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THE ROLE OF THE DIFFERENT CENTRAL BANK RATES IN THE TRANSMISSION OF MONETARY POLICY

by Luigi Buttiglione, Paolo Del Giovane and Eugenio Gaiotti(*)

Abstract

The monetary policy operating procedures of the Bank of Italy are based on the determination of both official rates and the rates on repo operations. This feature is common to the European countries that use some kind of interest rate "corridor". Under the prevailing interpretation, this procedure allows the central bank to separate the short-run effects from more persistent changes in the monetary stance. The paper reviews the rationale for using different instruments to implement either transparent and persistent interest rate movements or more gradual and less immediately visible ones, as may be found in the economic literature. The empirical evidence for Italy confirms that different policy rates have different effects: official rate changes mainly play a signaling role, with a faster effect on the whole interest rate structure and on expectations; repo rates have an immediate impact only on the very-short-term end of the yield curve. However, as repo rates represent the actual cost of most of banks' refinancing, market rates eventually tend towards them.

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1. Introduction

The operating procedures of the Bank of Italy are based both on the setting of official rates and on open-market securities repurchase agreements (interest rate tenders); the existence of two policy rates is also common to European countries that use some kind of interest rate "corridor". Official rates are moved in discrete steps and infrequently; allotment rates at repo auctions are indirectly influenced by the Bank of Italy through the supply of liquidity, and move in a more flexible and gradual way, usually within limits set by official rates. This paper addresses the issue of their different role in monetary transmission.

Section 2 describes the main institutional features of the monetary instruments of the Bank of Italy and discusses in some detail the setting of policy rates and their relation to liquidity management. Section 3 compares the Italian situation with that of other countries and discusses the implications of different tactics in interest rate management. Section 4 presents econometric estimates of the effect of both official rates and repo rates in monetary transmission (on bank rates, on short and long-term market rates, on non-financial agents' expectations).

2. Monetary policy instruments of the Bank of Italy

Since the eighties, a number of institutional reforms have improved the working of the monetary and financial markets and the effectiveness of indirect monetary control.

Among these,[1] the creation of the screen-based interbank market (MID) in February 1990 and the introduction of reserve averaging in October 1990 were aimed at decreasing the volatility of very-short-term interest rates and fostering their role as operating targets. Monetary procedures have increasingly focused on the control of very-short-term interest rates.[2] To this end, the Bank of Italy relies mainly on two instruments: the setting of official interest rates and open market operations (mainly repurchase agreements).

The official discount rate and the rate on fixed-term advances are set by the Governor of the Bank of Italy.[3] They are changed infrequently and by relatively large increments: in the period between 1990 and 1996, the discount rate was changed, on average, every 98 days and by 75 basis points each time. The *discount rate* applies to ordinary advances,[4] a collateralized overdraft facility for commercial banks that is accorded automatically but whose amount is limited; although

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1 See Gaiotti and Salvemini (1992), Gaiotti (1992) and Passacantando (1996). On the move from direct to indirect controls in the 1980s, see also Majnoni and Zautzik (1986).

2 This development is common to many other countries. According to BIS (1986), since the mid-1980s short-term rates have played a major role as operating targets in almost all countries, while changes in instruments and procedures have been intended to make interest rate setting more flexible.

3 The Governor of the Bank of Italy has directly set official rates since 1992. Previously, the formal decision was taken by the Treasury acting on a proposal from the central bank. See Passacantando (1996).

4 Ordinary advances derive from the "conti di anticipazione e deposito", which were used for transactions and as a liquidity buffer before the introduction of reserve averaging. Its role has diminished since then. The credit granted through this facility has gradually decreased since the mid-1980s (on September 1996 it was about 1.8 trillion lire, 1 percent of total monetary base); since the overnight rate is usually above the discount rate, due to arbitraging all available credit on the overdraft is used.

the discount rate has very little direct impact on the banks' refinancing costs,[5] it is seen by market participants as an important signal of the medium-term orientation of monetary policy. It is normally below market rates.

Fixed-term advances[6] are a standing facility to cope with unexpected end-of-day liquidity needs. Since May 1991, the rate on this facility has been uniform for all banks and equal to the discount rate plus a surcharge, as a consequence of reform aimed at increasing its role as an instrument of monetary policy and its signaling content. In normal conditions, the rate on fixed-term advances represents a ceiling on short-term fluctuations of money market interest rates. The Bank of Italy has occasionally rationed the supply of fixed-term advances, thus letting short-term rates temporarily rise above the rate on fixed-term advances.

Repurchase agreements[7] and *currency swaps*[8] are the main source of Bank of Italy refinancing to the banking system

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5 Commercial bill discounting also exists but the amounts involved are negligible.

6 Fixed-term advances are activated upon a bank's request. The Bank of Italy retains discretion in accepting or refusing the requests. The maturity is set by the Bank of Italy, at between 1 and 32 days. However, banks can repay funds in advance, either fully or in part. The surcharge on the discount rate never exceeded 1.5 percentage points (its present level). Although the supply has occasionally been rationed, beyond the short-run rationing may be difficult to implement, since it conflicts with the need to ensure financing for end-of-day shortages. In addition to the official rate, a penalty charge - equal to the discount rate plus 8 percentage points - is applied to advances granted after 4 p.m., near the closing of daily net settlement; this helps avoid moral hazard risks in using the facility.

7 Repo auctions are announced by the Bank of Italy early in the day on which the auction takes place, depending on its appraisal of liquidity conditions. Funds are allotted by American-type auctions, in which the Bank of Italy retains the option of cutting the demand schedule *ex-post*, in order to limit excessive fluctuations in allotment rates. "Cuts" have been used only once since 1993: on 25

(Figure 1).[9] Repos are the more relevant in signaling the monetary stance to the market, since they are the instrument used to regulate liquidity in the face of exogenous fluctuations both in demand (such as changes in required reserves) and supply (such as changes in foreign reserves or Treasury drawings on its deposit accounts with the Bank of

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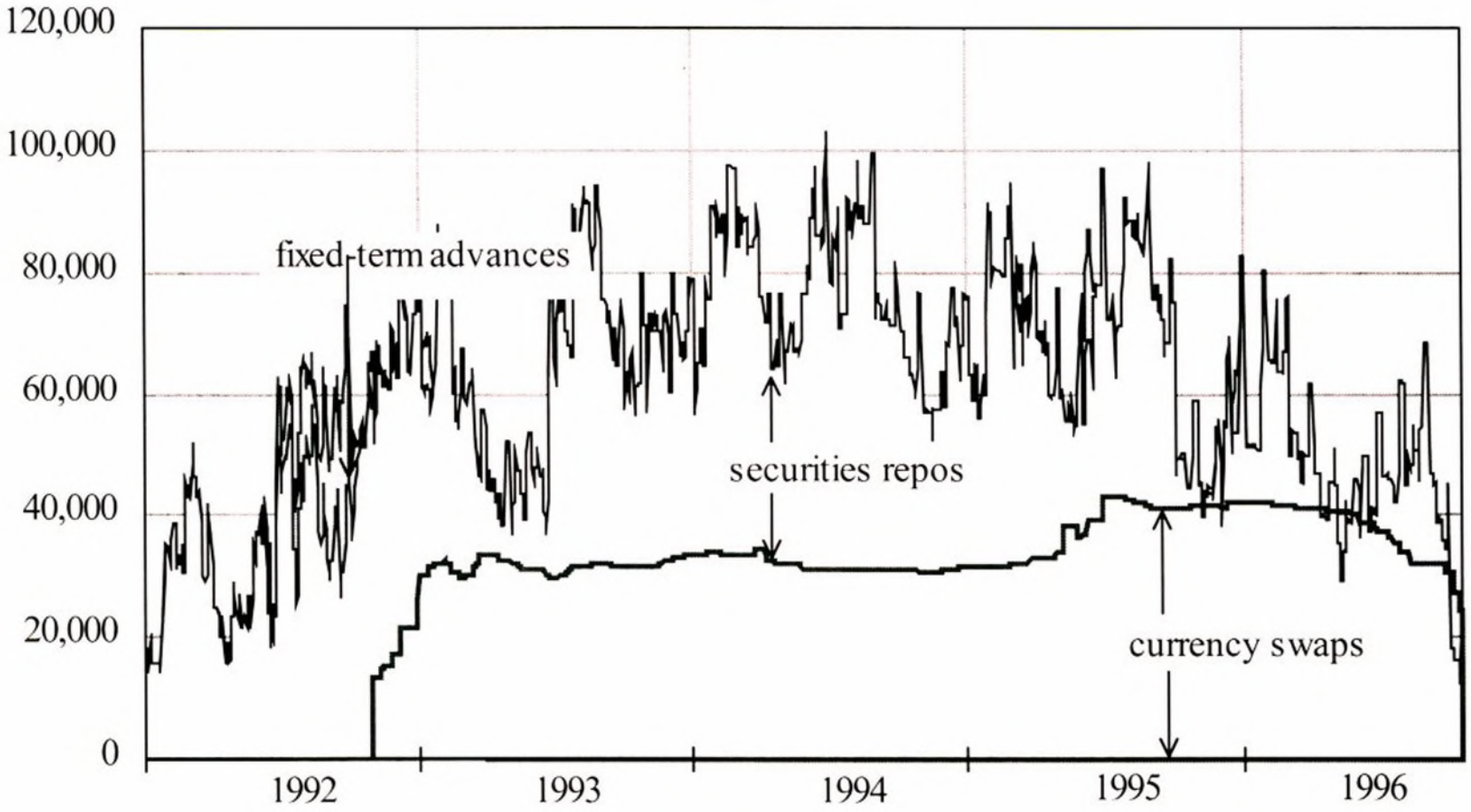
August 1995 no applications were accepted at rates below 10 per cent, contributing to stabilize short-term interest rates slightly above that level. Depending on the overall shortage or excess of liquidity created by autonomous factors, reverse repos may take the place of normal repos. Operations with a very short maturity - even 1 day - have sometimes taken place, usually in the closing days of the reserve maintenance periods. Participation in securities repos is extended to a broad range of institutions, including all the banks and securities investment firms with a status of specialist in the screen-based market for Treasury bonds (MTS, Mercato telematico dei titoli di Stato). At the auction, each bank can present a single bid, specifying both the quantity demanded and the interest rate offered.

[8] Currency swaps were introduced in October 1992. They help to diversify the range of available instruments and remove the distortions that could at times be caused by either a scarcity of securities available (in periods of large indebtness of the banking system with the Bank of Italy) or a reluctance to mobilize them (in periods of falling prices). Their stock increased gradually from about 30 trillion lire to approximately 40 trillion in the first months of 1995; it was gradually reduced to roughly 15 trillion at the end of 1996. Tender procedures for currency swaps are like those for repos. Auctions are announced the day before the operation takes place. They are called on an irregular basis: on average 1-2 in dollars and 2-3 in Deutsche Marks per month. The maturity of the swaps is in most cases 1 month for operations in marks and 3 months for those in dollars.

[9] Among other open market operations, since February 1994 the Bank of Italy has conducted *outright transactions in T-bills* through auctions with the primary dealers of the MTS. Given their short maturity, these operations are comparable to repos. They are mainly used to regulate liquidity when either the small amount or the urgency of the intervention required would prevent announcing a repo auction. *Outright transactions in Treasury bonds* at the initiative of the Bank of Italy are occasionally used to smooth excessive fluctuations in bond prices and to keep market conditions orderly; their volume is small in relation to market turnover. The Bank of Italy also participates in outright transactions taken at the initiative of the market and bilateral reverse transactions with primary dealers: the former help MTS specialists to overcome temporary shortages in particular securities, and are very often carried out in the form of barter securities transactions.

BANK OF ITALY FINANCING OF THE BANKING SYSTEM

(billions of lire)



Italy),[10] while currency swaps constitute a roughly constant stock of basic refinancing and are normally renewed at maturity. Repos take place as interest rate tenders. As Table 1 shows, they have no fixed periodicity or maturity; on average, there are one or two auctions per week, while most repos have a maturity ranging from between 10 and 20 days.

Daily liquidity fluctuations between two repo auctions caused by exogenous factors are normally dealt with by banks through *required reserve averaging*,[11] which was introduced in October 1990. Under the present system, banks are subject to both a daily liquidity constraint (they cannot mobilize more than 12.5 per cent of total required reserves on a single day) and an average monthly constraint (the average of excess reserves in the maintenance period must not be negative).[12]

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10 Since 1 January 1994, in compliance with the Maastricht Treaty, the Treasury has no access to financing from the Bank of Italy. The Treasury holds two deposit account with the Bank of Italy, the "Conto Disponibilità" ("Treasury payment account") and the "Fondo Ammortamento" ("Sinking fund for the redemption of government securities").

11 Reserve averaging was introduced with the explicit objective of fostering the development of the money market and increasing the information content of short-term interest rates; these results were undoubtedly achieved, as the volume of transactions on the screen-based market for interbank deposits increased substantially and the volatility of money market interest rates - especially the overnight rate - decreased dramatically. Banks must hold the required reserve balance, computed on the basis of the average stock of deposits in month t, on average over a maintenance period which runs from the 15th of month t+1 to the 14th of month t+2. The daily balance cannot be less than a given percentage (currently 87.5 per cent) of the average requirement. Carry-over from one computation period to the next is not allowed.

12 The following definitions are used: excess reserves = balance on reserve account - average requirement; free reserves = excess reserves + undrawn margin on the *conto di anticipazione* + vault cash.

Table 1

SECURITY REPURCHASE AGREEMENTS OF THE BANK OF ITALY

YEAR	AUCTION			QUANTITY (2)			MATURITY		
	number	partecipants (1)	accepted bids (1)	offered (1)	demanded (1)	assigned (1)	minimum (3)	maximum (4)	average (5)
1982	7	18	15	850	1706	1289	4	21	12
1983	17	10	6	1168	1838	1168	6	26	14
1984	20	15	9	2015	2797	1956	1	33	11
1985	20	18	9	1975	3640	1975	2	29	13
1986	64	19	11	2138	3551	2130	1	29	12
1987	31	24	14	2573	4529	2573	2	31	11
1988	11	29	9	3841	6866	3841	1	21	8
1989	11	27	12	2955	4837	2920	2	25	8
1990	36	44	19	3479	5302	3329	1	28	11
1991	77	41	23	3500	5695	3234	2	28	14
1992	144	57	35	5771	9635	5692	1	32	16
1993	110	52	28	6141	11716	6089	1	32	19
1994	89	50	32	7674	14656	7674	2	41	24
1995	74	51	28	8074	14799	8030	3	35	19
1996 (5)	34	39	19	8066	14983	8063	1	30	14

(1) Yearly average per auction. - (2) Billions of lire. - (3) Minimum maturity in the year. - (4) Maximum maturity in the year. - (5) Average maturity, calculated over all auctions in the year. - (5) January-September.

3. Managing Bank of Italy interest rates

In deciding the frequency and the volume of its repo operations, the Bank of Italy takes into account both the liquidity available on a given day and the liquidity expected to be available over the entire reserve computation period, estimating the latter on the basis of forecasts for exogenous liquidity creation through autonomous channels and for the demand for cash. Each day, the Bank reviews its estimates and computes an index of the interventions needed over the rest of the maintenance period to keep average excess reserves at zero, based on the available information on liquidity flows.[13] The supply of liquidity at repo auctions is set on the basis of this information; it may also reflect a desire to marginally tighten or loosen liquidity conditions.

In setting their demand at the repo auction, the banks consider two types of information: the aggregate need for liquidity over the rest of the maintenance period, measured by the running average of balances on the reserve account (which is published by the Bank of Italy on Reuters screens each day),[14] and daily liquidity needs, based on the aggregate daily level of excess reserves (this information is made available by private forecasters).

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[13] This index is described in Angeloni and Prati (1996).

[14] The running average is only an approximate, backward-looking measure. It is optimal only if the agents have no information on the autonomous liquidity flows expected in the remaining days. A thorough examination of alternative definitions of this index, under different assumptions about the information set of market participants, is given in Angeloni and Prati (1996). They find that both the daily and monthly indices affect the overnight rate; among different versions of the monthly index, they also find that those embodying forward-looking information about liquidity flows perform better, although the simpler definition used here also performs well.

Table 2

THE RATE ON REPURCHASE AGREEMENTS AND THE SUPPLY OF LIQUIDITY (1)

Dependent variable: ΔREPO	
Constant	0.20 (2.2)
$REPO_{t-1}$	-0.04 (1.8)
ΔDISC	0.51 (6.0)
$DISC_{t-1}$	0.02 (1.1)
daily liquidity index (2)	-0.006 (1.8)
"running average" liquidity index (3)	-0.03 (3.8)
R^2	0.17
S.E.	0.17
D.W.	2.3
Autocorrelation	[16%]

(1) OLS estimates. White's t-statistics in parentheses. Daily observations on auction days. Sample: 1993-95. ΔREPO: change in the allotment rate since the last repo auction. $REPO_{t-1}$: allotment rate at the preceding repo auction. ΔDISC: change in the discount rate since the preceding repo auction; $DISC_{t-1}$: discount rate at the time of the preceding repo auction. - (2) Daily excess reserves plus the portion of required reserves that can be mobilized (measured the day before the auction). - (3) Cumulative sum of excess reserves since the beginning of the reserve computation period, divided by the number of days remaining in the period (measured the day of the auction).

In Table 2, an econometric estimate on daily data shows how the repo rate is affected by the supply of liquidity,[15] as measured by the two indices of "daily" and "average" excess reserves,[16] (the repo rate is also regressed on its level at the preceding auction, on the discount rate prevailing at the time of the last auction and on its change since then).[17]

The coefficient of the "running average" index is significantly negative, indicating that a decrease in liquidity (for instance, due to a reduced supply of funds at the auction) induces an increase in the repo rate. The coefficient of daily balances has also the correct sign, although it is somewhat less significant.[18] Although the stable, negative relation with the supply of liquidity indicates that the allotment rates at repo auctions are affected by Bank of Italy policy, the relatively low R^2 of the regression (16.5 per cent, corresponding to a standard error of the regression of 17 basis points) also suggests that their very short-term fluctuations can not be fully interpreted as a

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15 The regression reproduces, for the repo rate and over the 1993-96 period, the analysis originally conducted by Angeloni and Prati (1996) on the overnight rate for the period 1991-92.

16 The "running average" index is the cumulative sum of excess reserves since the beginning of the reserve computation period, divided by the number of days remaining in the period (this corresponds to the average excess reserves that would be necessary in the second part of the computation period to bring the total average to zero). The daily liquidity indicator is defined as daily excess reserves, plus the undrawn portion on the "conto di anticipazione e deposito" (see footnote 4), plus the portion of required reserves that can be mobilized (currently, 12.5 percent of the requirement).

17 Different lag lengths were tested. F-tests suggested including the simultaneous value of the average index and one lag of daily liquidity.

18 The effect of daily liquidity is much stronger on the overnight rate than on the repo rate, as both the results of Angeloni and Prati (1996) and our own estimates indicate.

monetary policy signal, but also reflect shifts in the demand schedule and other factors (such as the changing maturity).

In one sense, official rates and the repo rate have opposite features: since the former are set directly by the Bank of Italy, they are a clear signal of the monetary policy stance, but their direct impact on banks' refinancing cost is negligible; the latter is more relevant in determining the actual cost of bank refinancing, but is indirectly controlled and its short-run volatility also reflects factors other than Bank of Italy intentions.

The behavior of the two official rates and the auction rate on repos in the 1992-96 period is shown in figures 2a-b. All played a role in monetary policy management. When the need for a strong, unequivocal signal was felt, official rates were adjusted. The importance of the signaling effect of monetary policy actions has increased in recent years: since the exchange rate was allowed to float, inflationary expectations have played an increasingly large role in monetary policy transmission, both for their direct effect on prices and their indirect effect through the exchange rate. Correspondingly, there has been increasing concern about sending clear signals to the market and acting in advance, countering inflationary expectations before they translate into actual price increases;[19] this was done with relatively substantial moves in official rates (largely unexpected by the market) in August

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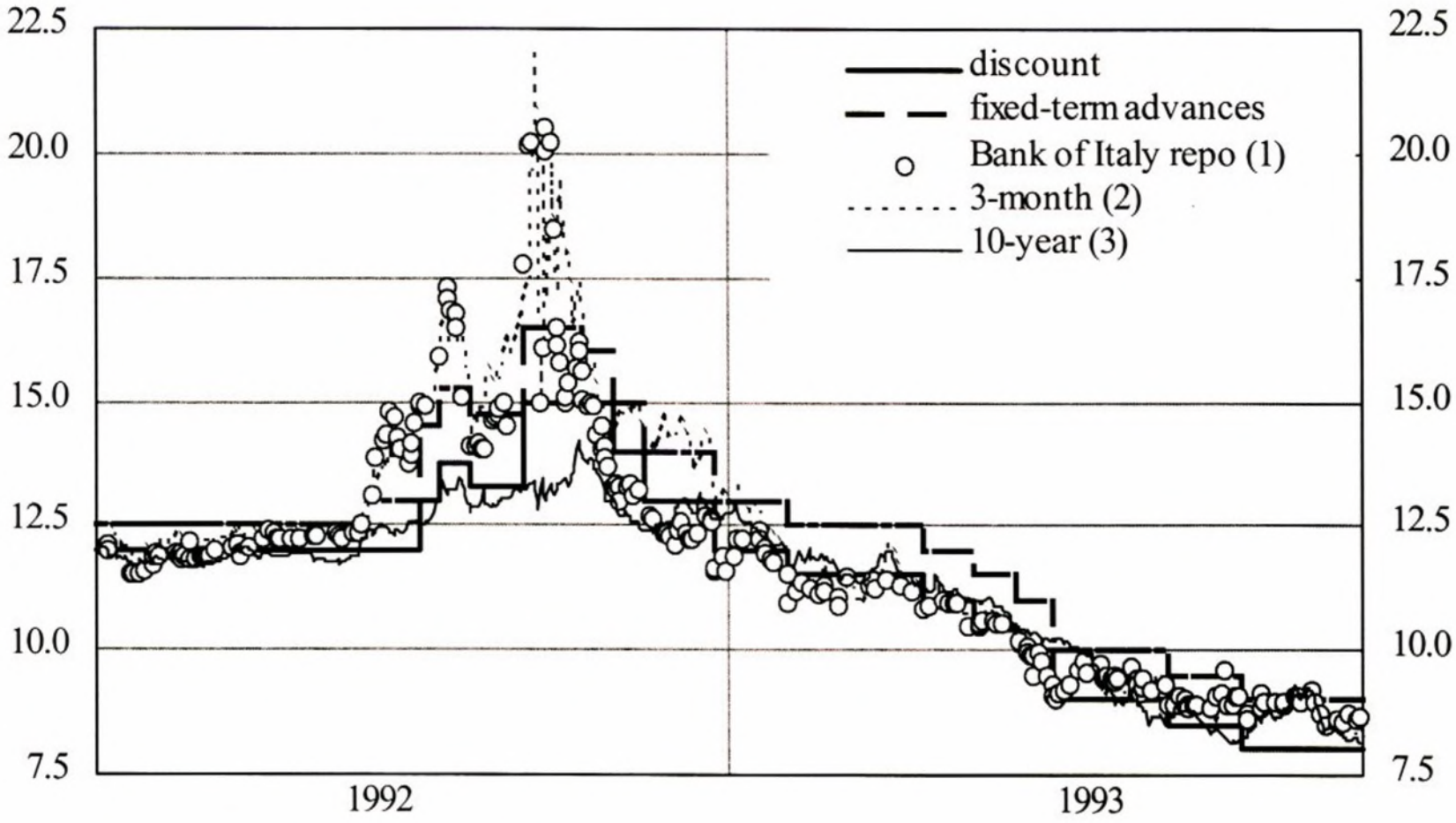
[19] For instance, the Bank of Italy's *Annual Report* for 1995 argues that "by orienting expectations monetary policy can influence the inflation rate through an additional channel alongside its more traditional ones of aggregate demand regulation and direct impact on the exchange rate".

MONETARY POLICY RATES AND MARKET INTEREST RATES

(percentage points)

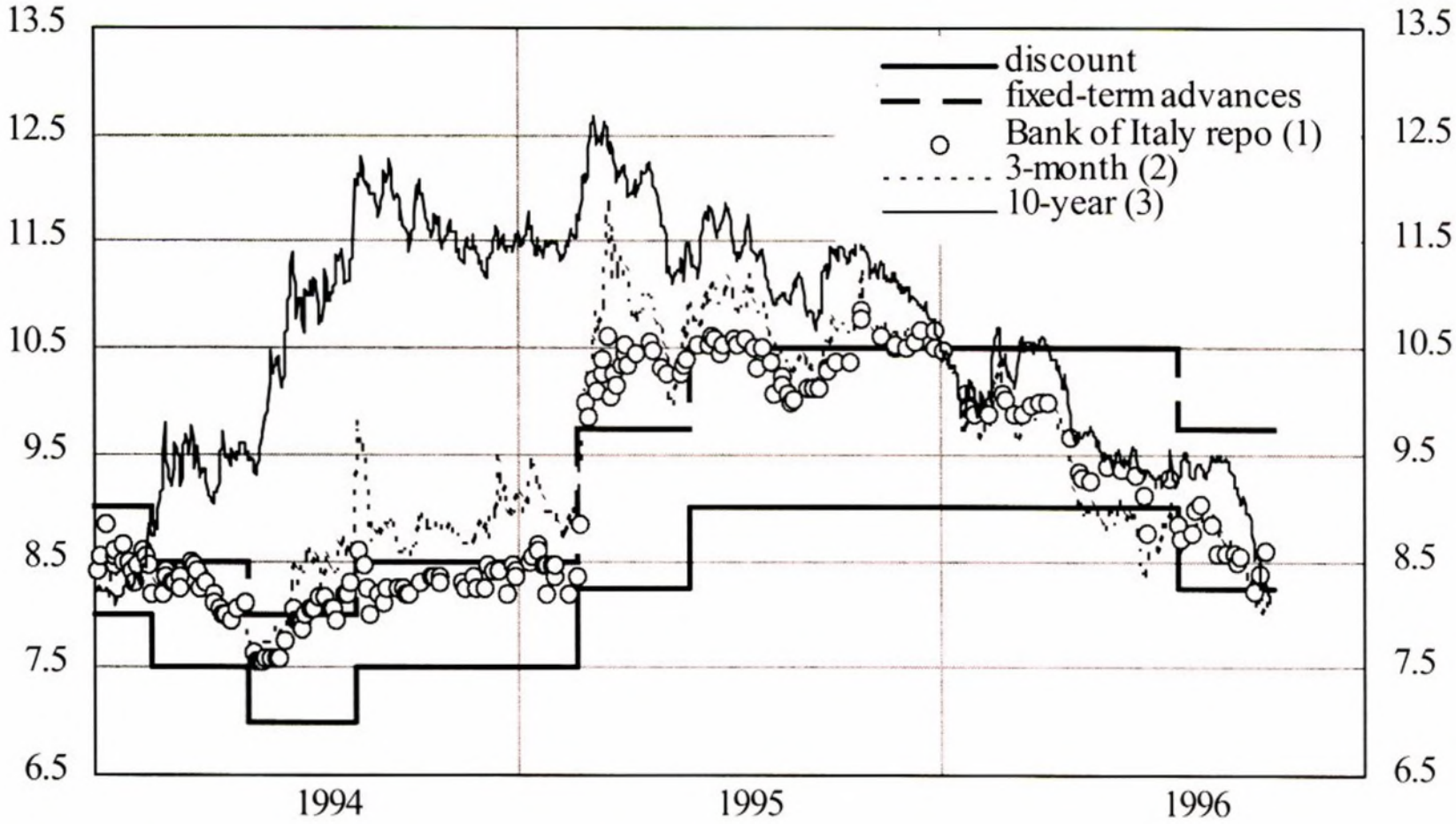


(1) Marginal allotment rates. - (2) Libor rate. - (3) Swap rate.

Fig. 2b

MONETARY POLICY RATES AND MARKET INTEREST RATES

(percentage points)



(1) Marginal allotment rates. - (2) Libor rate. - (3) Swap rate.

1994 and in February and May 1995.[20]

At the same time, the rate on repurchase agreements has been used with greater flexibility in the short run, when the Bank of Italy has sought to defuse short-term tensions without necessarily signaling a change in its medium-term orientation. The emergence of tensions on the foreign exchange market due to domestic or international shocks and the recurrent worsening of expectations on the process of budgetary adjustment have been countered by tightening liquidity conditions, reflected in the position of the repo rate with respect to the official rates. In some cases there was a subsequent increase in the official rates, when the shock proved not to be temporary or when it started to feed back onto inflationary expectations. In some other cases, when tensions quickly abated, the increase in the repo rates was reversed. These tactics were employed several times in the course of 1995, when instability affecting the exchange rate and domestic securities prices was repeatedly generated by the volatility of expectations concerning budgetary adjustment

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[20] "The Bank of Italy raised official interest rates at the end of May; in the wake of the previous increases in August 1994 and February 1995, this constituted a further reinforcement of the restrictive monetary stance aimed at forcing down inflationary expectations" (Banca d'Italia, *Economic Bulletin*, No. 22, February 1996, p. 44). This objective, already indicated in the press release on the occasion of the first rise, was emphasized even more explicitly in the case of the following move ("The increase is aimed at curbing inflation and countering the deterioration of inflationary expectations"). The increased need for pre-emptive measures to ward off inflation has also been repeatedly emphasized; indeed, a comparison of the movements in official rates and short-term interest rates at the time of the last three upturns in consumer price inflation (in October 1978, December 1986 and August 1994) indicates that the tightening of monetary conditions was more timely in the last instance (Banca d'Italia, *Annual Report for 1994*, Roma, pp. 84-85).

(linked to domestic political factors) and by changes in the climate in international markets.[21]

A gradualist strategy was followed in periods of decreasing interest rates (as in 1993, in the wake of the 1992 exchange rate crisis, and in 1996), deploying both liquidity control and the official rates, albeit to different extents. The official rates were reduced cautiously in order to ensure that the easing would not be interpreted as a relaxation of anti-inflationary resolve.[22] The movement of repo rates sometimes preceded the adjustment of official rates (as in the first part of 1993 and the first half of 1996), and sometimes followed it (as in the last part of 1993).

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21 "Between late February and mid-April the lira suffered a further sharp depreciation owing to tensions in the foreign exchange markets and domestic political uncertainty; there was a simultaneous increase in yields of government securities. The Bank of Italy progressively tightened monetary conditions by limiting the supply of liquidity on offer at auctions of repurchase agreements. Allotment rates for Bank of Italy repos and overnight rates rose above the rate on fixed-term advances" (Banca d'Italia, *Economic Bulletin*, No.21, October 1995, p. 44). In the second half of October, "liquidity control was tightened in response to a heightening of tension in the financial and foreign exchange markets; repo allotment rates rose to around 10.9 per cent for a few days, thus exceeding the rate on fixed-term advances" (Banca d'Italia, *Economic Bulletin*, No. 22, February 1996, p. 48).

22 In 1993, it was felt that a large, immediate cut in official interest rates "would have generated fear of laxity in monetary management, impeding the restoration of confidence and a lasting reduction in long-term market rates." (Banca d'Italia, *Economic Bulletin*, No. 16, February 1993, p. 38). In this period "open market operations kept very short-term interbank rates close to the discount rate in the first half of the year, pushing them up towards the rate on fixed-term advances from the summer onwards with the reappearance of pronounced exchange rate instability" (Banca d'Italia, *Economic Bulletin*, No. 17, October 1993, p. 47). In 1996, while the improved outlook for inflation and inflation expectations allowed an easing of monetary policy, the need remained to "completely eradicate the expectations of a resurgence of inflation", as was stated by Governor Fazio. Liquidity policy and official rate changes were both used: in the first part of the year monetary policy allowed a decrease in short-term market rates, while maintaining the underlying orientation unchanged, as was shown by the level of the official rates; these were reduced only in July.

4. The flexibility-visibility trade-off in the management of central bank rates

Interest rates that exhibit different degrees of flexibility and visibility are also found in the other major European countries that use some kind of interest rate "corridor", including an upper and lower limit (either posted rates on standing facilities, as in Germany, or repo rates, as in France) and a more flexible rate, controlled by the central bank in ways that depend on country-specific characteristics. In Italy the latter is determined via variable-rate auctions and thus to some extent reflects market conditions; in some other countries it is more strictly controlled by the central bank (determined with fixed-rate operations); in others it is a market rate (such as the overnight rate), only indirectly influenced by the supply of liquidity. The set of monetary policy instruments that will be available to the European System of Central Banks will also include both open market operations and standing facilities (European Monetary Institute, 1997).

The presence of an interest rate corridor often is the result of very different country-specific institutional developments: in Italy, the configuration of monetary policy rates depicted in figures 2a-b is not the result of a deliberate project, but the *de facto* consequence of a number of institutional changes.[23] In all these countries, however,

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[23] The introduction of repo operations as a way to manage liquidity, in the 1980s, coincided to a large extent with the move to indirect monetary control. The introduction of an averaging system for required reserves was aimed at giving stability to very short-term rates and allowing a larger use of short-term interbank rates as an operating target for monetary policy, giving the banks more flexibility in managing their liquidity and fostering the

both the official rates and the repo rate (or its equivalent) appear to play a role in the transmission of monetary policy and to be regarded by the markets as measures of monetary policy. In this sense, there are 'many' policy rates.[24]

The situation in other countries is different. The distinction between short-term interventions and the longer-term policy stance may be blurred when the central bank is almost continuously present in the market (for instance, in the absence of reserve requirements with averaging provisions, as in the UK), or official rates may have little impact in determining market yields, as in the US where, according to most interpretations, the federal funds rate is the main monetary policy signal and the discount rate plays a much lesser role.[25] In some countries official rates are simply linked to market rates through an indexation mechanism.

The differentiation of policy rate roles responds to the need to disentangle short-run effects from more persistent changes in the monetary stance. Angeloni (1994b) describes the model prevailing in continental Europe, emphasizing a mixture

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development of the interbank market. The change in the mechanism for setting the rate on fixed-term advances was aimed at enhancing its role as a monetary policy signal.

[24] This is not a necessary conclusion. In principle, an interest rate corridor may simply be used to limit short-term volatility around a central value, thus minimizing the need for interventions: in this case, its role is only to reduce the frequency of intervention by the central bank, distinguishing monetary policy interventions (aimed at determining the interest rate "within" the corridor) from merely technical ones (thanks to the averaging of the reserve requirements and to the limits on excessive fluctuations of market rates).

[25] The federal funds rate target has been considered as the relevant policy rate in most recent papers on the Fed's conduct (see for instance Goodfriend, 1993; Radecki and Reinhart, 1994; Roley and Sellon, 1995; Rudebusch, 1995).

of rigidity and a margin for flexibility, which performs the twofold function of sending clear medium-term signals to the market, through official rates, while also reacting to unexpected tensions in the short run, especially on the currency market, through liquidity management. Sanz and Val (1993) also emphasize the need to distinguish between short-term tightening and signaling the medium-term monetary policy stance. Commenting on the introduction of securities repos in Germany, Issing (1994) mentions the need to respond promptly and in a differentiated way to changing money market conditions. In the debate on policy procedures in Europe, Jensen (1996) sees interest rates on deposit and loan facilities as the most appropriate instrument for sending strong signals on the medium-term orientation, while the stance of monetary policy can be gradually adjusted via the repo rate.

In the economic literature, a call for very timely, visible and discrete moves in the policy rates stems from models in which price stability is the only concern and monetary policy works mainly through expectations. According to Goodhart (1996), with a price target, official rates should be moved in discrete steps as soon as "news" arrives; otherwise, monetary policy is always "too little, too late" and loses effectiveness. Cukierman and Meltzer (1986a) also argue that, with a single target, a noisy signal may diminish the credibility of the central bank, or make it more difficult to achieve.[26]

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[26] The view that a clear communication of the central bank's intentions concerning interest rates is more credible and more effective in affecting inflation expectations and longer-term rates is implicit in a number of positions expressed by central bankers. According to Rudebusch (1995), this is why, for instance, the Fed's management of interest rates features stability over the medium term. In this regard, Goodfriend (1991) notices that the transmission of monetary

However, other reasons may suggest moving interest rates in a gradual way and limiting the visibility of the policy signal. Goodhart (1996) explains the observed tendency of central banks to "smooth" movements in interest rates[27] by positing some additional objective, such as avoiding interest rate reversals, which may give an impression of uncertainty and indecision (Rudebusch, 1995 also cites this as a reason for gradualism). This concern may be particularly important when the central bank has imperfect knowledge of the nature and persistence of the shocks hitting the economy and time is needed to improve its understanding. The desire not to unsettle financial markets may also be a constraint: the possibility of market overreaction to policy changes may make central banks increasingly concerned about how an interest rate adjustment is perceived (sometimes, the importance attached to market reactions may even delay a decision until the need for the move is more clearly perceived by outside observers).[28] Similar arguments have been advanced for limiting the visibility of the signals sent to the market: the fear that financial markets may overreact to policy rate changes is considered a reason for the Fed's secrecy by Dotsey

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policy to output and prices does not respond directly to movements in the federal funds rate, but rather to rates at longer maturities (at least three or six months); since these rates depend on market expectations of future fund rates, by maintaining an expected constancy of the latter for some months, the Fed can influence longer-term rates and eventually its final objectives.

[27] Rudebusch (1995) shows that this is the case for the federal funds rate target: there is a high probability that a movement will be followed by another movement in the same direction. Goodhart (1996) extends this finding to other central banks.

[28] See Bisignano (1995). Since the central bank often has superior information on future inflation, as shown by Romer and Romer (1996), an increase in official rates may be perceived as disclosing information that inflationary pressures are worse than previously expected and determine a pessimistic reaction by the market.

(1987) and Goodfriend (1986).[29] If there are many targets, together with frequently changing "preferences" in the objective function, an optimal level of secrecy exists, according to Cukierman and Meltzer (1986b).[30]

The model observed in continental Europe may be seen as an attempt to solve optimally the trade-off between these two tactics, using interest rates with different flexibility and signaling content.

The signaling role of different policy rates, however, is not a given. It depends on how they are managed and the consistency of this behavior over time. According to Goodhart and Viñals (1994), it is not self-evident that rates on standing facilities would do a better job than open market operations in signaling monetary policy intentions. A provocative position is taken by King (1994), who notes that monetary policy signaling need not be linked to liquidity provision at all and that it could be achieved "by hoisting a flag from the top of the Bank, or by speeches by the Governor" or, in a more sophisticated way, by assigning probabilities to future policy outcomes. According to the Deutsche Bundesbank (1994) the use of repo operations in Germany, although generally successful, has only in part fulfilled "the hopes of being able to act more 'discreetly' with the aid of the more

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[29] However, the view that secrecy reduces the variability of market rates is questioned by Tabellini (1987).

[30] Another important reason for sending a less explicit signal about the level of the interest rate is sometimes linked to the need to diminish outside pressure on the central bank (hence allowing more independent behaviour). According to Goodfriend (1993), the adoption of non-borrowed reserves, rather than interest rate, targets in the 1979-1982 period in the US was mostly motivated by this need (while the Fed was actually still looking at interest rates as operating targets).

flexible money market management techniques", as "particularly in the case of securities repurchase agreements, the general public has sometimes attached a significance which was not nearly warranted to marginal changes in allotment rates".

This raises two questions: whether this approach to monetary tactics is successful in fine-tuning monetary transmission, at least in the short run; and what the relevant monetary policy indicator is over longer periods.

5. The transmission of changes in Bank of Italy rates to market rates and expectations

According to the interpretations outlined above, all the policy interest rates - both the official rates, directly set by the Governor of the Bank of Italy, and the repo rates, affected by liquidity policy - are effective in transmitting monetary policy, but their effects should be different. On the one hand, official rates should have greater impact on the expectations of the public and thus on longer-term segments of the yield curve. On the other hand, repo rates should influence mostly the shorter-term segment of interest rates and affect market expectations, credit conditions and spending decisions more slowly.

In this section, we test the validity of these assumptions. In particular, we test for differential effects of the repo rate and of the "average official rate"[31] of the

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[31] I.e., the arithmetic mean between the discount rate and the fixed-term advance rate. We do not distinguish between the effects of the two official rates, as they were almost collinear in the estimation period (the spread changed only five times and was between 1 and 1.5 percentage points for most of the period).

Bank of Italy through: i) the whole structure of market interest rates; ii) survey-based measures of expectations of different sectors of the economy.

Our analysis focuses on a comparison of impact and longer-run dynamic effects of changes in policy rates on each of these variables. We adopt a single-equation framework, interpreting the short-run effect as the contemporaneous coefficient of the policy rate, and the long-run effect as the total multiplier in that equation. As a consequence, the latter effect should not be interpreted as fully describing the steady-state equilibrium of the system, which may depend on other behavioral relations. It should also be emphasized that the relatively short period of time over which we run most estimates (the 1990s), together with the large movements in interest rates that occurred in that period, would suggest exercizing some caution in drawing strong conclusions on the overall equilibrium relations among interest rates.

From an econometric standpoint, disentagling the effect of repo rates and that of official rates is made possible by the fact that the behavior of the two variables in the estimation period is not collinear, although they broadly tend to move together. As can be seen in figures 2a-b, the position of the repo rate within the corridor did in fact change in different periods, moving from the upper to the lower part of the corridor, with some persistence.

The market interest rates considered are bank deposit and lending rates, Eurolira money market rates and medium and long-term Eurolira swap rates. We regress each variable on its own lags and on the contemporaneous and lagged values of the two policy rates. The estimation is conducted for the period

1991-95, when the changes in the operating procedures of the Bank of Italy became effective, well-developed markets for medium and long-term securities existed and high-frequency data on market yields were available. For bank rates, we used ten-day averages (the highest available frequency in banking statistics); for money-market and medium and long-term yields, end-of-week data were used. Survey data refer to the quarterly survey by Forum-Mondo Economico on inflationary expectations and the Isco monthly survey of household confidence; we present results based on recent work by Nicoletti-Altimari (1997) and Locarno and Parigi (1996). These regressions have a longer estimation period, starting in 1972 for the Forum-Mondo Economico survey and 1982 for the Index of Consumer Confidence. [32]

The inclusion of contemporaneous values of the repo rates in the regressions requires them to be weakly exogenous with respect to the dependent variable. As described in Section 2, repo rates are affected not only by the supply policy of the Bank of Italy, but also by demand behaviour. Since the maturity of most repo operations is between 10 and 20 days, shifts in market expectations may cause simultaneous movements in both market and repo rates. In order to isolate the movements led by policy actions only and to ensure the consistency of the estimation, we used an Instrumental Variable approach, choosing as instruments the two liquidity indices discussed in Section 2 and various lags of the repo rate.

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[32] Since a uniform rate on fixed-term advances did not exist until 1991, in these regressions we used the discount rate instead of the "average official rate".

MONETARY POLICY RATES AND MONETARY TRANSMISSION (1)

ENDOGENOUS VARIABLE	HYPOTHESIS			IMPACT			TOTAL MULTIPLIER		
	exclusion of repo rate	exclusion of official rate	official-repo rates have same effect	official rate (+) (-)	repo rate	GER rate	official rate	repo rate	GER rate
bank rates	(2)	(2)	(2)	(3) (4)	(3)	(3)	(3)	(3)	(3)
checking deposit	[16%]	[0%] **	[0%] **	0.03 0.30 (1.8) (5.8)	-	-	0.55 (26.5)	-	-
CDs	[2%] *	[4%] **	[31%]	0.15 (2.6)	0.05 (2.5)	-	-	1.0 (12.2)	-
average lending	[0%] **	[0%] **	[0%] **	0.37 0.12 (5.9) (2.1)	0.05 (3.1)	-	-	0.9 (31.3)	-
minimum lending	[0%] **	[5%] *	[4%]*	0.06 (1.1)	0.03 (1.4)	-	-	0.8 (33.0)	-
money market rates									
3 month	[0%] **	[0%] **	[16%]	0.35 (1.6)	0.65 (5.3)	0.80 (4.7)	-	1.04 (16.8)	-
6 month	[0%] **	[0%] **	[0%] **	0.46 (2.4)	0.39 (3.3)	1.73 (4.9)	-	0.95 (8.7)	-
1 year	[0%] **	[0%] **	[0%] **	0.49 (3.4)	0.31 (3.3)	1.52 (5.3)	-	0.83 (4.2)	-
medium-long term rates									
3 year swap	[6%]	[0%] **	[0%] **	0.39 (9.6)	0.07 (1.1)	1.01 (6.6)	-	-	0.83 (1.4)
5 year swap	[32%]	[0%] **	[0%] **	0.35 (4.3)	-	1.06 (6.0)	-	-	1.25 (2.2)
10 year swap	[45%]	[0%] **	[0%] **	0.28 (8.0)	-	1.22 (6.4)	-	-	1.8 (2.7)
survey expectations									
consumer confidence	[58%]	[1%] *	[4%] *	-0.20 (2.9)	-		-0.05 (2.5)	-	
inflation expectations	[84%]	[2%] *	[13%]	-0.10 (2.3)	-		-	-	

(1) OLS estimates; sample periods and full specification of the equation estimated are described in Tables 4-8. Average ten-day data for bank rates (1992-95); end-of-week data for market rates (1992-95); monthly data for consumer confidence (1982-1994); quarterly data for inflation expectations (1972-1995). (2) χ^2 test: p-values in square brackets. (*) and (**) indicate rejection of the null hypothesis, respectively at 5% and 1% confidence level. (3) t-statistics in parenthesis. (4) (+) ≡ rises; (-) ≡ cuts.

A summary of the results is given in Table 3, while a more detailed regression output is shown in tables 4-8. The first and second column of Table 3 report the test for the exclusion of the repo rate and the official rate, respectively, verifying whether each rate has additional explanatory power with respect to the other in explaining the endogenous variables considered. The third column reports the tests on the hypothesis that the two rates have the same effect - both dynamically and in equilibrium - on the dependent variable;[33] this assumption is equivalent to testing whether only one policy rate matters for monetary policy transmission. As the table shows, all these hypotheses are generally rejected, indicating that both policy rates matter and that their effects are different. The main exceptions are the effects of the two policy rates on the shorter money-market rates, which are quite similar, and the lack of effect of repo rates on medium and long-term yields and on survey expectations, which are only affected by official rates.

The last portion of the table compares the impact and total multipliers of the two policy rates (non-significant coefficients were excluded from the regression following a general-to-specific procedure). While official rate changes tend to have a stronger immediate effect, accelerating the adjustment, repo rates determine the value to which market rates tend, at least as far as bank rates and short-term yields are concerned.

All in all, the management of policy rates seems to have been successful in fine-tuning the short-run effects of

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[33] This assumption imposes the restriction that in each equation both the impact and the steady-state coefficients of the official rate are equal to the corresponding coefficients of the repo rate.

monetary policy, disentangling the expectations effect from the effect on liquidity conditions. Over the longer run, however, "fundamentals" matter, and the actual cost of banks' liquidity (i.e., the repo rate) is the appropriate measure of the effect of monetary policy on market yields.

5.1 *Bank rates*

We consider two deposit rates (on checking accounts and 6-month CDs) and two lending rates (the average and the minimum lending rates).[34]

The estimated equation for each rate is written in error-correction form:[35]

$$\Delta BR = \alpha_1 \Delta OFF_t^{+} + \alpha_2 \Delta OFF_t^{-} + \alpha_3 \Delta REPO_t + \alpha_4 \Delta BR_t + \beta_1 OFF_{t-1} + \beta_2 REPO_{t-1} + \beta_3 BR_{t-1}$$

where BR is the bank rate, REPO the repo rate and OFF the official rate. The suffixes "+" and "-" on official rate changes denote positive and negative variations. This choice follows the empirical literature on bank rates in Italy, which has found an asymmetric effect of official rate changes in the past; this feature was usually explained with oligopolistic

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[34] All rates are from ten-day banking statistics. The lending rate is the average rate on overdrafts and short-term loans of a sample of banks accounting for about 90 percent of total lending. Short-term credit in Italy represents about 50 percent of total bank credit. The minimum lending rate is defined as the first decile of the distribution of interest rates.

[35] The specification search started from a model with more lags; the final form was selected by deleting the lags that were not statistically significant.

Table 4

BANK RATES (1)

Δ dependent:	Checking deposit rate	6- month CDs rate	Average loan rate	Minimum loan rate
Constant	-0.10 (3.5)	-0.02 (0.7)	0.29 (3.9)	0.22 (3.7)
Δ dependent$_{t-1}$	0.20 (2.8)	0.44 (5.7)	0.13 (2.2)	-
ΔOFF_t^+	0.03 (1.8)	-	0.37 (5.9)	-
Δ OFF	-	0.15 (2.6)	-	0.06 (1.1)
ΔOFF_t^-	0.30 (5.8)	-	0.12 (2.1)	-
Δ REPO$_t$	-	0.05 (2.5)	0.05 (3.1)	0.03 (1.4)
dependent$_{t-1}$	-0.11 (6.1)	-0.04 (2.9)	-0.09 (6.1)	-0.13 (8.9)
OFF$_{t-1}$	0.06 (6.5)	-	-	-
REPO$_{t-1}$	-	0.04 (3.1)	0.08 (6.1)	0.11 (8.8)
R^2	0.66	0.72	0.73	0.67
S.E. of regression	0.05	0.07	0.09	0.08
D.W.	2.1	2.15	2.10	2.1
Autocorrelation	[53%]	[16%]	[5%]	[6%]
Sample	1992 d1- 1996 d10	1992 d1- 1996 d10	1992 d1- 1996 d10	1992 d1- 1996 d10

(1) OLS estimates. White's *t*-statistics in parenthesis. Confidence levels in square brackets. Average ten-day data.

price setting behavior on both deposits and loans.[36]

As is shown in Table 4, changes in the official rate usually have a larger impact on bank rates than changes in the repo rate; this is not the case, though, for instruments traded on more competitive markets (CDs; loans to the "best" customers). Similarly, the existence of an asymmetric effect of official rate changes is rejected for the CD rate and the minimum lending rate. Overall, the immediate effect of a 1-point rise in official rates on the various bank rates is between 3 and 30 basis points; the impact of changes in the repo rate ranges between 3 and 5 basis points. Structural forms estimated by other authors found stickiness in the adjustment of bank rates to market rates;[37] a comparison of our results with those obtained for previous sample periods suggests that in the 1990s there was a reduction in the stickiness of bank rates (an increase in the effect of the repo rate and an increase of the speed of adjustment in the following months).[38] These changes reflect the increase in competition in deposit and to a larger extent in credit markets that has been under way since the second half of the 1980s.

In the longer run, bank rates converge to the repo rate (except for checking accounts); this is also consistent with earlier findings of an approximately unitary long-run elasticity to money market rates. Overall, our results are

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[36] Official rate cuts are usually found to have a stronger effect on deposit rates than rises (the opposite holds for lending rates). See Angeloni (1994a).

[37] See, for instance, Angeloni (1994a); Cottarelli, Ferri and Generale (1995).

[38] In our regressions, Chow-tests reject the hypothesis of no change between the 1985-1991 period and the 1992-95 period.

consistent with the hypothesis that in the long run it is the actual cost of refinancing - the repo rate - that matters. The stronger impact effect of the official rate reflects its "signaling" content, which eventually vanishes if the effective cost of liquidity does not follow. Correspondingly, changes in repo rates do eventually affect bank rates even without official rate changes, although more slowly.

5.2 *Money market rates*

We considered interest rates on lira-denominated Euro-deposits for maturities of 3, 6 and 12 months. After the specification search, the estimated equation was:

$$\Delta MM_t = \alpha_0 + \sum_{i=-1}^{1} \alpha_{1i} \Delta OFF_{t-i} + \sum_{i=0}^{1} \alpha_{2i} \Delta REPO_{t-i} + \sum_{i=0}^{1} \alpha_{3i} \Delta GER_{t-i} + \alpha_4 \Delta MM_{t-1} + \beta_1 REPO_{t-2} + \beta_2 MM_{t-1}$$

where MM is the money market rate and GER is the rate on corresponding Deutsche Mark-denominated Euro-deposits. The latter is included in differences.[39] We also included one lead of the change in the official rate. This specification, used in some of the literature on the effects of policy rates,[40] takes account of the fact that when official rate changes are anticipated, part of their effect may be embodied in market rates in the days immediately preceding the change, so that the contemporaneous and lagged coefficients may underestimate the total effect.

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[39] The specification search rejected the inclusion of the level of the DM rate in the equation.

[40] Cook and Hahn (1984), Dale (1993), Radecki and Reinhart (1994), Roley and Sellon (1995) and Buttiglione *et al.* (1996) consider a time interval surrounding the day of the policy rate change.

Table 5

MONEY MARKET RATES (1)

Δ dependent:	3-month rate	6-month rate	1-year rate
Constant	-0.02 (0.1)	0.15 (1.4)	0.17 (1.4)
Δ dependent$_{t-1}$	-0.68 (6.5)	-0.56 (4.9)	-0.54 (2.6)
Δ OFF$_{t+1}$	0.20 (3.0)	0.25 (4.4)	0.28 (5.1)
Δ OFF$_t$	0.15 (0.8)	0.21 (1.5)	0.21 (1.6)
Δ OFF$_{t-1}$	0.34 (2.35)	0.33 (2.1)	0.32 (2.1)
Δ REPO	0.65 (5.3)	0.39 (3.3)	0.31 (3.3)
Δ REPO$_{t-1}$	0.46 (9.6)	0.30 (5.9)	0.13 (4.9)
Δ GER$_t$	0.16 (0.8)	1.37 (3.4)	0.49 (4.1)
Δ GER$_{t-1}$	0.63 (2.4)	0.36 (1.8)	1.03 (3.4)
dependent$_{t-1}$	-0.23 (4.1)	-0.12 (3.8)	-0.06 (3.1)
OFF$_{t-1}$	-	-	-
REPO$_{t-2}$	0.24 (3.5)	0.11 (2.9)	0.05 (2.2)
R^2	0.58	0.56	0.43
S.E. of regression	0.43	0.36	0.32
D.W.	2.1	2.0	1.8
Autocorrelation	[5.2%]	[94%]	[6%]
Sample	1991 w 30 1995 w 52	1991 w 30 1995 w 52	1991 w 30 1995 w 52

(1) Instrumental Variables estimates. Newey-West's t-statistics in parenthesis. Confidence levels in square brackets. End-of-week data.

The results show that both policy rates affect short-term market yields. A change in the official rate has an immediate effect on money market rates of about 0.4 points on average, increasing from 0.35 on 3-month yields to 0.49 on 12-month yields; the effect of the repo rate is larger (0.65) on 3-month yields, smaller (0.31) on 12-month yields (tables 3 and 5). Point estimates of the total multiplier suggest that the level of the repo rate has a unitary coefficient. This implies that in the long-run market rates are also determined by the actual cost of refinancing with the central bank.

5.3 *Medium and long-term yields*

For medium and long-term yields, we considered 3, 5 and 10-year swap rates on the Euro-market. The general form of the equation is similar to that in the preceding section. However, in this case the specification search suggested also including the level of German yields on corresponding maturities and selecting an equation of the following form:

$$\Delta ML_t = \alpha_0 + \sum_{i=-1}^{0} \alpha_{1i} \Delta OFF_{t-i} + \alpha_2 \Delta REPO + \alpha_3 \Delta GER_{t-i} + \beta_1 GER_{t-1} + \beta_2 ML_{t-1}$$

where ML is a generic medium or long-term rate. The results show that while the effect of the repo rate is almost negligible, changes in the official rate display a significant effect on interest rates on these segments (Tables 3 and 6). This is consistent with the findings of Buttiglione *et al.* (1997) and offers evidence in favour of the expected

Table 6

MEDIUM AND LONG-TERM YIELDS

Δ dependent:	3-year rate (IV)	5-year rate (OLS)	10-year rate (OLS)
Constant	0.10 (1.2)	0.06 (0.5)	-0.05 (0.4)
Δ OFF_{t+1}	0.17 (4.0)	0.15 (4.2)	0.12 (3.9)
Δ OFF_t	0.22 (3.2)	0.19 (3.9)	0.17 (4.2)
Δ $REPO_t$	0.07 (1.1)	-	-
Δ GER_t	1.01 (6.6)	1.06 (6.0)	1.22 (6.4)
$dependent_{t-1}$	-0.015 (2.2)	-0.019 (2.2)	-0.026 (2.1)
OFF_{t-1}	-	-	-
$REPO_{t-1}$	-	-	-
GER_{t-1}	0.013 (1.4)	0.024 (1.9)	0.048 (2.0)
R^2	0.30	0.30	0.31
S.E. of regression	0.23	0.21	0.19
D.W.	2.1	2.1	2.1
Autocorrelation	[33%]	[50%]	[60%]
Sample	1991 w 30 1995 w 52	1991 w 30 1995 w 52	1991 w 30 1995 w 52

(1) Instrumental Variable (IV) when $\Delta REPO_t$ is included, OLS otherwise. Instruments for $\Delta REPO_t$ are its own lags and the two liquidity indexes. Newey-Wests's *t*-statistics in parenthesis. Confidence levels in square brackets. End-of-week data.

persistence of changes in the official rates and of their larger signaling content.

Furthermore, the difference between short-run dynamics and long-run effects is larger than in the case of bank rates or short-term yields. Though official rate changes do affect the adjustment of market rates, they only have a dynamic effect. In the long run, the behavior of domestic long-term rates is entirely driven by the corresponding German yields. This result is consistent with other findings on Italian and international rates. Fell (1996) finds that in many industrial countries in the course of the 1980s and the 1990s long-term rates were increasingly responsive to international yields rather than to domestic short-term rates.

The fact that, beyond the very short run, the level of the policy rate does not enter this equation may look surprising. However, it must be stressed that this does not necessarily imply the absence of an equilibrium relation between short and long domestic rates, which may well result from other behavioral equations.[41] At any rate, empirically, the difficulty in finding an equilibrium relationship between Italian short and long rates in the 1990s is not an uncommon result; it is probably connected to the shortness of the estimation period relative to the substantial swings that took place in long rates and in risk premia.

On the relation between Italian and German long rates, the equation we estimated is admittedly incomplete, since it does not include the expected inflation differential, thus

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[41] E.g., in a full model, this may derive from the link between domestic and foreign short rates and the link between foreign short and long rates.

involving a convergence in nominal, rather than real, rates. This may be justified as a necessary approximation, due to the high frequency of the data, over which no satisfactory proxy for expected inflation is available; as Fell (1996) argues, such a specification may be satisfactory as long as the expected inflation differential is a stationary process. Indeed, using lower frequency data, the inclusion of an inflation differential term usually proves significant, without seriously affecting the other properties of the equation: on quarterly data for 10-year Italian Treasury bond rates, Gaiotti and Nicoletti (1996) find that domestic yields converge on foreign ones, plus the expected inflation differential and a risk premium.

5.4 *Survey-based measures of expectations*

The significance of the impact of official rate changes on market expectations is confirmed by tests based on measures of expectations other than those implicit in the yield curve. Nicoletti Altimari (1997) and Locarno and Parigi (1996), working on survey data, showed respectively that discount rate increases do contribute to downward revisions of inflation expectations and to decreases in consumer confidence. Both these variables play a role in monetary transmission: inflation expectations affect the determination of wages (and may also contribute to the short-run dynamics of prices, for a given rate of wage growth); consumer confidence contributes to explaining consumption behavior. [42]

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[42] See Gaiotti and Nicoletti Altimari (1996), Locarno and Parigi (1996).

Since the expectations measured by the survey data are not (or not only) expressed by financial operators, but refer to a composite sample in the first case and to households only in the second, the distinction between the highly visible discount rate, widely commented on the press, and the yield on more technical operations like repos should be quite important.

The dependent variable in the first equation is the one-quarter-ahead inflationary expectation measured by the Forum-Mondo Economico survey.[43] Apart from the policy rate, explanatory variables include past inflation, the capacity utilization rate, the unemployment rate, the exchange rate, prices of foreign competitors and energy prices. As is shown in the first column of Table 7, discount rate changes have had a significant effect on inflationary expectations since 1984.[44] This result is probably related to the transition to indirect controls after 1983. The other two columns of the table show the results obtained by running the same regression with the repo rate, either added to the discount rate or substituted for it. This rate has no additional explanatory power in the equation; substituting the discount rate with the repo rate does not yield significant estimates of the coefficient.

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[43] The Forum-Mondo Economico survey of Italian experts from different sectors has been conducted since 1952. See Visco (1984).

[44] Nicoletti Altimari (1996) originally estimated the equation with variable coefficient techniques, identifying both an adjustment effect (which he calls a "learning" process) following the inflation volatility of the 1970s, and a jump in the monetary policy coefficient in 1984. In our estimation, we included a dummy variable (with value one after 1984) and a learning variable reproducing the one he estimated.

Table 7

INFLATION EXPECTATIONS (1)

Dependent: $\pi_{t/t-1} - \pi_{t-1/t-2}$			
DU84* Δ DISC$_{t-1}$	-0.11 (2.3)	-	-0.09 (1.6)
DU84* Δ REPO$_{t-1}$	-	-0.03 (1.2)	-0.01 (0.3)
$\pi_{t-1} - \pi_{t-1/t-2}$	0.16 (3.3)	0.16 (3.3)	0.16 (3.3)
$\Delta(CPU_{t-2} - \overline{CPU})$	0.06 (2.0)	0.06 (2.2)	0.06 (2.0)
ΔU_{t-2}	-0.19 (2.1)	-014 (1.7)	-0.18 (2.0)
$\Delta \dot{e}_{t-2}$	0.02 (2.8)	0.02 (2.8)	0.02 (2.8)
$\Delta \pi^{*}_{t-2}$	0.03 (1.3)	0.03 (1.0)	0.03 (1.2)
$\Delta \dot{pe}_{t-2}$	0.01 (2.8)	0.01 (2.6)	0.01 (2.8)
learning	1.24 (4.4)	1.22 (4.2)	1.24 (4.4)
*learning** $\pi_{t-2/t-3}$	-0.45 (5.1)	-0.45 (5.0)	-0.45 (5.1)
R^2	0.54	0.53	0.58
S.E. of regression	0.25	0.26	0.26
D.W.	2.2	2.2	2.2
Autocorrelation	[24%]	[21%]	[23%]
Normality	[71%]	[79%]	[72%]
Heteroschedasticity	[62%]	[94%]	[67%]
Sample	1972 q1 1995 q4	1972 q1 1995 q4	1972 q1 1995 q4

(1) OLS estimates. White's *t*-statistics in brackets; confidence levels in square brackets. *U*: unemployment rate; *e* : rate of change of the effective exchange rate; *pe* rate of change in energy prices; $CPU - \overline{CPU}$: difference of the capacity utilization rate from its normal value; $p_{t+1/t}$: one quarter-ahead CPI inflation expected at *t* (*Forum-ME* survey data, at annual rate); *p* *: weighted rate of change of average prices of 14 of Italy's trading partners; DISC: official discount rate; REPO: rate on securities repurchase agreements with the Bank of Italy. DU84 is a dummy that takes value 1 since 1984,4. DU84 = dummy variable equal to 1 after 1984, "learning" is an adjustment variable, originally estimated with transition function tecnique (see Nicoletti (1996)). Quarterly data.

Table 8

CONSUMER CONFIDENCE (1)

Dependent:	log (ICS)		
constant	1.21 (4.1)	0.94 (3.5)	1.17 (4.0)
$\log(ICS_{t-1})$	0.59 (7.2)	0.63 (7.6)	0.59 (7.3)
Δ DISC	-0.17 (2.8)	-	-0.21 (2.9)
Δ REPO	-	0.01 (0.2)	-0.03 (1.1)
$DISC_{t-1}$	-0.05 (3.2	-	-0.06 (2.5)
$REPO_{t-1}$	-	-0.03 (1.6)	0.04 (0.2)
$\log(ICS_{t-2})$	0.30 (3.7)	0.25 (3.0)	0.32 (3.7)
(Δ U + INFL)	-0.03 (3.3)	-0.04 (3.7)	-0.03 (3.2)
$\Delta EXCH_t$	-0.59 (5.6)	-0.62 (5.4)	-0.59 (5.7)
$EXCH_{t-1}$	-0.09 (3.2)	-0.04 (1.9)	-0.09 (3.1)
Δ INDPROD	0.43 (2.9)	0.50 (3.7)	0.46 (2.9)
PCYCLE	-0.01 (2.4)	-0.01 (2.1)	-0.01 (2.3)
R^2	0.95	0.95	0.95
S.E. of regression	0.018	0.019	0.019
D.W.	2.0	2.0	2.0
Autocorrelation	[75%]	[45%]	[68%]
Normality	[6%]	[8%]	[6%]
Heteroschedasticity	[35%]	[30%]	[36%]
Sample	1982 m 3 1994 m12	1982 m 3 1994 m12	1982 m 3 1994 m12

(1) OLS estimates. White's *t*-statistics in parenthesis; confidence levels in square brackets. ICS: Index of Consumer Sentiment; U: unemployment rate; INFL; inflation rate, based on the cost of living index; EXCH: lira/DM exchange rate; INPROD: index of industrial production; PCYCLE: dummy for periods of government crises. Monthly data.

As to consumer confidence, the effects of monetary policy rates on the Index of Consumer Confidence, based on a survey of households conducted every month since 1982,[45] are analyzed. The first column of Table 8 reports the estimates of a regression of the index on the discount rate and on some macro-variables (the inflation rate, the unemployment rate, the exchange rate, real disposable income and a variable that captures the effects of political events, given by a dummy variable for the periods of cabinet crisis):[46] a 1 point increase in the discount rate worsens consumer confidence (the index decreases by about 20 percent). The other two columns of the table show that this effect disappears if monetary policy is measured by the repo rate. Even the inclusion of both the repo and the discount rate among the explanatory variables indicates that the former has no additional explanatory power.

6. Conclusions

The conduct of monetary policy in Italy hinges both on the direct setting of official rates and on liquidity control, which in turn affects the interest rate on the central bank's securities repurchase agreements. Both these instruments have been used in recent years, with the twofold purpose of affecting long-term inflationary expectations, due to their primary role in monetary transmission, and responding more

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[45] The index is drawn from the response to nine questions concerning the general economic situation in the last and next twelve months, whether it is a good time to buy durables, expectations about unemployment, the household's economic situation in the last and next twelve months, the household's financial position and the possibility and economic advantage of saving. From 1973 to 1981 the survey was conducted every four months; since 1982, monthly.

[46] This basically reproduces unpublished estimates by Locarno and Parigi (1996) on a monthly basis. Their 1996 paper reports results on quarterly data and gives a full description of the equation.

flexibly to recurrent, if often transient, exchange rate tensions and worsening of expectations. The literature offers reasons for the choice of different policy rates and for either very transparent, discrete and persistent interest rate movements or more gradual, flexible and less immediately visible ones.

We have tested some implications of these procedures for the monetary policy transmission process in Italy, finding that the rate on repos and the official rates both matter in monetary transmission, but in different ways. The repo rate mostly affects the short-term end of the yield curve and, as it represents the actual cost of banks' refinancing, it forms the value to which market rates and bank rates eventually tend to converge. The official rates have a much larger role in speeding up dynamic adjustment and in shaping the expectations of non-financial operators.

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