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INFLATION AND CURRENCY DEVALUATION IN ITALY (1971-1979)

by Antonio Di Ruggiero, Mauro Rota

Italy experienced higher and more persistent rates of inflation than other western economies during the Great Inflation (1971-1979). The policy response in Italy was prompted by the idea that wages were the carrier of inflation, and that the devaluation of the lira was the only viable response to sustain firms' profit rates and aggregate demand. We discuss the relevance of this policy approach, and conclude, against the prevalent view, that the devaluation worsened the inflation spiral while wages played only a marginal role.

Keywords: inflation, exchange rate policy, cointegration, Italian economy.

L'Italia ha sperimentato tassi di inflazione più elevati e più persistenti rispetto ad altre economie occidentali durante la Great Inflation (1971-1979). La risposta dei policy maker in Italia assunse che i salari fossero il principale vettore dell'inflazione e che la svalutazione della lira fosse l'unica risposta praticabile per sostenere i tassi di profitto delle imprese e la domanda aggregata. Abbiamo analizzato tale impostazione di policy e abbiamo concluso che, in opposizione all'opinione prevalente, la politica di cambio rappresenta la principale fonte della spirale inflazionistica in Italia e che i salari hanno svolto solo un ruolo marginale nell'aumento dei prezzi.

Parole chiave: inflazione, politica dei tassi di cambio, cointegrazione, economia italiana.

1. Introduction

How do policy makers react to inflation? The question seems outdated in the current world characterised by persistent periods of low inflation or even episodes of deflation, at least in the western economies. However, industrialised countries experienced periods of high inflation during the 20th century, the causes of which can be found either in market mechanisms or in the policy responses. We look at the history of Italy, and study how policy makers behaved during the period 1971-1979, when inflation in Italy reached unprecedented heights.

The current study sheds light on the relationship between the exchange rate policy and inflation in Italy in order to unveil the reasons and consequences of the broader policy

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strategy implemented during one of the stormier epochs of the economic and political history of the country. We suggest the high rates of inflation experienced by Italy during the 1970s were the outcome of the devaluation of the lira, which policy makers implemented as a response to the deterioration of firms' profit rates. In this context, wages, often declared as the primary explanation, did not play a crucial role in sustaining inflation.

The end of the fixed exchange rates system in 1971 worsened the Italian balance of trade, and exposed domestic firms to a stronger foreign competition. At the same time, both the wage claims of the late 1960s, and the oil and commodity shocks of the early 1970s deteriorated firms' profit expectations, and eventually depressed domestic demand. Indeed, Italian policy makers used exchange rates as the main policy instrument in order to spur domestic economic growth and to sustain firms' profit rates.

According to Guido Carli, the Bank of Italy Governor at the time, the inability to control wages and prices left no choice other than the devaluation of the currency to counterbalance the decreases in firms' profit rates (Bank of Italy, 1972-1973). In fact, wages were perceived as an independent variable the growth of which above the labour marginal productivity would hamper the competitiveness of the Italian industrial system. The agreement of a full indexation of wages, signed by unions and firms' associations in 1975 (also known as *punto unico di contingenza*) allegedly accelerated inflation rates. The argument advanced by policy authorities was that the Italian firms competed on price on the international markets, and, thus, any increase in labour cost would worsen competitiveness, and depress profit rates. Carli considered the devaluation of the lira in real terms to be the only viable response to preserve the international competitiveness of the domestic industrial system.

We argue, however, that the chosen exchange rate policy was an unfortunate response to the growth of prices and production costs, and served only to fuel the spiral of depreciation and inflation that characterised the Italian economy until 1979. Italian economists, such as Salvati (1984), Andreatta and D'Adda (1985), and Barca (1997), pinpointed the nexus between the devaluation policy and inflation rates during the 1970s. Yet, Augusto Graziani (1998) was the first to describe the aims and scope of the exchange rate policy put in place by Italy during the floating exchange rate regime. Italy conducted a differentiated exchange rate policy with respect to the USA and Germany, its two main trading partners. Policy makers sought to devalue more against the German mark because of the German firms' competition on the market of goods, and to devalue less, or slightly revalue, against the US dollar, because raw materials and energy were swapped in dollars. The underlying policy objective was to obtain a level of real exchange rate so as to guarantee the competitiveness of the Italian industrial sector. Nevertheless, this strategy seemed to have contributed to boost domestic inflation diametric to its purpose.

Our empirical analysis shows that the exchange rate policy was a key source of inflation across the 1970s and that the increases in domestic prices did not affect devaluation in a systematic way. Moreover, wages did not contribute to feeding inflation in the long run, suggesting that both the Central Bank and the government misunderstood their policy responses in the new context determined by floating exchange rates. Our empirical strategy involves a test as to whether inflation, measured by the variations in the consumer price index (CPI), and the real exchange rates of the lira against the US dollar and the German mark co-evolved in the long run through a cointegrating relation from January 1972, the end of the Smithsonian agreement, to March 1979, the start of the European Monetary System (EMS). In what follows, we define exchange rates in terms of direct quotation, meaning that an increase in the real exchange rate turns into a devaluation.

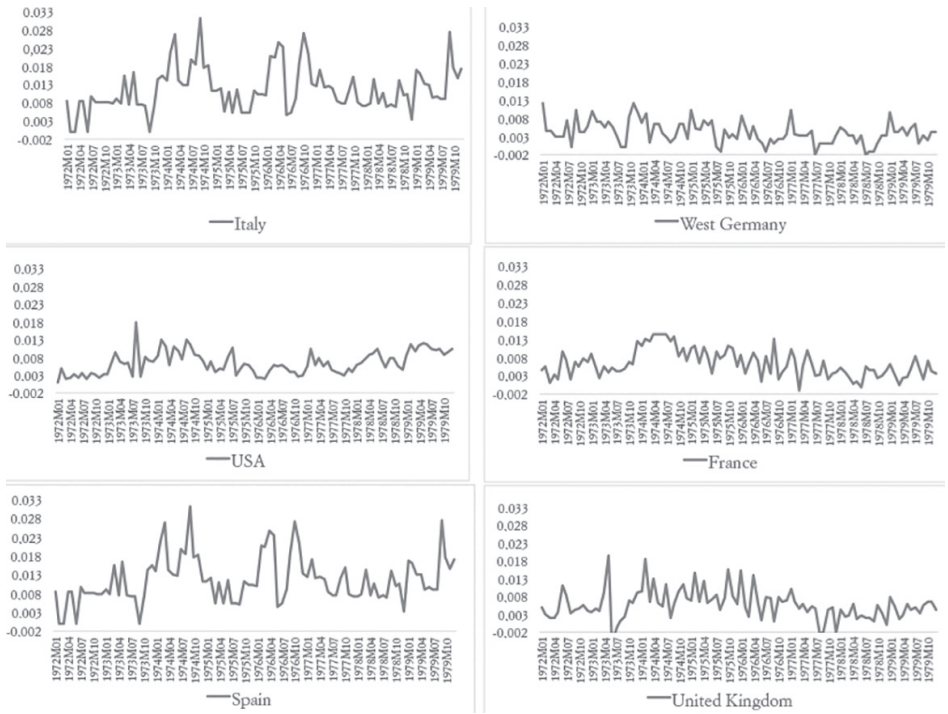
We complete our validation procedure of the concurrent explanations of the spiral between devaluation and inflation by checking whether real wages had a significant impact on prices. The results clearly show that there is no effect of real wages on inflation, both in the long and in the short run, when trying to establish robustness of our empirical findings. These results cast doubts on the consolidated belief that the inflation rates in Italy where triggered by uncontrolled wage claims during the 1970s.

The rest of the paper proceeds as follows. Section 2 provides an overview of the literature regarding the Great Inflation. Section 3 introduces the historical debate on the Italian policy responses to inflation. Section 4 shows our results, the robustness of which are presented in Section 5. Section 6 provides readers with the implications of our findings. Section 7 concludes.

2. The determinants of the Great Inflation: an overview of the literature

All the western countries experienced high inflation rates from the early 1970s to the second oil shock of 1979. However, Italy experienced larger and more persistent inflation rates compared with its main trade partners such as Germany, France, and the USA. The different patterns of inflation during the period 1971-1979 are shown in Figure 1.

Figure 1. Patterns of monthly-to-monthly inflation by country from January 1972 to March 1979



Source: our computation on IMF (2009).

Several attempts were made to understand the causes of the Great Inflation of the 1970s. One branch of studies focuses on the role played by the sequence of adverse shocks to the supply side. The shocks to oil prices and other commodities created disturbances on the relative prices, which, in turn, may have had an outsized influence on aggregate inflation through the wage-price adjustment (Bruno and Sachs, 1985). This argument has been challenged by Barsky and Kilian (2004), who consider monetary fluctuations as the key factor in explaining the variations in commodity prices, and, thus, the following inflationary effects. The role of monetary and fiscal policies was aimed mainly at maintaining full employment at the price of rising inflation. Yet, a loose monetary policy to sustain output left inflation as the only legacy, without affecting the natural rate of unemployment (Friedman, 1976). Other studies emphasise the lack of credibility of central banks when pursuing discretionary policies (Clarida *et al.*, 1998). Economic agents learnt that central banks would not follow previously announced rules regarding price stability, and then revised their expectations leading to permanently higher inflation (Kydland and Prescott, 1977; Barro and Gordon, 1983a and 1983b). The argument of a bad monetary policy is reviewed by Orphanides (2003), who, through the lens of forward-looking and activist policy theories, concludes that monetary policy failed not because of inconsistency but because of imperfect forecasts of the natural rate of unemployment.

Cross-country studies of Nelson (2005 and 2007) compare the cost-push view of the Great Inflation with the standard monetarist theory, concluding that the inflationary spiral of the period 1971-1979, and the quick reduction of prices in the 1980s were pure monetary phenomena.

A further possible source of inflation can be found in the exchange rates. In particular, the literature on real exchange rate targeting has emphasised the unintended effect on inflation that can stem from a misalignment of the real exchange rate managed by policy makers (see Adams and Gros, 1986; Montiel and Ostry, 1992; Calvo *et al.*, 1995). Dornbusch *et al.* (1990) suggest that a devaluation of the real exchange rate increases real debt service, which, in turn, leads to creation of money that affects prices. Further, exchange rates may have a direct impact on prices through imported goods, including intermediate inputs. Currency depreciations correlate with increases in the cost of living, which can exert pressure on wages generating inflation if an institutional wage adjustment mechanism is effective.

The institutional setup of the international monetary system has been also invoked as a destabilising factor for the world economy. The Bretton Woods system constrained the monetary policy of member states to peg with the dollar. The stability of exchange rates during the Golden Age guaranteed both the growth of international trade, and a level of prices consistent with wage moderation and high investment rates. After the fall of the Bretton Woods system, and the inception of the floating exchange rate regime, policy makers would pay less attention to public spending, leading monetary authorities to conduct more inflationary policies (Eichengreen, 2007). An opposite view argues that prices were already rising before the collapse of the Bretton Woods agreements because of both the excessive US debt and the global money growth, which contributed to feeding the commodity bubble of the early 1970s (Meltzer, 1991).

Specific causes of the Great Inflation in Italy have been identified by the economic and historical literatures in the wage-push hypothesis, in the fiscal dominance, and in the domestic social conflicts. The fiscal dominance hypothesis connects the inflationary bias with the large fiscal deficits financed by money creation (Fratianni and Spinelli, 2001) until

1981, when the Bank of Italy "divorced" from the Treasury. The social conflict perspective, instead, considers the Italian inflation as an unconscious outcome or a deliberate target generated by the interactions of different social groups under the idea that each group, rentiers, capitalists, or workers, can gain from inflation under different circumstances. Elena Seghezza (2019) has recently discussed that conscious social conflicts in Italy led to the period of high inflation, which, however, occurred with the help of key economic institutions including the Bank of Italy. Paolo Baffi, who chaired the Bank of Italy in the second half of the 1970s, argued that inflation rates were driven by clashing interests of social groups fighting for the as large as possible slice of the pie. However, the Central Bank could not avoid the escalation of prices because was unable, for institutional reasons, to pursue an inflation targeting monetary policy (Seghezza, 2019).

However, the most accepted explanation of the Italian Great Inflation is related to the wage-push perspective (Modigliani and Tarantelli, 1975 and 1977). Since the late 1960s, trade unions gained power in the bargaining process, and were able to push wages up. The excess of nominal wages with respect to labour marginal productivity increased unit labour cost, which increased final prices, and deteriorated real exchange rates. In turn, the exchange rate devaluation shifted prices up (pass-through effect), the growth of which was incorporated in wages through the sliding wage indexation system. In this view, the entire process is governed by the wages considered as the independent variable in the inflationary process. In the framework proposed by Modigliani and Tarantelli, the behaviour of unions is crucial. As it has been recently discussed (Ciccarone and Di Bartolomeo, 2018), the trade unions would have accepted a temporary excess of inflation over wages, which could reduce inflation expectations, eventually breaking the spiral between prices and wages. Moreover, the explanation provided by Modigliani and Tarantelli fits the mechanism that was at stake after the *punto unico di contingenza* was introduced, but gives little relevance to what happened before 1975, when the devaluation policy became the prevalent trait of the Italian economic policies.

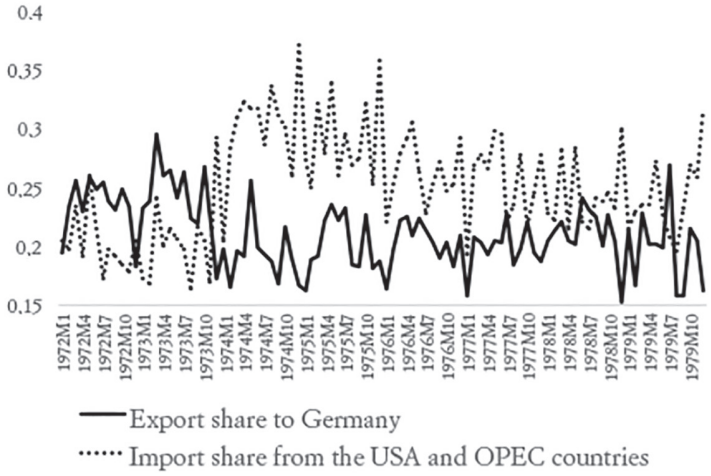
We argue that the previous explanations of the Italian Great Inflation underestimate another possible mechanism induced by the voluntary devaluation of the real exchange rate, which was instead discussed in the coeval policy debate.

3. The policy debate in Italy

As we mentioned in the introduction, there were good reasons behind the decision of letting the lira float on the international currency market. In 1973, Guido Carli, the Central Bank Governor, assumed that leaving the fixed exchange rate regime was a consistent response to speculative attacks against the lira and that its fluctuations were actually "imposed by the market".

Moreover, the devaluation of the lira responded to a domestic imbalance in the primary distribution between profits and wages. The wage share on total GDP began to increase at the expense of profits during the mid-1960s. Because the growth of wages was no longer dependent on productivity increases, unit production costs rose, and the Italian industrial competitiveness worsened. Firms could not react by increasing final prices unless they would accept losing competitiveness in front of their main trading partners. The combined effect was a temporary increase in the wage share, and a compression of firms' profit rates.

Figure 2. Italian export to Germany, and Italian imports from the USA and member countries of the Organization of the Petroleum Exporting Countries (OPEC)



Source: our computation from OECD Tradestats (2012).

According to Guido Carli, the difficulty of containing the increases in nominal wages and, thus, in the cost of labour would depress the rate of capital accumulation, unless a devaluation policy was introduced (Bank of Italy, various issues, and Roggi, 1987).

Because the Italian inflation was exclusively due to labour cost increases according to the Bank of Italy (1972), the devaluation of the real exchange rate served the policy target of transferring increases in labour cost into the final prices without any loss of firms' competitiveness on the foreign markets. Policy makers did not perceive devaluation as an additional engine of inflation. Moreover, they assumed that the devaluation would divert domestic demand from foreign goods to domestic goods sensitive to import price elasticity (Bank of Italy, 1974). In fact, the real exchange rate, capturing the overall competitiveness of the Italian industrial system, assumed the status of privileged policy variable in order to improve the balance of trade, to guarantee an adequate level of profits for the Italian firms, and to sustain economic growth.

Graziani and Meloni (1980) challenged the Bank of Italy's view by discussing whether devaluation was the proper policy instrument for multiple targets or whether it generated unintended consequences. The external devaluation of the lira conveyed the possibility for entrepreneurs to raise prices as much as they needed because competitiveness would not have been jeopardised by the devaluation. This incentive seemed to have taken place in Italy during the floating exchange rate regime as a result of continuous interventions of the monetary authority in the currency market, feeding the expectations that any increase in prices would be followed by the devaluation of the lira. It also perhaps explains why entrepreneurs did not oppose any resistance to wage increases. Thus, this mechanism led to a spiral between devaluation and inflation in which wages simply followed prices in order to keep their purchasing power as much as unchanged.

In fact, Graziani reverted the causality nexus between prices and currency devaluation. During the flexible exchange rate regime of the 1970s, he suggested that the Italian policy

makers were able to conduct a differentiated exchange rate policy. The core strategy was oriented to devaluing the domestic currency more against the German mark and to devaluing it less, or even revaluing it, against the US dollar. Italy succeeded in that strategy thanks to the constant appreciation of the German mark against the US dollar during the period 1971-1979 (Graziani, 1998). The motivation behind this policy was that the weight of goods traded in dollars accounted for 50% of imports, while the Italian exports were mainly directed towards the German mark area. Graziani criticised the exchange rate policy conducted by the monetary authorities because it generated an inflationary spiral in which wages simply ran after price increases.

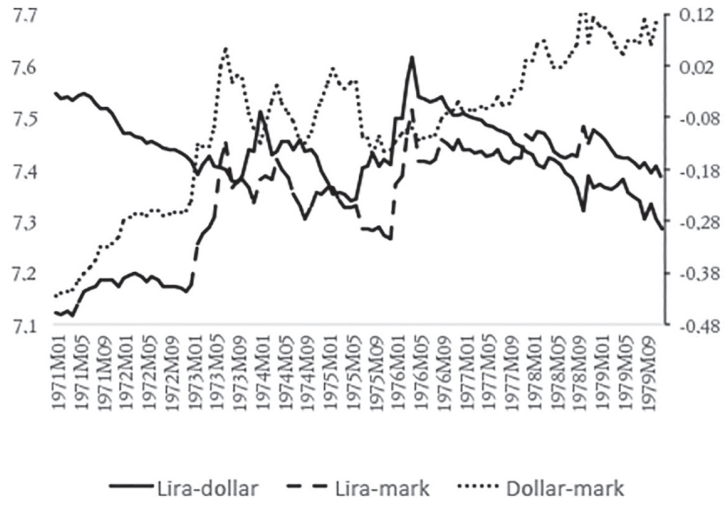
We use Graziani's scheme to investigate the role of devaluation in determining the rate of inflation in Italy, stressing that the spiral between devaluation and inflation was driven by the exchange rate policy strategy implemented under the flexible exchange rate regime.

We define as the nominal exchange rate of the domestic currency against one unit of foreign currency, and $\frac{P_f}{P_d}$ as the relative prices of goods and services expressed in the foreign and domestic currencies. Hence, we adopt the standard definition of real exchange rate:

$$R = \frac{e * P_f}{P_d}$$

The foreign and domestic price indices used here are the CPIs. In the rest of the paper, we rely upon this definition of real exchange rate. Figure 3 confirms that the real exchange rates of the lira against the dollar and the mark followed the scheme advanced by Graziani (1998).

Figure 3. Real exchange rates (log scale): lira-dollar and lira-mark (left axis), and dollar-mark (right axis)



Source: our computation on International Monetary Fund (2010).

4. Devaluation and inflation in Italy

The aim of this section is to clarify whether the devaluation policy implemented by the Italian policy makers triggered an inflationary spiral during the 1970s. Using the empirical and theoretical findings discussed in the previous section, we start by checking whether inflation and real exchange rates are tied by a long-run relationship from January 1972 to March 1979.

The analysis is based on the classical Johansen (1991 and 1995) approach, which considers three endogenous variables: ΔP, the inflation rate measured by the CPI variation, REXLD, the lira-dollar real exchange rate, and REXLM, the lira-mark real exchange rate. The inflation rate is expressed as the first log-difference of the CPI index, and the real exchange rates are both expressed in logarithms. All the variables are at monthly frequency. A set of monthly dummy variables is also introduced to control for possible seasonal effects. A stationary variable in the system will reveal itself by introducing restrictions on the coefficients of the cointegration vector of the form $\beta = (1,0,0)$. So, the test for zero restrictions suffices to check whether a long-run relationship is spurious, i.e. whether it reveals a stationary variable or not.

Table 1 reports the standard Johansen trace and max-eigenvalue tests of our system.

Table 1. Johansen cointegration test (sample: January 1972-March 1979)

	Trace test		Max-eigenvalue test	
Number of cointegrating equations	Trace statistics	5% c.v.	Max-Eigen statistics	5% c.v.
1	38.46	35.19	28.09	22.3
2	10.39	20.26	6.51	15.89

Note: vector autoregression (VAR) has been estimated to optimise the number of lags. The VAR residuals pass the usual tests of no-autocorrelation and normality at the usual level of significance. Hence, we compute cointegration test with 11 lags, c.v.: critical value.

Both tests suggest the existence of one cointegrating vector regardless of the assumptions we make about the deterministic component. In order to check whether it reflects a spurious relation or not, we impose a zero restriction to check whether the cointegrating vector is of one the following forms: $\beta = (1,0,0)$ or $\beta = (0,1,0)$ or $\beta = (0,0,1)$. If the imposed restrictions are rejected in all the cointegrating vectors at the usual level of confidence, we should conclude that all variables are integrated of order one. The three possible cointegrating vectors, in the case of a constant term in the cointegration equation, and the correspondent likelyhood-ratio tests (LR tests) for binding restrictions are reported in Table 2. The exercise reveals unambiguously that all the variables of our interest are I(1) and that at least two of them cointegrate with each other.

Table 2. Vector error correction estimates (sample: January 1972-March 1979)

	Variable normalised to 1	Variables restricted to 0	LR test	P-value
Vector 1	ΔP	REXLD REXLM	6.95	0.03
Vector 2	REXLM	ΔP REXLD	22.02	0.00
Vector 3	REXLD	ΔP REXLM	22.02	0.00

Since we find evidence of only one cointegrating vector, we prefer to estimate the relationship between inflation and devaluation by using a single equation approach that escapes the typical problems of specification in overparametrised VARs. One further reason to adopt a uni-equational approach is that, in such a context, several procedures are available for testing cointegration, which can serve as robustness checks of our results.

Table 3 shows the estimations of the long-run relationship among the variables of interest using the static regression proposed by Engle Granger (1987), the Dynamic Ordinary Least Squares (DOLS) (Saikkonen, 1991; Stock and Watson, 1993), and the Fully Modified Ordinary Least Squares (FMOLS) (Phillips and Hansen, 1990).

Table 3. Cointegrating estimations (dependent variable: inflation (ΔP); sample: 1972:01, 1979:03)

Method of estimation	REXLD	REXLM	C
Engle-Granger (first step)	0.0314*** (0.0108)	0.0173*** (0.0064)	–0.3494*** (0.0872)
DOLS	0.0314** (0.0152)	0.0178** (0.0087)	–0.2814*** (0.1229)
FMOLS	0.0278* (0.0142)	0.0189** (0.0085)	–0.3338*** (0.1149)

Note: standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The coefficients of the exchange rates are all positive and significant, meaning that the devaluation induced price increases consistently with the hypothesis of Graziani. In order to confirm the validity of a cointegration relationship, we run the Augmented Dickey Fuller (ADF) and Phillip-Perron unit root tests on the residuals of equations in Table 3. Both tests suggest rejecting the hypothesis of no cointegration among the variables in all the three specifications.

A more comprehensive analysis is developed in the next step, in which we propose three different error correction models (ECMs) computed from the long-run estimations. We estimate the specification below in order to study the short-run dynamics of inflation:

$$\Delta^2 P = c + \sum_{i=0}^{-2} a_{t-i}\Delta REXLD_{t-i} + \sum_{i=0}^{-2} b_{t-i}\Delta REXLM_{t-i} + \gamma ECM_{t-1} + \epsilon_t$$

With $\epsilon_t N(0,\sigma^2)$ and $Cov(\epsilon_t \epsilon_{t-s}) = 0$

Where the dependent variable is the rate of acceleration of inflation ($\Delta^2 P$), and the regressors of interest are the lagged error correction term ECM_{t-1} and the first log-difference of real exchange rates ($\Delta REXLD$,$\Delta REXLM$).

Table 4 shows that all the lagged error correction terms, obtained from different long-run estimations of Table 3, are negative and highly significant, meaning that an excessive level of inflation is corrected towards the equilibrium. In all the specifications, we are able to explain almost 50% of the inflation acceleration on a monthly basis.

The contribution of the real exchange rates is determined by both the short and the long-run coefficients. As for the short run, the lagged coefficients of the change in the lira-dollar exchange rate indicate that a devaluation of the lira contributes to the acceleration of inflation. Considering the baseline results of the Engle and Granger ECM representation, an increase in one standard deviation of the first log-difference of the lira-dollar exchange rate produces an acceleration of inflation equal to 4.84% on a monthly basis, while, in the case of the lira-mark exchange rate, inflation accelerates by 0.49%. Hence, the impact of devaluation against the US dollar had an effect on inflation 10-fold higher than the devaluation against the German mark. In the long run, the effects are, instead, quite similar. Inflation increases by 1.43 percentage points (p.p.) in response to an increase of one standard deviation in the lira-dollar exchange rate, and by 1.16 p.p. in response to the same increase in the lira-mark exchange rate.

The results in the baseline ECM representations are confirmed in ECM estimations based on DOLS and FMOLS first-stage regression. As for the short-run component, the effect of devaluing the lira against the German mark is close to zero in both the DOLS and FMOLS specifications.

The higher magnitude of the short-run effect of the real exchange rate with the dollar compared with the lira-mark exchange rate can be attributed to the relative importance that oil and raw materials, both priced in dollars, had in the foreign balance of trade.

However, to give full economic meaning to the results of Table 4, we test the stability of our specifications over time, and the weak exogeneity hypothesis of the explanatory variables. Stability checks are presented in Appendix A, where the cumulative sum (CUSUM) of square residuals, and the recursive estimates of the ECM terms are reported.

Table 4. Short-run dynamics of inflation (dependent variable: Δ^2P)

	Engle-Granger	DOLS	FMOLS
Δ^2P_{-1}	–0.0191 (0.0982)	–0.0188 (0.0983)	–0.177 (0.0981)
ΔREXLD	–0.0135 (0.0194)	–0.0150 (0.0194)	–0.0143 (0.0194)
ΔREXLM	–0.0114 (0.0159)	–0.0227 (0.0158)	–0.0107 (0.0159)
$\Delta REXLD_{-1}$	0.0513** (0.0196)	0.0676*** (0.0193)	0.0522*** (0.0195)
$\Delta REXLM_{-1}$	0.0532*** (0.0159)	0.0614*** (0.0159)	0.0531*** (0.0159)
$\Delta REXLD_{-2}$	0.0642*** (0.0199)	0.0506** (0.0201)	0.0605*** (0.0199)
$\Delta REXLM_{-2}$	–0.0432** (0.0199)	–0.0636*** (0.0169)	–0.0435** (0.0168)
ECM $term_{-1}$	–0.478*** (0.1008)	–0.477*** (0.1009)	–0.480*** (0.1006)
Intercept	–0.0002 (0.0005)	–0.0002 (0.0004)	–0.0002 (0.0005)
R-squared	0.521	0.521	0.523
Durbin-Watson test	1.91	1.91	1.92

Note: all the specifications pass the usual test of normality, no autocorrelation and no serial correlation.

A final answer about the consistency of our findings is provided by checking the exogeneity of the explanatory variables. This is an essential requirement for a causal identification of the economic relation under scrutiny. The empirical strategy followed here is to run a system of equations estimated through the Seemingly Unrelated Regression (SURE) procedure to test whether the long-run relationship has influence only on inflation or whether it affects the other variables in the system. This test is expressed in the following system of equations:

$$\Delta^2 P = c_1 + \sum_{i=0}^{-2} a_{1t-i}\Delta REXLD_{t-i} + \sum_{i=0}^{-2} b_{1t-i}\Delta REXLM_{t-i} + \gamma_1 ECM_{t-1} + \epsilon_{1t}$$

$$\Delta REXLD_t = c_2 + \sum_{i=0}^{-2} a_{2t-i}\Delta^2 P_{t-i} + \sum_{i=0}^{-2} b_{2t-i}\Delta REXLM_{t-i} + \gamma_2 ECM_{t-1} + \epsilon_{2t}$$

$$\Delta REXDM_t = c_3 + \sum_{i=0}^{-2} a_{3t-i}\Delta^2 P_{t-i} + \sum_{i=0}^{-2} b_{3t-i}\Delta REXLD_{t-i} + \gamma_3 ECM_{t-1} + \epsilon_{3t}$$

In order to assess the weak exogeneity of real exchange rates, the condition $\gamma 2 = \gamma 3 = 0$ must hold. The joint restrictions on these parameters hold, as indicated by the Wald test conducted on different ECM estimations. In all the cases, we are not able to reject the weak exogeneity assumption, implying that inflation has been affected by exchange rates in the long run, while the reverse is not true. By applying restrictions also to the short-run coefficients of inflation in the exchange rate equations, we find that they are not significantly different from zero. Thus, we can conclude that inflation did not affect the real exchange rates either in the long run or in the short run, and that both our measures of real exchange rates could be assumed as (weakly) exogenous, as it has been argued by Graziani.

5. The role of wages

We introduce the real wages in our specification in order to provide empirical evidence of another major point of Carli's scheme. He strongly held that an increase in real wages could cause some firms to exit the market, triggering a supply contraction and a rise in inflation (Bank of Italy, 1972-1973). This view is based on the equality between marginal productivity, which is a decreasing function of the number of employees, and real wages. Therefore, an increase in real wages shifts the levels of employment and production down in order to keep firms on the equilibrium condition. A sudden increase in the level of real wages, due to unions' market power, may also force firms to leave the market, leading to a contraction in the aggregate supply. If aggregate demand does not change, the disequilibrium between demand and supply turns into an increase in prices. Any reaction of monetary wages that prevents the fall of real wages is an obstacle to the restoration of the firms' equilibrium. Sustained inflation rates and contractions of production may coexist only if prices run after wages. This leads to an inflationary spiral, which was the most likely outcome for the Italian economy at that time, according to the view of the Bank of Italy.

We test the hypothesis whether real wage increases could have contributed to sustain inflation rates. First, we scrutinise the stochastic properties of the series of real wages during 1971-1979, finding that it is unambiguously a stationary series. All the canonical tests of stationarity, and their counterparts, the unit root tests, agree on the stochastic properties of real wages. Second, we measure the effects of real wages on inflation by introducing them in the ECM representation. Table 5 reports the error correction specification, which includes, among the short-term variables, also the real wages.

The causal identification is carried out by studying the weak exogeneity of the regressors involved in Table 5. Differently form Table 4, we have one more regressor, the real wages, which does not enter the long-run equation. The system of equation is analogous with the exception of one more equation describing how real wages could be influenced by inflation and real exchange rates both in the short and in the long run. The introduction of a new and pivotal variable does not change the results presented in Section 4. Moreover, the behaviour of the real wages deserves more attention. They do not affect inflation in the short run but they are, in turn, depressed by inflation. Finally, we do not find any correlation between the lagged error correction term and the real wages.

Table 5. Short-run dynamics of inflation (dependent variable: Δ^2P)

	Engle-Granger	DOLS	FMOLS
Δ^2P_{-1}	-0.0247	-0.0237	-0.0213
	(0.0986)	(0.0986)	(0.0984)
ΔREXLD	-0.0152	-0.0269	-0.0161
	(0.0194)	(0.0159)	(0.0194)
ΔREXLM	-0.0152	-0.0168	-0.0146
	(0.0160)	(0.0177)	(0.0160)
$\Delta REXLD_{-1}$	0.0499**	0.0668***	0.0507**
	(0.0195)	(0.0193)	(0.0195)
$\Delta REXLM_{-1}$	0.0543***	0.0627***	0.0540***
	(0.0159)	(0.0159)	(0.0159)
$\Delta REXLD_{-2}$	0.0595***	0.0454**	0.0605***
	(0.0201)	(0.0203)	(0.0201)
$\Delta REXLM_{-2}$	-0.0399**	-0.0611***	-0.0402**
	(0.0169)	(0.0170)	(0.0170)
$ECM\ term_{-1}$	-0.495***	-0.497***	-0.502***
	(0.1024)	(0.1026)	(0.1026)
Real Wages	-0.0353	-0.0354	-0.0354
	(0.0245)	(0.0244)	(0.0244)
$Real\ Wages_{-1}$	0.0327	0.0326	0.0321
	(0.0202)	(0.0242)	(0.0242)
C	-0.0004	-0.0004	-0.0013
	(0.0012)	(0.0012)	(0.0017)
R^2	0.53	0.53	0.54
DW	1.94	1.95	1.95

Note: all the specifications pass the usual test of normality, no autocorrelation and no serial correlation.

6. Historiographical implications

This section is aimed at placing our empirical findings in the historiographical debate about the Italian economic policy of the 1970s. Our results shed light on the controversial reasons behind the devaluation policy, providing evidence that devaluation boosted inflation. This result is by itself a concurrent explanation of one of the most impressive increases in domestic prices for an industrialised country in the second half of the 20th century.

The international economy after 1971 dramatically changed its fundamentals compared with the Golden Age framework. The monetary stability of the Bretton Woods era was the aftermath of several concomitant events. Good policies and an institutional setup oriented to restraining potential inflationary bias were the seal of approval for stabilising prices. After the fall of the Bretton Woods system, policy makers had one more card to play (Eichengreen, 2007).

As for the Italian economy, the exchange rate policy became a crucial instrument to prevent the fall of industrial profits. Carli's scheme informed the Italian economic policy during the 1970s, according to which the devaluation of the lira would sustain the profitability of the manufacturing sector in the international markets, and improve the balance of trade.

According to the Italian policy makers, the failure in containing wage claims after the turmoil of the late 1960s and the early 1970s raised inflation, deteriorating the competitiveness of the Italian firms on foreign markets. The elective instrument of policy to counteract the adverse effects of inflation became the devaluation of the real exchange rate. Within this picture, the Italian policy makers tried to maintain high growth rates and to sustain social consensus without caring for the consequences of high inflation rates on long-run investment decisions and on the fiscal budget. The devaluation policy appeared to be, also in the view of the Italian political parties, the most acceptable measure in terms of social consensus (Barca, 1997; Seghezza, 2019). Among economists, the evaluation of the Italian policy strategy is controversial. On the one hand, Giavazzi and Spaventa (1989) argued that, because taxation was not indexed to inflation, the rise of prices provided the resources to subsidise profits in the short run, maintaining a high rate of employment. On the other hand, it is unclear whether the exchange rate policy, which is a short-run policy instrument, could have sustained an increasing rate of accumulation in the economy, which is a long-run target for policy makers (Nardozzi, 1980). Graziani criticised the exchange rate policy adopted by the monetary authorities because it generated an inflationary spiral in which wages simply adjusted to previous price increases in contrast to a more orthodox view that assigned to wage increases the pivotal role in boosting inflation.

In this paper, we have tried to provide evidence in favour of Graziani's hypothesis. According to our empirical analysis, we can establish that inflation was caused by movements in the real exchange rates, which represented the policy objectives at that time.

The implications of our analysis are twofold. First, the inflationary bias induced by the devaluation of the lira may have been underestimated by policy makers, since the rate of profit and the financing of public deficit were the priorities of the policy agenda. It might be that the devaluation policy was unavoidable in the light of the imbalances of fiscal budgets, the political instability, and the pressure on production costs, which favoured the speculative attacks against the lira. Perhaps, Italy could have devalued less and in a more gradual way, mitigating the effect on internal inflation as Graziani (1998) and Spaventa (1984) suggested.

Second, the legacy of the Italian exchange rate policy in terms of inflation could have slowed the process of industrial reconversion, because firms dumped any cost increase on prices without implementing any action aimed at improving productivity.

7. Conclusions

After the demise of the Bretton Woods system, the industrialised economies were run down by persistent inflation rates. Italy stood out for the magnitude of inflation rates during the 1970s. Several explanations of the Italian inflation focus either on the importance of wage bargaining, the fiscal dominance, or the social consensus. We have, instead, shifted the focus on the role played by the exchange rate policy.

The Italian policy makers at that time, and the central banker in particular, considered wages as an independent variable, and managed exchange rates to counterbalance the inflation generated by increases of wages beyond the productivity level in order to support the competitiveness of Italian firms on the foreign markets. In contrast, some scholars (Graziani, 1998) emphasised the nexus between the devaluation of the domestic currency and the inflationary bias during the period 1971-1979, suggesting that real depreciation was a potential source for inflation. Wages ran after inflation following the real depreciation of the lira, and did not fully recover the loss of their purchasing power.

The two perspectives read the economic history of Italy in a very different way, with implications on the growth strategy implemented after 1971. The analysis we have carried out has shown the existence of a stable long-run relationship between inflation rates and the real exchange rates of the lira against its main trading partners. Moreover, our inquiry has also provided evidence of a causal relationship that goes from the real exchange rates to inflation. In addition, we have found that real wages did not affect the inflation dynamics, at least in the period under investigation.

Our findings clearly suggest that inflation did not drive the exchange rate movements; rather, the exchange rate policies, which may have had different roots and targets, turned out to have inflationary consequences.

Apart from the historiographical implications, our results offer a spinoff in the current debate about the possible devaluation in the case of an exit from the European Common Currency by southern European States. Episodes of inflation in the economic history of Italy during the 1970s seem to suggest that voluntary devaluation, which would be an exit from the euro area, is not a free lunch and that the resulting inflationary bias would be the only costly legacy.

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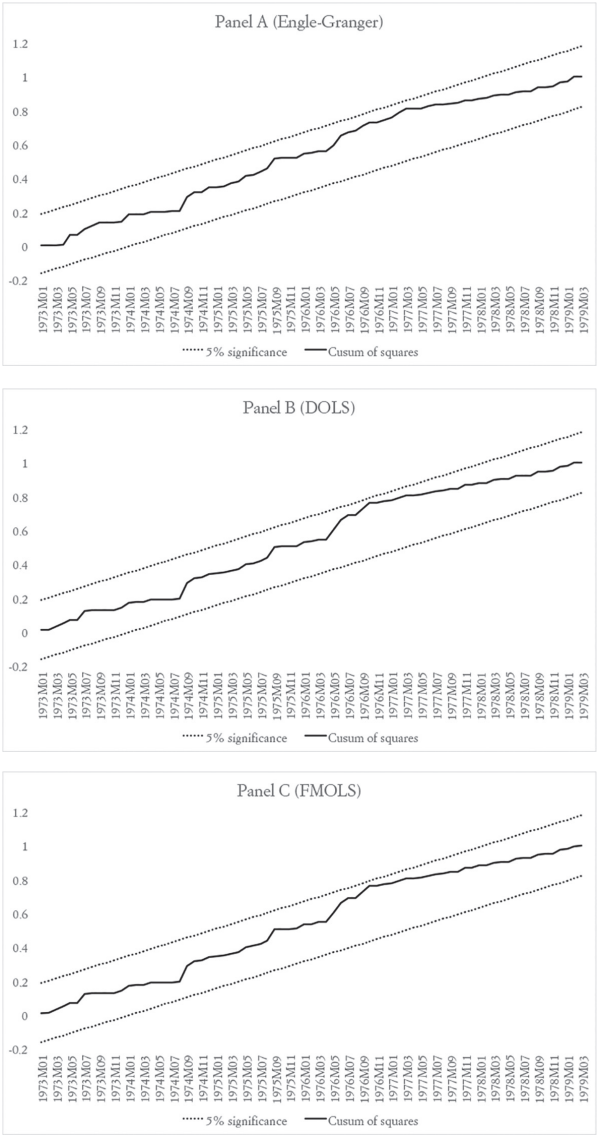
Appendix A

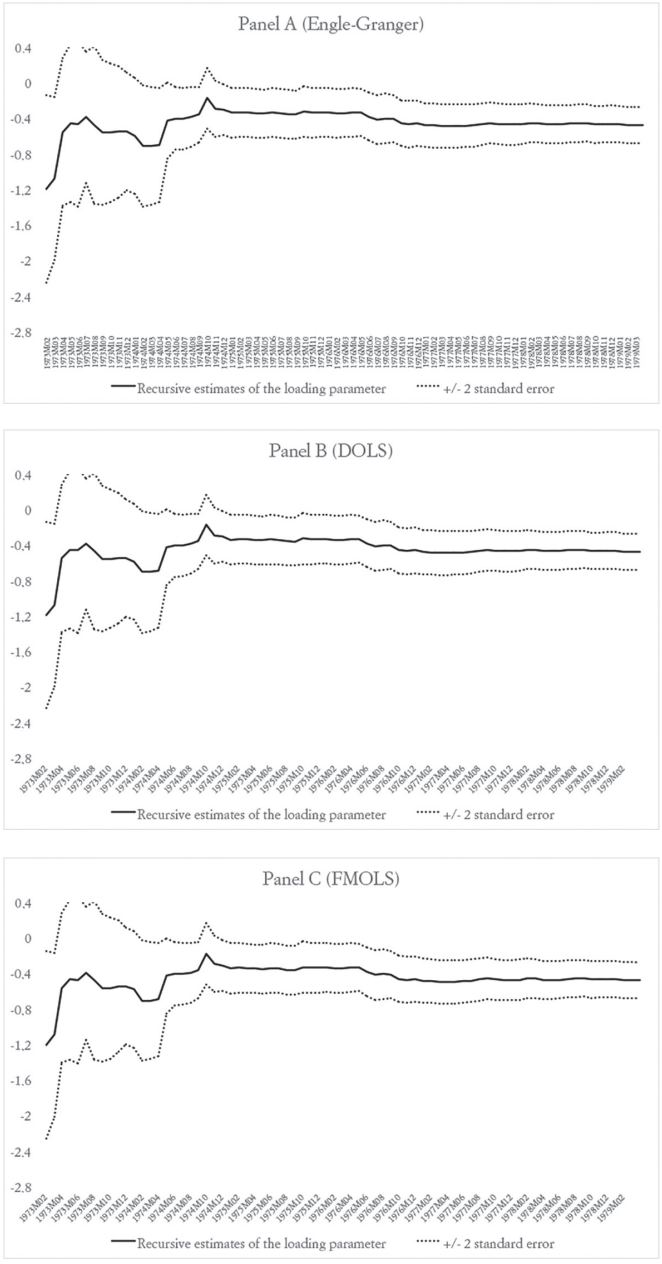
Figure A1 plots the CUSUM of squares test for each short-run representation of Table 4. Figure A2 shows the recursive estimates of the coefficients of the loading parameter. The stability checks are strongly reassuring about the validity of our estimates.

Figure A1. Stability checks: CUSUM of squares tests of equations in Table 4



Source: estimation output of the equation in Table 4.

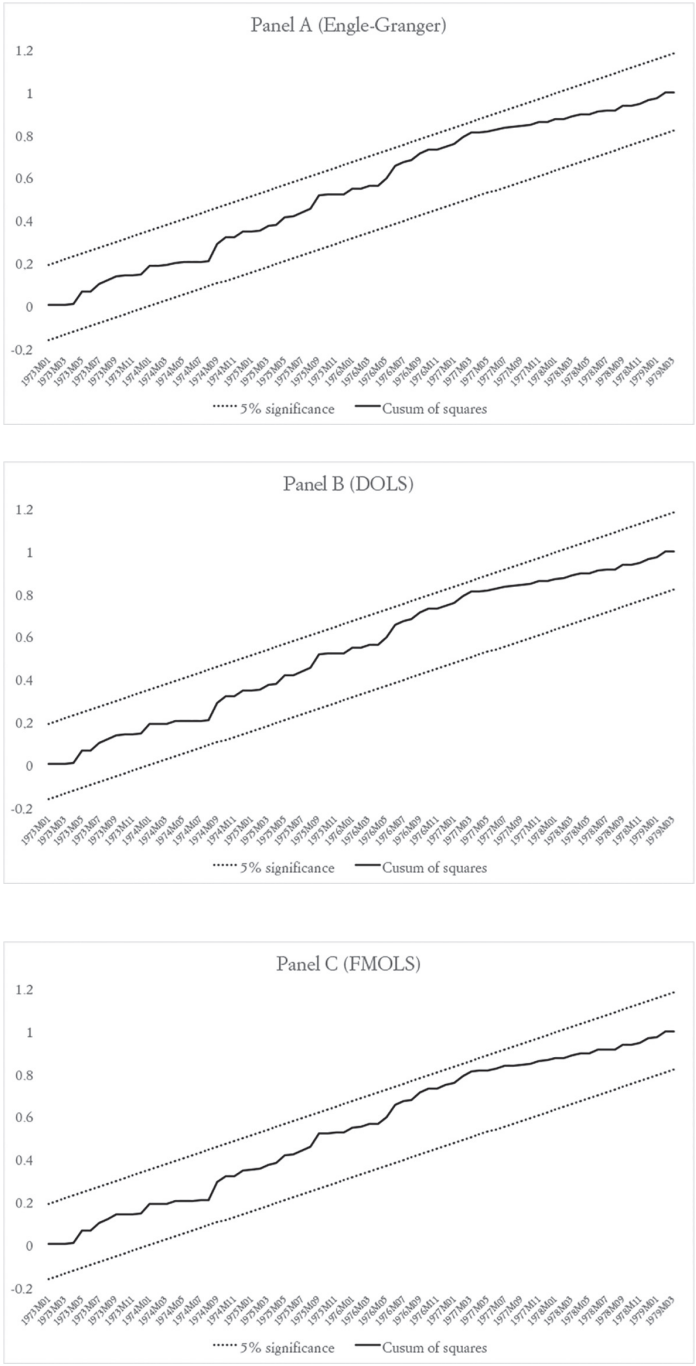
Figure A2. Stability checks: recursive estimates of the loading parameter from equations in Table 4



Source: estimation output of the equation in Table 4.

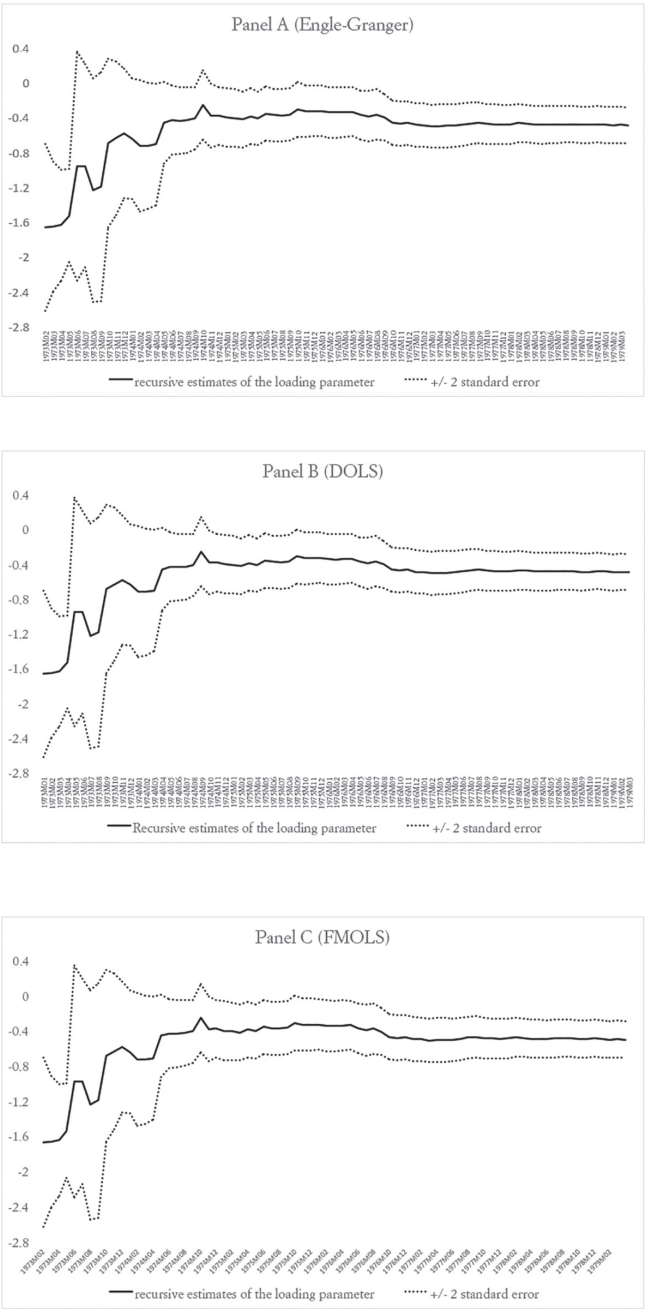
The same tests have been performed in the case of the results displayed in Table 5. As before, the stability checks are strongly reassuring about the validity of our estimates.

Figure A3. Stability checks: CUSUM of squares tests of equation in Table 5



Source: estimation output of the equation in Table 5.

Figure A4. Stability checks: recursive estimates of the loading parameter from equations in Table 5



Source: estimation output of the equation in Table 5.