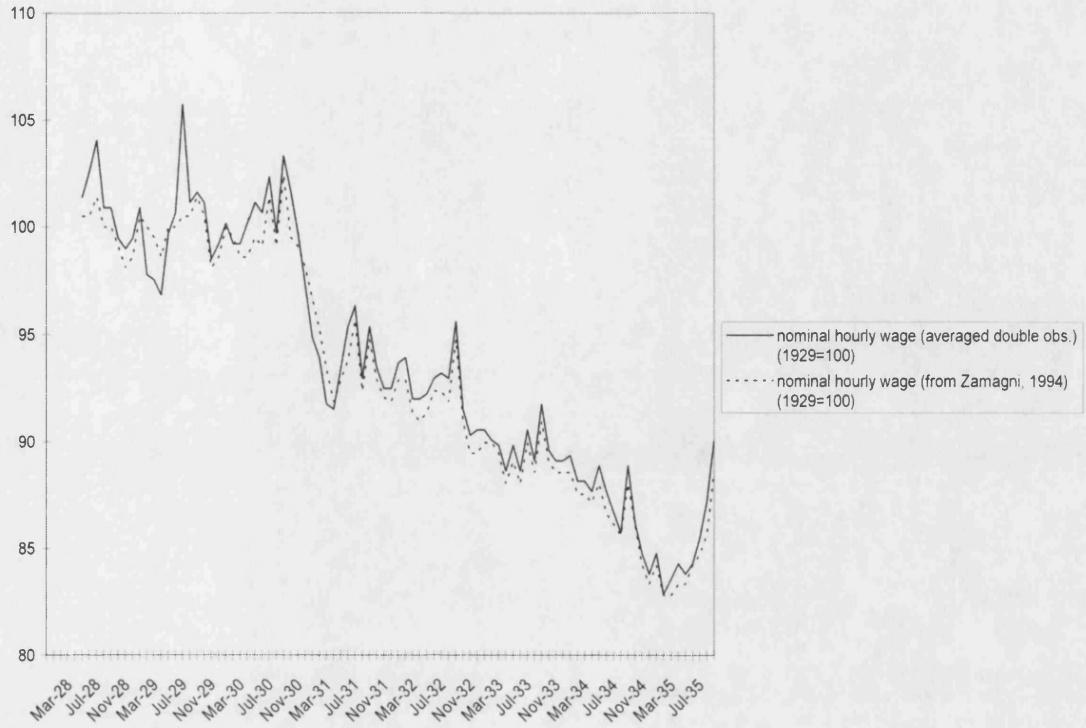


Figure 2.2: Real Hourly Wages of Factory Workers

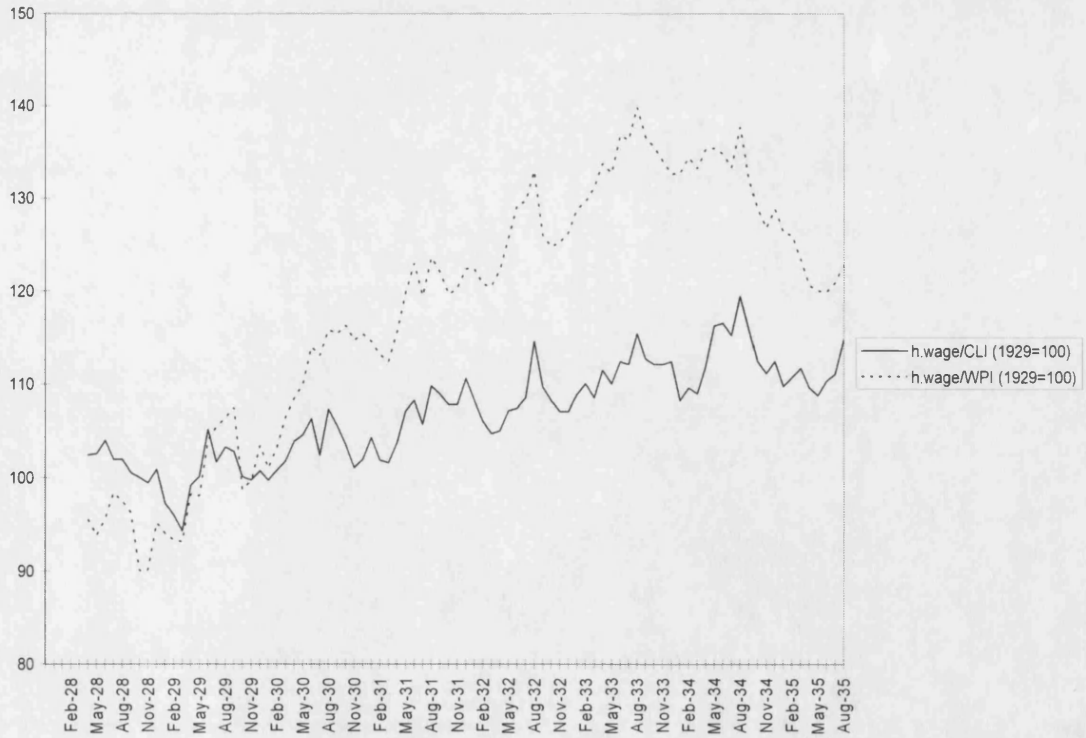


Figure 2.3: Real Monthly Wages of Factory Workers

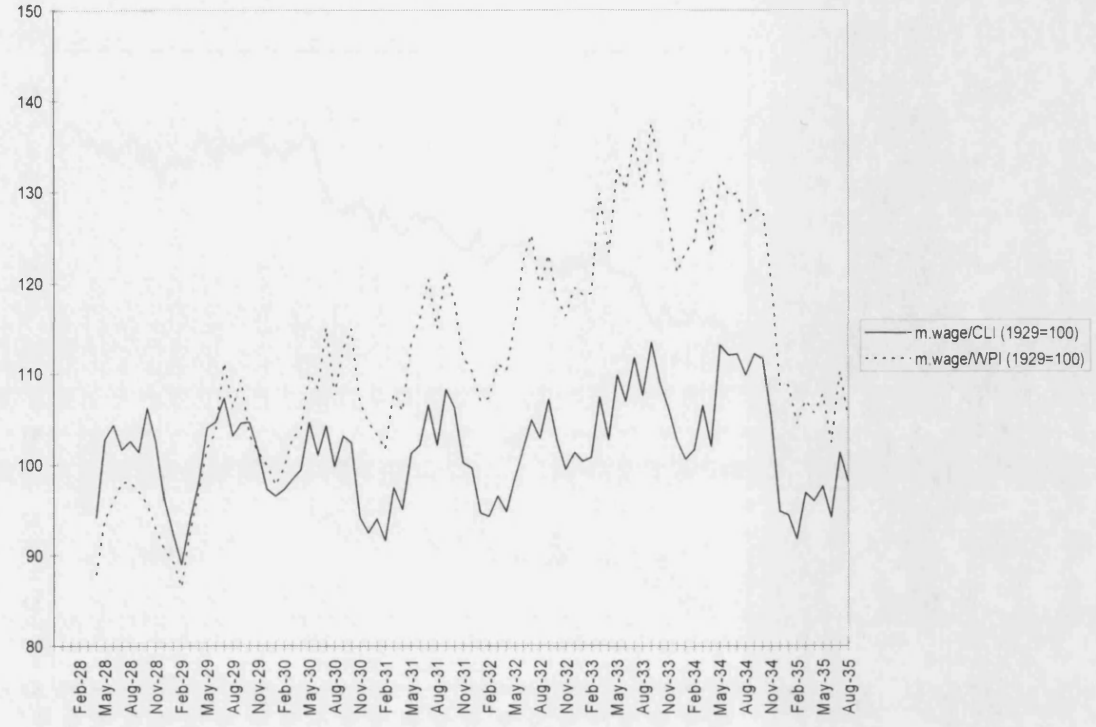


Figure 2.4: Further Measures of Real Hourly Wages of Factory Workers

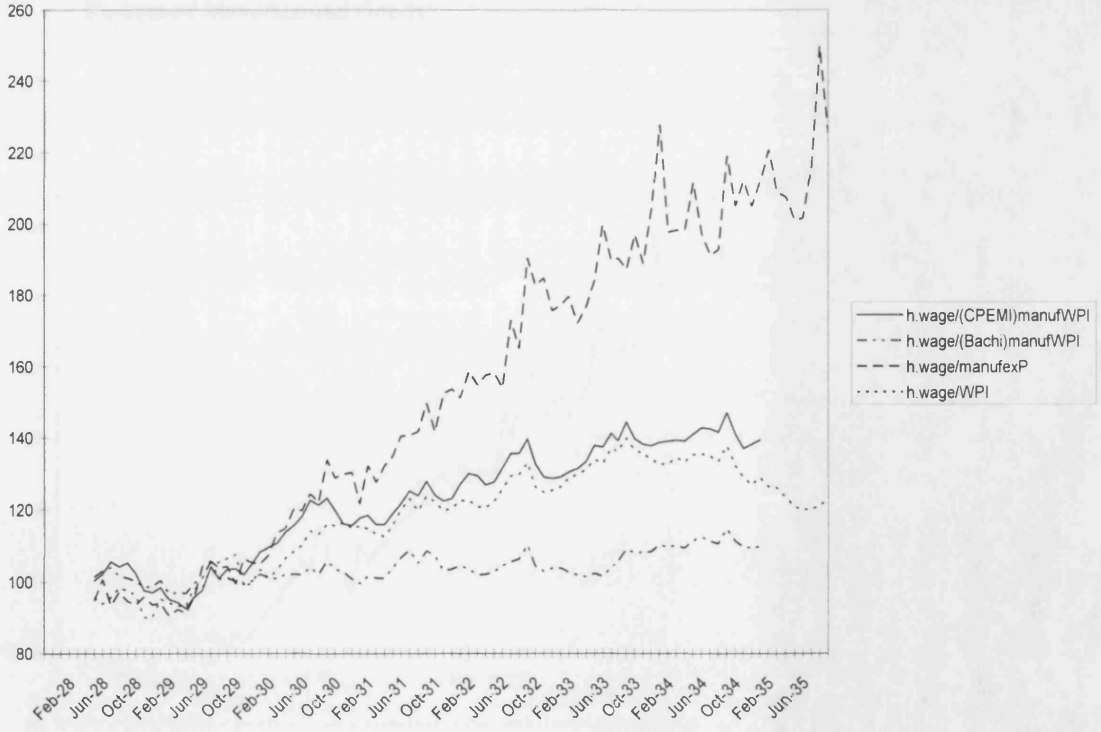


Figure 2.5: Nominal Hourly Wages of Factory Workers in Industries Exposed to and Sheltered From International Competition (Italian lira)

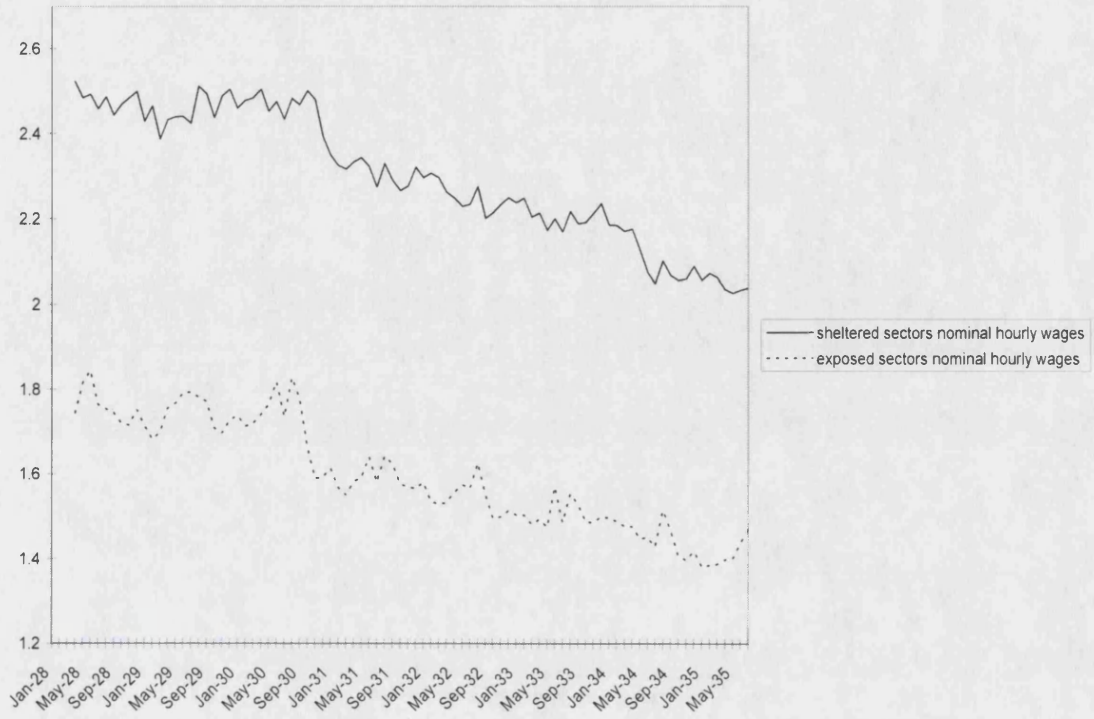


Figure 2.6: Nominal Hourly Wages of Factory Workers in Exposed Sectors Deflated by Prices of Exports of Manufactured Goods

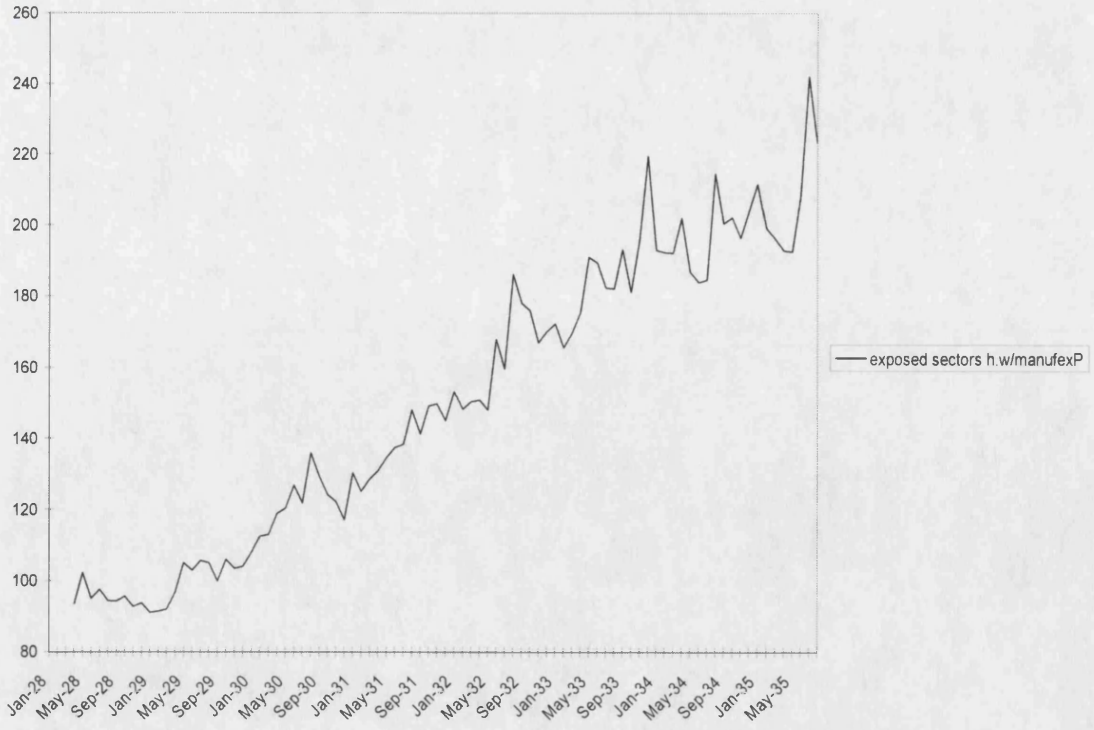


Figure 2.7: Nominal Hourly Wages of Factory Workers in Exposed Sectors Deflated by Wholesale Price Indices of Manufactured Goods

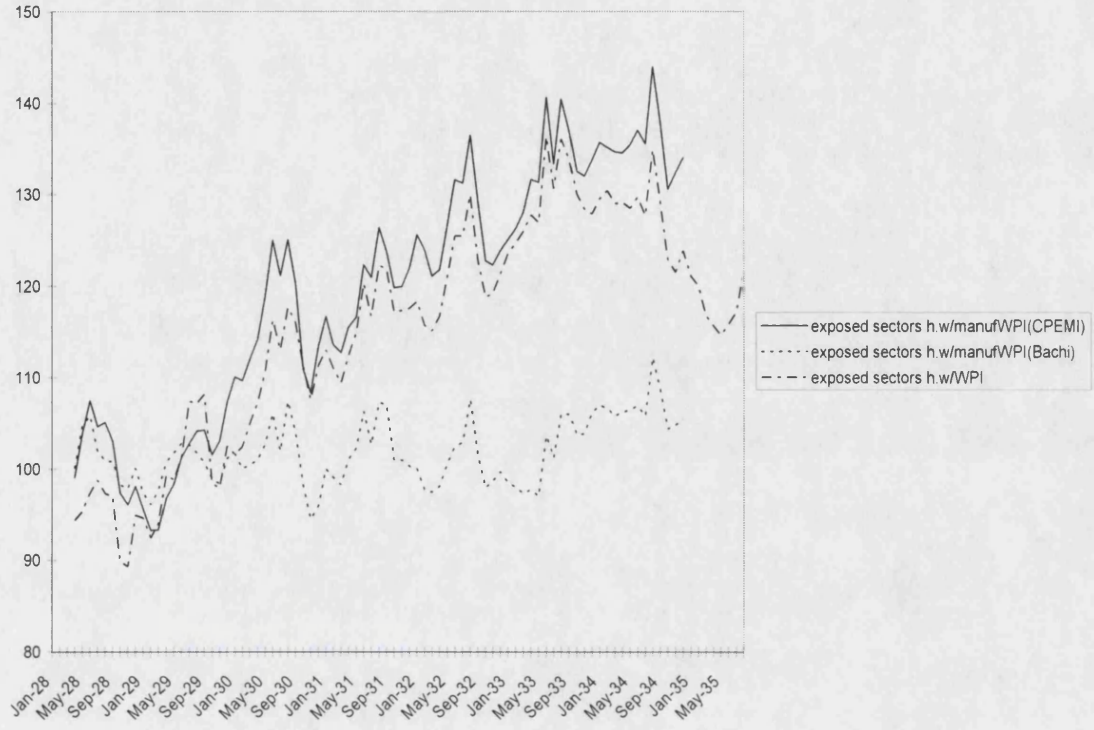


Figure 2.8: Nominal Hourly Wages of Factory Workers in Sheltered Sectors Deflated by Wholesale Price Indices of Manufactured Goods

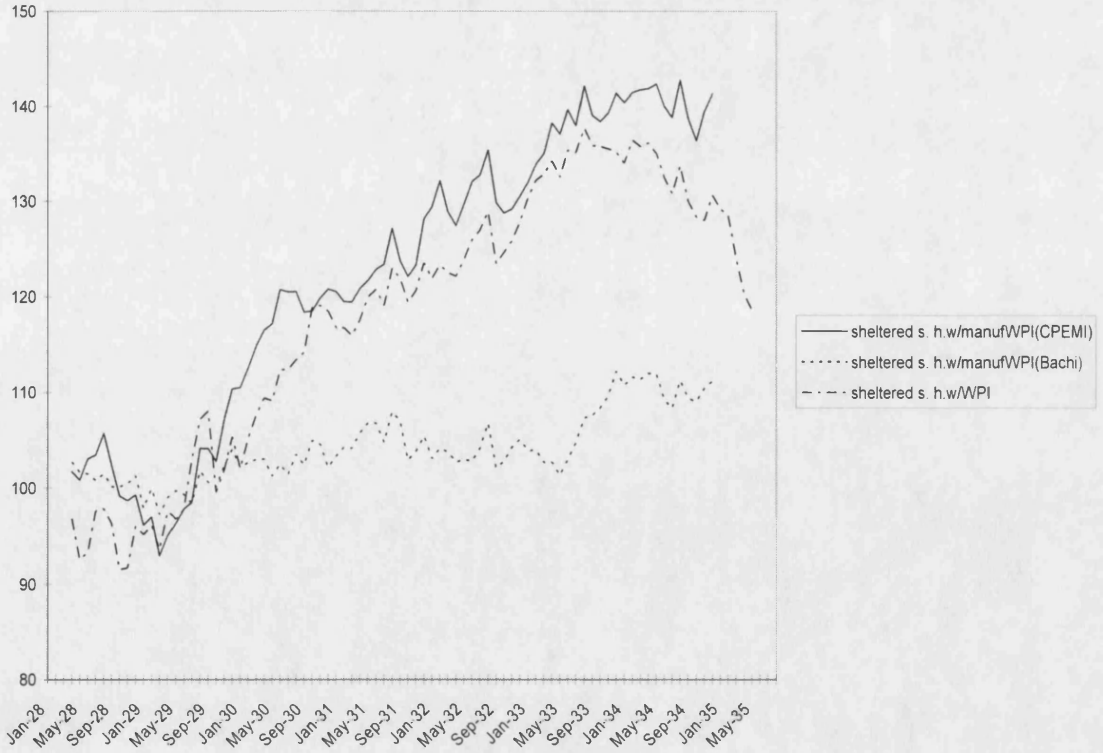


Figure 2.9: Real Actual and Trend Productivity Feasible Hourly Wages in the Industrial Sector

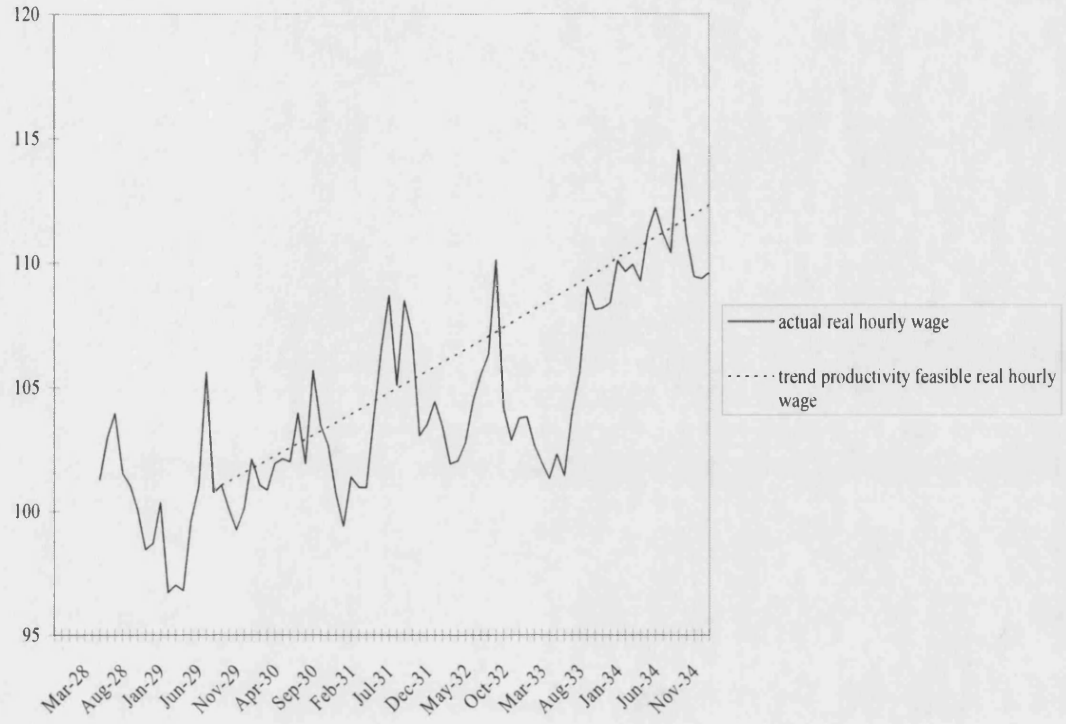


Figure 2.10: Nominal Actual and Trend Productivity Feasible Hourly Wages in the Industrial Sector

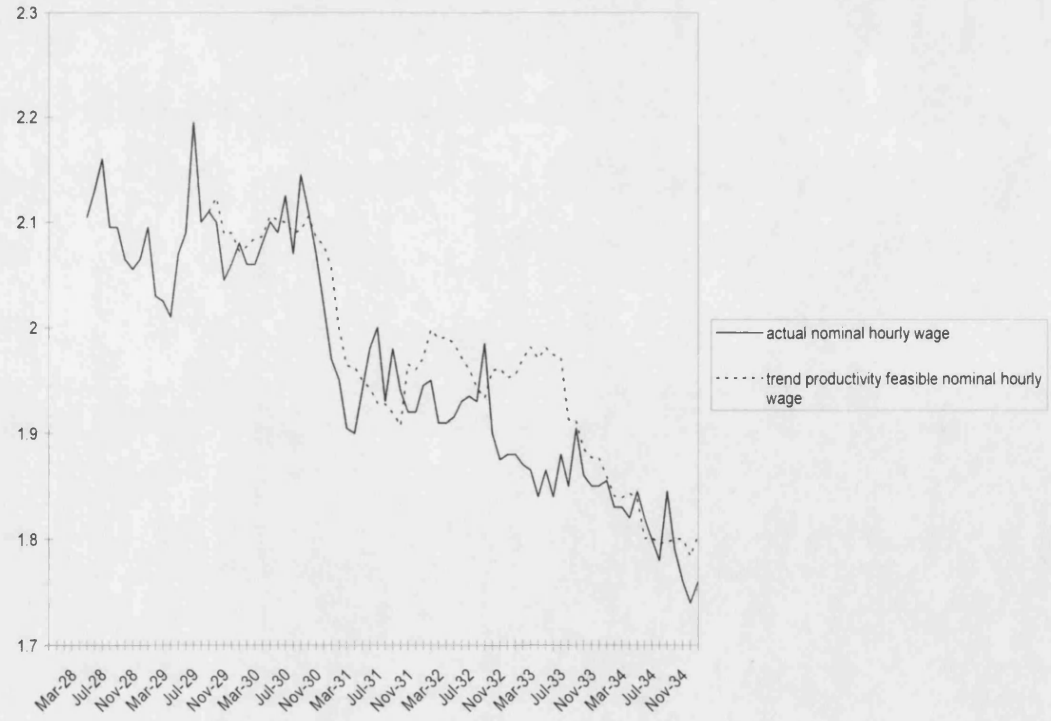


Figure 2.11: Actual and Fitted Values From the Estimated Labour Demand Equation for Exposed Industries

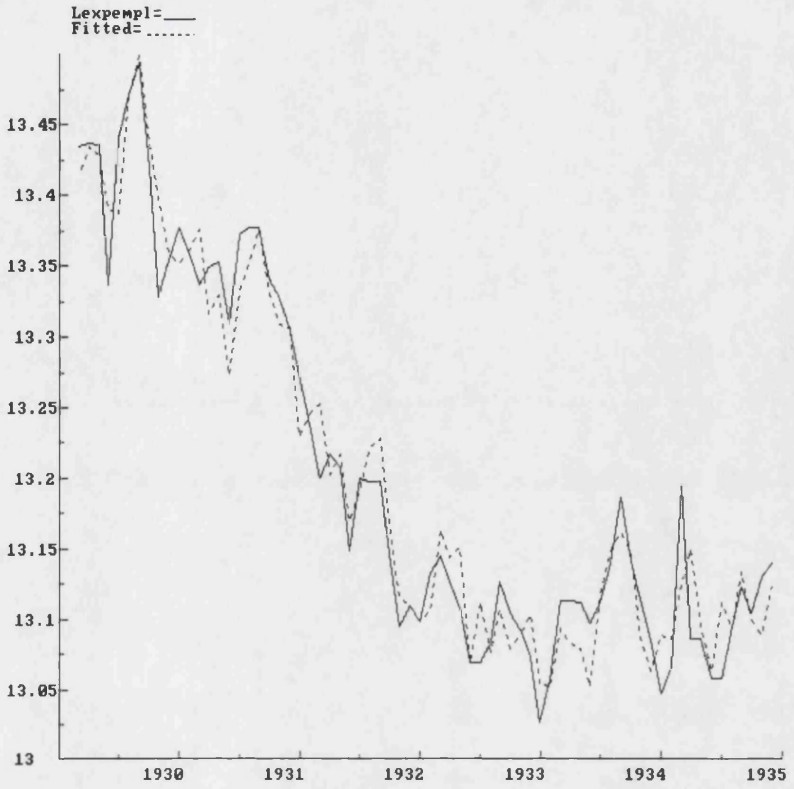
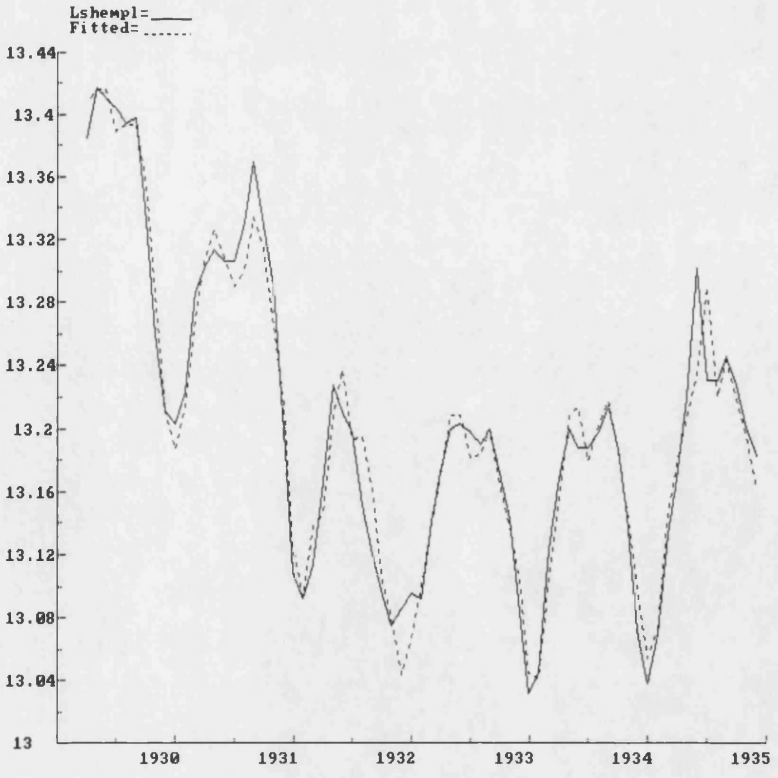


Figure 2.12: Actual and Fitted Values From the Estimated Labour Demand Equation for Sheltered Industries



CONCLUSIONS

Italy was on the Gold Standard between December 1927 and the *de facto* suspension of currency convertibility in December 1934. Furthermore, its economy was in crisis from the latter part of 1929 and did not experience a significant recovery until 1935. Hence the Italian case would seem to be one for which the evidence appears consistent with the hypothesis that Gold Standard membership prolonged and deepened the economic crisis.

In this study, the credibility in the eyes of the international financial markets of the commitment to remain in this exchange rate regime and the effects of the economic crisis, and hence also of this commitment, on the labour market have been investigated. In doing so, the consequences of the dictatorial nature of the country's government have also been considered.

Our analysis of the international financial markets expectations on the Italian lira-gold parity has led us to conclude that a devaluation of the currency was anticipated from the autumn 1929, but that none of the macroeconomic variables usually considered in models of exchange rate and balance of payments determination seems responsible for this low confidence in the sustainability of the gold peg. These results differ from those obtained in particular by Hallwood, MacDonald and Marsh (1996, 1997), who found no evidence of persistent expectations of devaluation, unexplained by similar macroeconomic variables, that did not precede an actual devaluation for the classical and inter-war Gold Standard exchange rates they considered. However, our results for the Italian lira-gold parity do seem consistent with evidence gathered from documents of the time (both from archival sources and from the financial press).

It would seem that the Italian government, as far as it could affect them, was able to prevent that any of the macroeconomic variables considered as possible explanatory ones deviated from a pattern consistent with the Gold Standard constraints enough to support expectations of its abandonment. However, it would appear that the role of the government's actual policies in the formation of the financial markets' expectations may have been less important than that of other determinants, in particular the dictatorial nature of the political regime. To this end we noted: that the Fascist government's decision process was less transparent than those of democratic executives; that it exerted a censorship which affected the perceived reliability of officially published economic data; and that it shared control with the central bank over the discount rate, thus inducing suspicion that monetary policy could have been aimed at other objectives instead of preserving the gold parity. All these elements may have made it difficult for foreign observers to correctly assess not only the sustainability of the exchange rate regime, but also the very stability of the political regime. Hence it would seem possible to argue that, in the presence of expectations of a devaluation of the Italian currency, which increased the costs of remaining in the Gold Standard (for example, by causing reserve losses which had to be followed by monetary tightening, which in turn only worsened the

economic crisis), the relatively small influence of actual policy on expectations could have been an additional reason for an early exit from the exchange rate regime.

Our analysis of real labour costs in the Italian industrial labour market during the Depression (1929-1934) has supplied evidence that they rose faster than productivity in industries that were exposed to international competition, but not in those sheltered from it. However, the estimation of labour demand functions (based on a model of a profit maximising representative firm facing imperfect competition in the output market) for the two sets of industries has suggested that further substantial cuts in nominal wages across all industries would have been needed to keep labour demand at its pre-crisis peak, to counterbalance the effects of movements not only in output prices, but also in input prices and aggregate demand.

These results are broadly consistent with those in previous literature on the Italian industrial labour market during the Depression. Furthermore they add some extra insights. In particular, the evidence of the importance of an appropriate choice of wage deflator would suggest that it could be worthwhile checking the robustness of Mattesini and Quintieri's (1997) results to changes in their measure of real wages. Moreover, the fact that real labour cost did not rise faster than productivity in the industries the government was more interested in could explain why it did not intervene to induce or force further wage cuts. Another factor that may have played a role in discouraging the government from using its powers of intervention in the labour market is that the worsening of factory workers' living standards throughout all the Fascist period could have meant that by the early 1930s they were approaching a lower bound below which social unrest would have occurred; a similar suggestion has been put forward by Toniolo and Piva (1988).

Finally this analysis suggests that a currency devaluation, accompanied by reflationary policies to generate price increases, could have reduced real labour costs and thus strengthened labour demand at constant nominal wages. It would therefore seem to confirm the thesis of Toniolo (1980) that an earlier abandonment of the gold peg would have been beneficial, and that the refusal by the Fascist regime to consider it contributed to the length and depth of the economic crisis. Therefore, insofar as the obstinacy with which the Fascist leadership stuck to the commitment to defend the Italian lira-gold parity, even after the most important members of the Gold Standard (UK and US) had abandoned it, can be attributed to the government's perception that it would thereby improve the international reputation of the country, and to the extent that this need was more acute (or was considered to be so) due to the dictatorship, the consequences can really be considered as an economic cost of the lack of democracy.

APPENDICES

Appendix A.1: Estimates of Gold Points and Their Violations

On the basis of the data on costs of gold transfers to and from Italy found in ASBI documents and of interest rates, some estimates of gold points for the lira exchange rates with respect to US dollar, UK pound and French franc are calculated.

None of these estimates take into account the additional costs arising because of convertibility restrictions. Therefore, the estimated gold export points can be considered as lower bounds of the actual values.

A.1.1. Gold Point Estimates and Violations for the Lira/Dollar Exchange Rate

Data on the costs of gold transfers between Italy and New York in the early 1928 and in late 1932 or early 1933 have been found in ASBI documents.

The first calculation of gold points is based on the data on gold transfer costs contained in a letter written by the delegate of the Bank of Italy in New York, Podestà, to the Bank's Governor, Stringher, on 27 January 1928 (see ASBI, Introna Ispettore, pratt., n. 3, fasc. 1). Podestà considered a gold transfer between New York and Naples and specified the following costs:

for gold transfers from New York to Naples:

packing	0.0070%
transportation from the Federal Reserve Bank to the steamer	0.0035%
freight (New York-Naples)	0.2500%
insurance	0.0750%
interest loss (10 days; interest rate=3.5%)[8]	0.0972%
total costs per dollar	0.4327%
total costs per lira (at the parity of $0.052631 per lira)	$0.000228
gold import point	$0.052859, or 18.918 lira

for gold transfers from Naples to New York:

handling	0.0035%
freight (Naples-New York)	0.2500%
insurance	0.0750%
mint expenses[9]	0.00127%
interest loss for the journey (10 days; interest rate=3.5%)	0.0972%

[8] This interest rate was the official discount rate in New York at the date of the letter.

[9] Podestà was able to specify the mint expenses in New York but he did not know whether the Bank of Italy would have charged gold importers with similar costs.

interest loss on 2% of gold value in New York (10 days; interest rate=3.5%)[10]	0.0019%
total costs per dollar	0.4403%
total costs per lira (at the parity of $0.052631 per lira)	$0.000232
gold export point	$0.052392, or 19.084 lira

It is worth noting that in all his calculations Podestà did not consider the costs of gold transfers between Naples and Rome. Therefore the actual gold export and import costs were higher that the estimated ones.

Podestà also calculated the gold import point for a 14 rather than 10 day journey and for different New York interest rates. In particular, when the interest loss was calculated for a 14 day journey at a 4% interest rate (i.e. the New York private discount rate), the gold import point became 18.908 lira per dollar (and the gold export point 19.092); when a 14 day interest loss at a 4.5% interest rate (i.e. the New York call money rate) was considered, the gold import point became 18.904 lira (and the gold export point 19.096). Finally, when a 10 day interest loss at the Italian private discount rate of 6.25% was considered, the gold import and export points became respectively 18.904 and 19.099.

The issue of which interest rate should be used when calculating gold points has been considered by Officer (1996). He has noted that the "[i]nterest loss was an opportunity cost for the arbitrageurs/transferors" (p. 162) and therefore the relevant interest rate was that on alternative investment opportunities available to these agents. In the case of the dollar/sterling exchange rate considered by Officer, the dominant arbitrageurs were the New York banks. Therefore Officer has identified the "pertinent interest rate" as "that obtainable on loans placed in the New York call-money market" (ibidem).

However Officer's criterion does not seem to be useful for the estimation of gold points for the lira exchange rates. As a matter of fact there is no evidence of gold exports from Italy before March 1934,[11] while the gold imports seem to have been organised not by private agents when the lira was particularly strong, but rather by the Bank of Italy, in its efforts to increase the share of gold reserves with respect to those in gold currencies, and independently from their profitability.[12]

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[10] The New York Mint paid 98% of gold value on delivery and the remaining 2% within ten days.

[11] The stock of gold reserves is non decreasing from December 1927 to February 1934. Furthermore, no mention of gold outflows before March 1934 has been found in archive documents. It can be noted that this evidence is consistent with the restrictions to lira convertibility described in Section 1.2.

[12] Various archive documents mention such gold imports. See, among the others, the letter to the New York Federal Reserve Bank vice-governor, Harrison, by his deputy, Crane, on 23 May 1928, where Stringher's plans to import gold from New York were described (doc. 209 in De Cecco, 1993); the quotations from American financial press reported by the New York Bank of Italy's delegate, Podestà, in his memorandum on the week 15-20 September 1930, where a large gold import from New York to Italy is attributed to the Bank of Italy, because of its occurrence at a time when the lira/dollar exchange rate would have made gold export from Italy profitable (ASBI, Segreteria Particolare, pratt., n. 66, fasc. 1);

According to Officer's criterion, the Bank of Italy being the only agent in gold imports, it could be argued that the interest cost of gold import should be the interest rate on its alternative investment, hence maybe the Italian official discount rate. However this seems to be just a superficial application of Officer's criterion, because the Bank of Italy was not deciding its gold imports on the grounds of their profitability.

The application of Officer's criterion to gold exports is even more difficult. As the Bank of Italy was converting lira into foreign currencies only, the gold exports should have involved an intermediate country, whose central bank could have sold gold against its currency. To the best of my knowledge, no evidence of this kind of triangular gold exports has been found. Hence an attempt to identify the main agents implementing it, maybe by referring to the dominant ones in the dollar/sterling case, could be just speculation.

Therefore the choice of the appropriate interest rates in the estimation of gold import and export costs remains an open problem.

It can finally be mentioned that the delegate of the Bank of Italy in London, Nathan, argued that the agents implementing gold transfers (he was considering the London-Rome and Rome-London journeys) would have been in the importing country, and that therefore an interest rate of the destination country should have been used to calculate gold points (see Nathan's letter to the Bank's Director General, Azzolini, on 28 September 1928 in ASBI, Rapporti con l'Estero, cpl., n. 143).

In the above estimations, the gold import point decreases from 18.918 to 18.904 and the gold export point increases from 19.084 to 19.099 if a 10 day interest loss is calculated on the basis of the Italian private discount rate (6.25%) rather than the official discount rate in New York (3.5%).

If these gold points are interpreted as allowed percentage fluctuations around the 19 lira to the dollar parity, it can be noted that while the 3.5% rate would have allowed a 4.3‰ lira appreciation and a 4.4‰ lira depreciation, the 6.25% rate would have allowed a 5.1‰ lira appreciation and a 5.2‰ lira depreciation, that is a 0.8‰ wider band on both sides.

The Italian translation of a telegram sent on 2 March 1928 to the Bank of Italy by the Guaranty Trust Company of New York, in reply to a request of information by the Bank, allows a further gold point estimation (the document is in ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8). The cost elements reported in the document referred to a New York-Naples (or Rome) journey, and are presented in the following table:

freight	0.2500%
insurance	0.0750%
packing	0.0105%
commission	0.0075%

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the Bank of Italy's internal documents mentioning gold imports from New York on 16 July 1931 (ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8) and London on 9 September 1932 (ibidem).

customs expenses	0.0006%
total	0.3436%

If the Italian official discount rate (6.5%) on 10 March 1928 (date of the planned beginning of the journey according to the document) is considered as the appropriate opportunity cost, because the gold transfer would have been paid by the Bank of Italy, then the gold import point estimate is 18.902 for a 10 day interest loss, and 18.888 for a 14 day interest loss.

If the assumption is made that all elements of cost apart from the interest loss are equal for gold import and export,[13] also the gold export point can be calculated. If the Italian official discount rate is used to determine the interest loss, the gold export point estimate is 19.100 for a 10 day journey and 19.114 for a 14 day journey. If the official discount rate in New York (4.0%) is used, the gold export point estimate is 19.087 for a 10 day journey and 19.095 for a 14 day journey.

From internal Bank of Italy's notes dated 21 March 1928 (see ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8) further estimations of gold points can be made. These notes contained the following elements of cost for a gold transfer from New York to Naples (as for the calculations based on the above described Podestà's letter, the actual gold import costs were higher than those indicated in these notes, because they included also the costs of the Naples-Rome journey):

freight	0.2500%
insurance	0.0570%
packing	0.0105%
commission	0.0075%
customs expenses	0.0006%
total	0.3256%

In the document, the interest loss was calculated for a 15 day journey at a 2.5% interest rate. At the time, the official discount rate in New York was 4%, while the Bank of Italy's one was 6.5%. Thus the 2.5% rate seems too low, no matter what criterion was used to choose it. If the Italian official discount rate is considered as the appropriate opportunity cost, because the prospective gold import was being planned by the Bank of Italy, then the gold import point is 18.888 lira per dollar.[14]

If the assumption is made that all elements of cost apart from the interest loss are equal for gold import and export,[15] also the gold export point can be calculated. If the Italian official

[13] This is not strictly true. For example, the above described Podestà's letter indicated the costs at the New York Mint. Here these costs will be neglected. Thus, the calculated gold export point should be interpreted as lower than the actual one.

[14] With a 2.5% interest rate, the gold import point is 18.918.

[15] The same caveat highlighted in the previous case holds also here (see note 6).

discount rate is used to determine the interest loss on a 15 day journey, the gold export point is 19.114. If the official discount rate in New York is used, the gold export point is 19.094.

A final set of gold point estimations for the lira/dollar exchange rate can be based on the data on the costs for a gold transfer from New York to Genoa or Naples presented in a further Bank of Italy's internal memorandum (see ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8).[16] The document is undated, but its position in the file strongly supports the opinion that it was written in late 1932 or early 1933. The data reported in the document are:

Freight	0.2500%
Insurance[17]	0.0557%
Packing	0.0105%
Commission	0.0075%
customs expenses	0.0010%
Total	0.3247%

The interest losses are calculated on the basis of the Italian official discount rate. If the document was written between 2 May 1932 and 8 January 1933 (hence the relevant interest rate is 5.00%), the gold points are 18.913 and 19.088 for a 10 day journey and 18.903 and 19.099 for a 14 day journey. If the document was written between 9 January and 8 March 1933 (hence the relevant interest rate is 4.00%), the gold points are 18.918 and 19.083 for a 10 day journey and 18.910 and 19.092 for a 14 day journey.

It can be noted that the values of some of the costs were equal in all the examined documents (these include freight, packing, commission and customs expenses; these last two elements however were not considered by Podestà), while the reported insurance cost decreased with time (from 0.0750% in the first two documents, to 0.0570% in the third and to 0.0557% in the last).

Gold import point estimates lie in [18.888; 18.918]; gold export point estimates lie in [19.083;19.114]. These estimates imply a maximum allowed lira appreciation and depreciation against the dollar between 4.3-4.4‰ and 5.9-6.0‰ of the 19 lira per dollar parity. The maximum appreciation and depreciation allowed by the 18.90-19.10 gold points was by 5.3‰.

Besides the uncertainty in the calculation of interest losses (due to the choice of both the interest rate and the length of the journey), these gold point estimates may be affected by an undervaluation of gold transfer costs. The costs of the gold transportation do not refer, at least in three out of the four considered documents, to the complete journey. Apart from the estimates

[16] As in the previous lira/dollar gold point estimates, also in this case the costs for the journey from Genoa or Naples to Rome are neglected. Thus, also in this case, the actual gold transfer costs were higher than the estimated ones.

[17] In the document, three levels of insurance costs are presented. Here the lowest is reported, so as to prudently estimate gold transfer costs.

based on Podestà's letter, the others do not include mint expenses in New York. No estimate includes the costs arising from convertibility restrictions.

These observations would seem to suggest that the gold points set by the February 1928 royal decree may have undervalued actual gold transfer costs. Therefore an assessment of gold point violations based on the 18.90-19.10 gold points could be excessively severe. However the following analysis of gold point violations is based on them, because they are near to the means of the intervals containing the gold point estimates and because they seem to have influenced markets' confidence on the lira-gold parity (see Section 1.3.3).

The 18.90-19.10 gold points are compared with end of month data on spot, one-month-ahead and three-month-ahead forward lira/dollar exchange rates (from Einzig, 1937, Appendix I).

On the period January 1928-August 1931, the spot rate violated the 18.90 gold import point by no more than 0.11%; the one-month-ahead forward rate by no more than 0.05%; while the three-month-ahead forward rate did not violate this gold point. On the same period, the spot rate violated the 19.10 gold export point by no more than 0.16%; the one-month-ahead forward rate by no more than 0.34%; the three-month-ahead forward rate by no more than 0.84%.

However on the period September 1931-February 1933, spot and forward exchange rates were always above the 19.10 gold export point. In each month of the period, the spot rate violated this gold export point by a percentage lying in [0.73%; 4.95%]. The corresponding intervals for the one-month-ahead and three-month-ahead forward rates are, respectively, [1.15%; 5.86%] and [1.15%; 7.91%].

It would seem that the 19 lira per dollar parity was no longer credible after the pound crisis in September 1931 and that, from this date, the lira/dollar exchange rate regime was not a target zone centred around the 19 lira per dollar parity.

Nevertheless it would seem possible to argue that before September 1931 the violations of the 18.90-19.10 gold points do not impair the interpretation of the lira/dollar exchange rate regime as a target zone. All the more so in the light of the observation that very small extra costs of gold export due to the convertibility restrictions would be enough for the conclusion that no violation of the 19.10 point occurred to be warranted.

A.1.2. Gold Point Estimates and Violations for the Lira/Pound Exchange Rate

The only document containing information on the costs of gold transfers between London and Rome that has been found in ASBI is the letter written by the Bank of Italy's delegate in London, Nathan, to the Bank's Director General, Azzolini, on 28 September 1928 that has been mentioned in the previous Section with regard to the choice of the appropriate interest rate (see

ASBI, Rapporti con l'Estero, cpl., n. 143).[18] The data on the cost of gold transfers presented by Nathan are:

escorted transport from London to Rome	0.19 lira per pound of gold value
insurance	0.045 lira per pound of gold value
packing	0.004 lira per pound of gold value
interest loss (4 days; interest rate=5.25%)	0.056 lira per pound of gold value
total costs	0.295 lira per pound of gold value

Nathan used the total costs based on the 5.25% Italian private discount rate to determine the gold import point at 92.17 lira per pound, but he used a 4.25% British interest rate to calculate the gold export point at 92.75 lira per pound, due to his assumption that the agent paying the gold transfer was in the importing country.

Between January 1928 and August 1931, the spot lira/pound exchange rate[19] violated the 92.17 gold import point by no more than 0.12%; the one-month-ahead forward lira/pound exchange rate by no more than 0.03%; while the three-month-ahead forward rate never violated it. On the same period, the spot rate violated the 92.75 gold export point by no more than 0.53%; the one-month-ahead forward rate by no more than 0.59%; while the three-month-ahead forward rate by no more than 0.67%.

Therefore, it would seem possible to argue that the violations of the 92.17-92.75 gold points do not impair the interpretation of the lira/pound exchange rate regime as a target zone, during the entire period when both currencies were pegged to gold.

The observations made for the lira/dollar case on the approximations involved in the estimation of gold transfer costs and their likely undervaluation apply also here.

A.1.3. Gold Point Estimates and Violations for the Lira/French Franc Exchange Rate

A Bank of Italy internal note dated 25 March 1933 reported the costs (inclusive of transportation and insurance) of a gold transfer via railway from Paris to Rome on behalf of the Bank itself (see ASBI, Rapporti con l'Estero, pratt., n. 342, fasc. 8):

from Paris to Ventimiglia	7.313‰
from Ventimiglia to Rome	5.000‰
interest loss (2 days; interest rate= 4.56%)	0.25‰
total cost	12.563‰
gold import point	73.502 lira = 100 French francs
gold export point	75.372 lira = 100 French francs

[18] Actually, in this letter Nathan revised a previous gold point calculation, by modifying his interest rate choice. Thus, the other cost elements were the same in the two documents.

[19] The data on spot, one-month-ahead and three-month-ahead forward lira/pound exchange rates are end of month quotations from Einzig (1937, Appendix I).

The figure for the Paris to Ventimiglia cost was said to have been determined on the basis of an offer made to the Bank of Italy by the French Lazard Bank on 17 October 1931. The figure for the Ventimiglia to Rome cost was said to have been determined on the basis of railway fares for the Bank. The 4.56% interest rate is higher than the Italian official discount rate at the time (4%) and also than the Italian private discount rate (4.25%).

Gold points were calculated in the note from the parity of 74.437 lira to 100 French francs under the assumption that gold import and export costs were equal.

Another Bank of Italy internal note, dated 1 April 1933, presented quite different gold transfer costs (ibidem). The document read "Calculation of gold export point from Rome to Paris" and reported the following figures:

(door to door) transportation	3‰
insurance	0.40‰
packing	0.25‰
assay costs	0.25‰
interest loss (3 days; interest rate= 5%)	0.42‰
total costs	4.32‰
gold export point	74.761 lira = 100 French francs

Under the assumption that gold import and export costs were the same, except for assay costs, the gold import point is 74.137 lira to 100 French francs.

These gold export costs are much lower than those reported in the previous document, written just a week earlier, for the opposite transfer. The transfer costs before the interest loss were 12.313‰ in the previous document, while they are 3.99‰ in this one. In this document, unlike in the previous one, no indication of the source of information on which the figures were calculated was supplied. This could be a sign that the previous document's figures were more accurate.

Also the interest loss was calculated differently in the two notes: in the second one, both the number of days and the interest rate were higher. However neither the official nor the private Italian discount rates rose in that week. For what concerns the journey length, if the additional day in the second document cannot be explained by the time needed to obtain the payment for the delivered gold at the Bank of France (the hypothesis of delays in the payment of gold by the Bank of France is at the moment just a conjecture and no evidence can be provided to support it), it would seem that the references to the information sources in the previous document could make the 2 day figure more accurate.

Finally, the gold export point in the first document did not account for assay costs. If these were to be considered, the gold export point would raise from 75.372 lira to 75.391 lira to 100 French francs.

In a third Bank of Italy's internal note, dated 3 April 1933, the costs (inclusive of transportation and insurance) of a gold transfer via railway from Rome to Paris on behalf of private individuals were reported (ibidem):

from Rome to Ventimiglia	13.50‰
from Ventimiglia to Paris	7.313‰
interest loss (2 days; interest rate= 4.56%)	0.25‰
total cost	21.063‰
gold export point	76.004 lira = 100 French francs

The Rome to Ventimiglia cost was said to have been determined on the basis of railway fares for private individuals; the Ventimiglia to Paris cost had the same source as in the 25 March 1933 document. No assay costs were mentioned. The interest loss was based on the same interest rate and journey time as in the 25 March 1933 document, thus no delays in gold payments by the Bank of France were considered.

The gold transfer costs for private individuals were estimated as almost 68% higher than those for the Bank of Italy.

Under the assumption that private individuals would have borne the same costs for gold import and export, the gold import point was 72.870 lira to 100 French francs.

While the costs that the Bank would have incurred implied a 1.26% allowed appreciation or depreciation of the lira/French franc exchange rate with respect to its parity, the costs for private individuals implied a 2.11% allowed appreciation or depreciation. It would seem possible to argue that it is the costs for the private individuals that should be considered in estimating the gold points, because it would have been them who would have tried to exploit the profit opportunities arising from too large a depreciation or appreciation of the exchange rate.

It should also be recalled that the Bank of Italy was not selling gold to private individuals, thus they would have needed to afford the additional costs of obtaining gold from a third central bank before selling it to the Bank of France, if they wished to reap the profits arising from a large lira depreciation against the French franc.

A further set of estimates can be based on the data presented in the letter sent on 4 September 1933 to the Bank of Italy by a Swiss company, the "Società Anonima Svizzera Luciano Franzosini" (ibidem). In this letter, the cost of a gold transfer from Paris to Rome on behalf of the Bank itself, inclusive of insurance, customs, packing, etc., that is of all the costs up to delivery at the Bank of Italy, was set at 1.40‰. And the journey time was set at 3 days.

If the assumption that the Italian official discount rate (at the time, 3.5%) can be used to determine the interest loss is made, the gold import and export points are 74.314 and 74.566. If the lower French official discount rate (2.5%) is used, the gold points become 74.321 and 74.560. Under both assumptions, these gold point estimates are the nearest to the parity: they allow only a 0.22-0.23% depreciation or appreciation.

The interpretation of the lira/French franc exchange rate as a target zone is assessed firstly on the basis of the gold point estimates obtained by explicitly considering private individuals' costs (i.e. 72.870 and 76.004 lira to 100 French francs).

The spot, one-month-ahead and three-month-ahead forward rates (end of month exchange rate quotations published in Einzig, 1937, Appendix I) never violated the gold import point throughout the entire period January 1928-April 1934.

Between January 1928 and August 1931, the spot, one-month-ahead and three-month-ahead forward rates never violated even the gold export point. However, between September 1931 and April 1934 the gold export point was substantially violated by all these exchange rates: the spot rate violations were no larger than 3.55%; the one-month-ahead forward rate violations no larger than 4.61%; the three-month-ahead forward rate violations no larger than 7.11%.

It would seem possible to argue that the lira/French franc exchange rate regime was indeed a target zone until the pound crisis in September 1931. But it would seem difficult to support such an interpretation for the following period, even if, unlike in the lira/dollar case, it includes dates when the spot and the forward rates were lower than the 74.437 parity.

These conclusions do not seem to be impaired if estimates of gold points based on lower costs are considered. Between January 1928 and August 1931, the spot rate violated in two months the highest gold import point estimate (i.e. 73.314) but it never violated the second highest (i.e. 74.137); while neither of the forward rates violated even the highest gold import point estimate. In the same period, the spot rate violated only the lowest gold export point estimate (i.e. 74.566), by less than 1%, but it never violated the second highest (i.e. 74.761); while the one-month-ahead forward rate just violated the 75.372 estimate and the three-month-ahead forward rate violated this 75.372 estimate by no more than 0.30%.

The observation that none of the gold point estimates includes the additional costs arising from the convertibility restrictions would appear to strengthen the argument in favour of a target zone interpretation of the lira/French franc exchange rate regime between January 1928 and August 1931.

Finally, it is worth mentioning that also in the lira/French franc case the reliability of the gold point estimates is affected by the unresolved problem of the interest rate choice.

Appendix A.2: Determinants of Devaluation Expectations: Sources and Construction of the Dataset

The main criterion in the choice of the series by which to measure the variables considered as possible determinants of devaluation expectations is that they have to have been available to financial markets' agents when they formed their expectations.

The employed data on central banks' reserves are based on: for Italy, total reserves (i.e. gold plus gold currencies and gold currency denominated assets) at the Bank of Italy, as from ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues (the same data are available also from League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues); for US, gold reserves at the Federal Reserve Banks, as from League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues; for UK, gold reserves at the Bank of England, as from League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues; for France, gold reserves plus reserves in foreign assets (including funds available at sight and negotiable securities), as from League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues.

The first difference of the logarithm of each of the monthly series is used to calculate the differentials between reserves' growth rates in Italy and the other three countries.

The month to month growth rate is preferred to growth rates based on longer time intervals for all the relevant regressors to maximise the length of the sample period on which the equations for the determinants of devaluation expectations are estimated, given that for a large number of regressors data are available only from January 1928. The disadvantage of this choice is that a growth rate based on a shorter period is affected by a larger noise component.

The inflation rate for each of the four countries is calculated as first difference of the logarithm of a wholesale price index. The sources of these price indices are: for Italy, Cotula and Spaventa (1993, Tav. A.15. This index is based for 1928-1929 on ex-post calculations, and for 1930-1931 on monthly interpolations that could have been implicitly done at the time. However, for the entire period, similar monthly series of wholesale price indices were published by ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues); for US, UK and France, League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues.

The employed growth rates of monetary aggregates are first differences of the logarithms of the following series: for Italy, banknotes circulation as from ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues; for US, M1 as from Friedman and Schwartz (1970, Table 1, Col. 8); for UK, M1 as from Capie and Webber (1985, Table I.(2), Col. I); for France, (seasonally unadjusted) M2 as from Patat and Lutffalla (1986, Table 1 of the appendix).

The values of exports and imports published for all four countries in League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues, are used to calculate the logarithms of the exports over imports ratios. Values rather than quantity indices are chosen because the regressor is interpreted as a measure of the effect of international trade on reserves.

The employed data on output growth rates are first differences of the logarithms of the following series: for Italy, from January 1929 to August 1931 a proxy of the Ministry of Corporations' industrial production index (published from 1934 both in Ministry of Corporations, *Sindacato e Corporazione*, Rome, various issues, and in ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues) and for 1928 a backwards prediction of the same index, calculated as described below, in Appendix A.2.1; for US and France, monthly indices of industrial production as from League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues; for UK, a monthly index of business activity calculated as described below, in Appendix A.2.2.

The employed data on bankruptcies and protests are the first differences of the logarithms of the indices for these variables published in ASSONIME, *Bollettino di Notizie Economiche*, Rome, various issues.

The employed data on stock market indices are the first differences of the logarithms of the general index and the index for the banking sector published in ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues (series calculated by Prof. Bachi).

A.2.1. The Italian Index of Industrial Production

When, in 1934, the Ministry of Corporations began to calculate a monthly series for industrial production, it set January 1929 as starting date of the series. The criteria on which these calculations were based were described in both the periodicals that published the series: briefly in ISTAT, *Bollettino Mensile di Statistica*, Rome, August 1934 and following issues, and more in detail in Ministry of Corporations, *Sindacato e Corporazione*, Rome, 1-2, July-August 1934 and following issues. These sources explained that the index was based on two successive aggregations, via weighted geometric means, of 32 elementary components (the weights being workers employed in the various industries in the first aggregation, and employed workers combined with value added in the second one).

Despite the fact that financial markets' agents could not know this index during the period January 1928- August 1931, they may have used the partial indicators of industrial production that were published at the time to implicitly calculate a proxy of a more comprehensive industrial production index.

Hence here the fitted values from the regression of the Ministry of Corporations' industrial production index on a set of indicators available at the time are used to calculate the differentials between measures of output growth for Italy and the other countries for the sub-period starting in January 1929, while the predicted values from the same model are considered for 1928.

The model specification chosen to proxy (from January 1929 onwards) and predict backwards (for 1928) the values of the industrial production index is:

(A.2.1) $$\text{indprod}_t = \gamma_0 + \gamma_1 \text{elpw}_t + \gamma_2 \text{steel}_t + \gamma_3 \text{wkdhrs}_t + \gamma_4 \text{empl}_t + \varepsilon_t,$$

where: all the variables are in logarithms; indprod is the Ministry of Corporations' industrial production index; elpw is an index of production plus imports of electrical power (source: ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues); steel is an index of steel production (same source); wkdhrs is an index of the total number of worked hours in the industrial sector (based on the surveys of the industrial labour market carried out by the confederation of industrialists, and published, as mentioned in Section 2.3, both in ASSONIME, *Bollettino di Notizie Economiche*, Rome, various issues, and in ISTAT, *Bollettino Mensile di Statistica*, Rome, various issues); empl is an index of the number of workers employed in the industrial sector (based on the same surveys and calculated by Zamagni, 1994, Tab. 11).

The OLS estimation results relative to the specification in equation (A.2.1) are presented in Table A.2.1:

Table A.2.1: A Proxy for the Italian Industrial Production Index: OLS Estimates (January 1929- August 1931)

	coefficients (and t-ratios)
constant	-2.1886 (-1.680)
$elpw_t$	-0.50410 (-2.337)
$steel_t$	0.11558 (1.568)
$wkdkrs_t$	0.29875 (0.970)
$empl_t$	1.5746 (3.991)
R^2	0.837005
number of observations	32

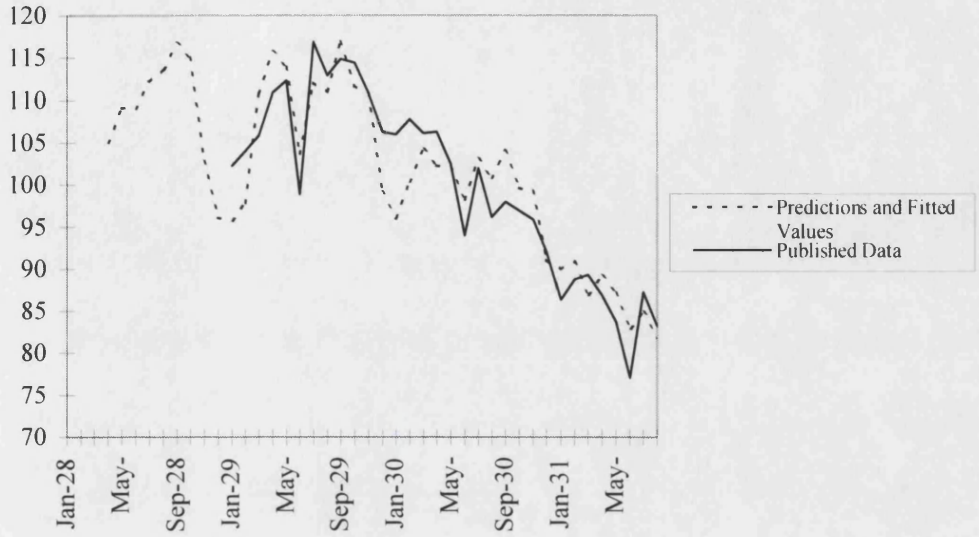
The high R^2 suggests that financial markets' operators at the time may have been able to implicitly calculate quite a good proxy of the industrial production index that the Ministry of Corporations began to publish only in 1934.

Furthermore the predictions generated by this model are consistent with the information on industrial production available at an annual frequency. In particular the indices calculated by both ISTAT and OEEC indicate that the average industrial production in 1928 was slightly smaller than that in 1929 (the figures being 99 for 1928 and 100 for 1929 according to OEEC; 98 for 1928 and 100 for 1929 according to ISTAT. See, respectively, OEEC, *Statistiques industrielles 1900-1955*, Paris, 1956, Addendum, and Ercolani, 1969). A slight increase in industrial production from 1928 to 1929 is observed also if the predictions generated by the model presented above for 1928 are compared with the actual data for 1929 (or the fitted values generated by the model): the predicted 1928 peak is at 116.70 while the actual peak in 1929 is at 116.90 (and the fitted values' 1929 peak at 116.91).

The comparison with the available annual data allows in particular to prefer the specification in equation (A.2.1) to that which includes also a linear trend among the regressors: the model with trend predicts not only a 1928 peak larger than the actual 1929 one (124.04 with respect to 116.90), but also 1928 values generally higher than the actual 1929 ones.

The predicted and fitted values generated by the model in equation (A.2.1) are presented in Figure A.2.1, together with the published data.

Figure A.2.1: Italian Industrial Production Index: Published Data, Predictions and Fitted Values



A.2.2. The UK Index of Business Activity

For the UK, no monthly series on industrial production is available for the considered period. However, a quarterly series was published by League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues, and *Economist* calculated a seasonally adjusted monthly series for an index of business activity. This second index was intended to be "an attempt to measure changes in the economic activity of the country quantitatively and not in terms of values; in other words, it [was] intended to give an approximate indication of variations in the "real" national income" (*Economist, Trade Supplement*, No. 145, June 29, 1935, p. 42). The index was regularly published starting from *Economist, Trade Supplement*, October 21, 1933, where the method for its construction was first described. This method was then subjected to minor changes in *Economist, Trade Supplement*, No. 145, June 29, 1935 (mainly, the number of component series was slightly reduced, and a geometric mean rather than an arithmetic one was used for the aggregation).

Here a seasonally unadjusted index of business activity for the UK, based on the method and most of the components indicated by *Economist, Trade Supplement*, No. 145, June 29, 1935, is calculated for the period January 1928-August 1931 and is then used in the equations for the determinants of devaluation expectations.

Despite the fact that *Economist*'s index of business activity was not actually available to contemporaries in the period January 1928-August 1931 (as the seasonally unadjusted version calculated here), it may be argued that agents in the financial markets could have implicitly had a knowledge of the trends in economic activity not very different from that implied by such index. Firstly they knew the quarterly industrial production index published by League of

Nations, *Monthly Bulletin of Statistics*, Geneve, various issues. Furthermore it would seem reasonable to assume that they broadly shared the *Economist*'s opinion about which variables could be used as indicators of economic activity (the component series were published throughout the considered period) and their relative importance (expressed by the weights with which they entered the *Economist*'s index). Hence the use of the seasonally unadjusted index of business activity, calculated as described below, can be argued not to constitute a substantial violation of the earlier stated criterion for the choice of the series via which to measure the regressors in the equations for the determinants of devaluation expectations, that is their presence in the financial markets' agents' information set.

The component series with the largest weight in the *Economist*'s business activity index (see *Trade Supplement*, No. 145, June 29, 1935) is that for employment. As in that index, also in the seasonally unadjusted one calculated here the employment series is based on the figures on workers insured against unemployment in Great Britain and Northern Ireland who are not unemployed (either temporarily stopped or wholly unemployed) published monthly in the *Ministry of Labour Gazette*, various issues. Unlike in the *Economist* case, no seasonal adjustment is made here.

A series on coal production (published in the *London and Cambridge Economic Service Bulletin*, various issues) is used instead of that on coal consumption employed by *Economist*.

The index for production of electricity calculated by *Economist* (as described in the July 10, 1926 issue, pp. 57-58) and regularly published throughout the sample period is used as a proxy for the industrial consumption of electricity measure included in *Economist*'s index. This choice is based on the observation that the production of electricity index was calculated so as to be a measure of "the trend of electrical power production in the principal industrial centres of Britain" (*Economist*, July 10, 1926, p. 58) and hence "to show the fluctuations in activity in those firms that had adopted electricity as a motive force"(p. 57).

Merchandise on railways is measured via the same series on tonnage of freight carried on standard-gauge lines of Great Britain, less coal and coke, used in *Economist*'s index (and regularly published in *Economist, Trade Supplement*), because that component was seasonally unadjusted also there.

Building activity is measured on the basis of the same figures on the values of building plans approved by local authorities in England and Whales (monthly published in the *Ministry of Labour Gazette*) used in *Economist*'s index, deflated by the Board of Trade's general wholesale price index (published for example in the *London and Cambridge Economic Service Bulletin*, various issues).

The sum of the series on iron and steel production (published in the *London and Cambridge Economic Service Bulletin*, various issues) is used instead of that of iron and steel consumption employed by *Economist*.

The series of imports of raw materials and exports of UK manufactures (in values, published in the *London and Cambridge Economic Service Bulletin*, various issues), deflated respectively by the Board of Trade's wholesale price indices for materials and general (same source), are also used.

Shipping movements are measured by the data on the tonnage of ships with cargoes entering and leaving British ports (published in the *London and Cambridge Economic Service Bulletin*, various issues).

Finally a series of the total clearings granted in Town and Country by the London Bankers' Clearing House (as from the *London and Cambridge Economic Service Bulletin*, various issues) is considered. A price index similar to that employed by *Economist* is calculated to deflate it, as weighted arithmetic average of the *London and Cambridge Economic Service Bulletin*'s index of wages (with a weight of 2), the Ministry of Labour's cost of living index (published in the *London and Cambridge Economic Service Bulletin*, with a weight of 2), and the Board of Trade's general wholesale price index (same source, with a weight of 1).

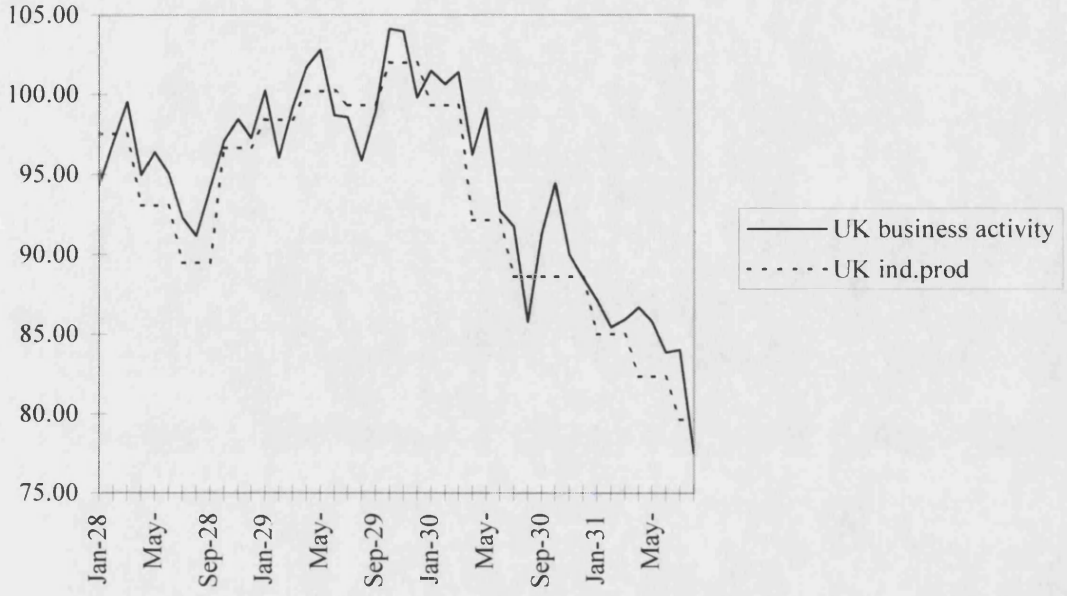
For each of the employed component series, a transformation into an index whose average over 1929 equals 100 and the same weight as in the *Economist*'s index are used in the geometric average (the only exception being the weight for bank clearings). Hence the weights are: 10 for employment, 4 for coal production, 2 for electricity production, 4 for merchandise on railways, 2 for building activity, 2 for iron plus steel production, 2 for imports of raw materials, 3 for exports of manufactures, 2 for shipping movements, and 4 for bank clearings. Therefore, the component series' weights' sum is 35 for the index calculated here, while it was 42 for the *Economist*'s index.

The additional series included in the *Economist*'s index but not in that calculated here are: commercial motor vehicles in use (with a weight of 2), postal traffic receipts (with a weight of 3), and consumption of cotton (with a weight of 1). Furthermore the *Economist*'s index included two series of bank clearings: metropolitan, country and provincial bank clearings (with a weight of 4), and town clearings (with a weight of 1).

The business activity index calculated here is presented together with the quarterly index of industrial production published in League of Nations, *Monthly Bulletin of Statistics*, Geneve, various issues, in Figure A.2.2.

The path of the business activity index is so close to that of the industrial production one to justify the assumption that an index similar to the business activity one could be in the financial markets' operators' information set.

Figure A.2.2: UK Indices of Business Activity (Calculated Here) and Industrial Production (League of Nations) (1929 average=100)



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