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The Monetary Policy of the European Central Bank and the Euro-US Dollar Exchange Rate.

by

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DISCUSSION PAPER

THE MONETARY POLICY OF THE EUROPEAN CENTRAL BANK AND THE EURO-DOLLAR EXCHANGE RATE

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I. The aim of the research is the evaluation of the exchange rate of the Euro after the first six months of its existence. The task is not easy because it is not possible to test empirically the validity of a comprehensive scheme of the effects of the launch of the Euro: nowadays we possess about one hundred daily observations of the external value of the european currency.

In principle it would be possible to create a "virtual framework" extending to the past the possible determinants of the value of the Euro using the ECU as a proxy and creating an European Central Bank (ECB) using the weighted data of the central banks adhering to the Eurosystem. It would then be easy to simulate, for example, a 'reaction function' of the ECB and to check the effects of its conduct on the financial markets and the response of the exchange rate of the Euro against, for instance, the US Dollar.

This conceptual experiment, shared by many researches, tries to depict potential scenarios after the European Monetary Union[2], and to evaluate the main effects of new monetary policy on the financial and product markets.

Nevertheless it is well known that such procedures conflict with the outcomes of the 'Lucas critique': they assume the estimated parameters of the model would be invariant when altering the monetary policy rule, in our case the birth of the ECB. It follows that predictions from these exercises are unreliable.[3]

Our research will try, therefore, to evaluate the effects of european monetary authorities' conduct on the exchange rate of the Euro utilising statistical information from the beginning of the Eurosystem.

The main interpretative hypotheses of the research can be summarised in the following points:

(i) the evolution of the Euro external value is strictly connected with the agents' *confidence* on real, financial and foreign exchange markets;

(ii) the ECB monetary policy strategy influenced negatively (or at least neglected) the agents' confidence and expectations already affected by cyclical conditions of european economy;

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[2] See Bagliano et al. (1999). Several financial institutions use such time series to forecast monetary aggregates and interest rates in the Euro Area.

[3] The difficulty to predict effects of economic policy in the presence of major regime changes is emphasised in United Nations (1999).

(iii) the resulting portfolio reallocation determined a short-term capital outflow in favour of US Dollar denominated assets and, hence, an Euro depreciation.

The consistency of the whole framework will be checked by the use, first, of descriptive statistic on variables as the Industrial Sentiment, the Interest-Rate Spread, the Implied Volatility of exchange rates, the Risk Reversal, and, subsequently, by the building of a Structural Autoregressive Model.

II. The evolution of the external value of a currency depends, in principle, on the interactions between the whole domestic stance of economic policy, the expectations of the agents operating in the financial, exchange and product markets and the economic policy of the 'Rest of the World'.

In the case of the exchange rate of the Euro these interactions must be connected with a further policy issue, i.e. the statement of the Maastricht Treaty on the relative powers of the Council of Ministers and the ECB to determine the exchange rate regime[4]. We shall discuss in short this issue aiming at emphasising the undivided responsibility of the ECB in the present conduct of Euro exchange rate policy.

In principle the role of the Council of formulating general orientations for exchange rate policy may lead to conflicts about desirable monetary policies. It is well known that the European Central Bank announced a strategy based on the control of the monetary aggregate M3. This strategy has no probability, except by chance, to be achieved by the ECB if the general orientations by the Council on the exchange rate policy are exogenous to the ECB.

The system can actually work only in a situation of absolute agreement on the "hierarchy" of the final targets of the economic policy and of complete accord between the Council of Ministers and the ECB. The orientations for the exchange rate, pertaining *de jure* to the Council, should *de facto* be determined simultaneously with the setting of

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[4] The Maastricht Treaty states:"*…the Council, acting by a qualified majority either on a recommendation from the Commission and after consulting the ECB or on a recommendation from the ECB, may formulate general orientations for the exchange rate policy…These general orientations shall be without prejudice to the primary objective of the ESCB to maintain price stability*."

monetary targets.[5] Only in such a framework the institutional commitment to price stability could be achieved.[6]

The hypothesis of a connection between ECB monetary policy and the evolution of the Euro exchange rate can be stated if we assume that, at the present, the ECB is the principal agent responsible of the management of the Euro and that the ECB will give, in future, a stringent interpretation of the Maastricht Treaty; accepting general orientations by the Council only if they are strictly consistent with the control of the monetary aggregates.[7]

The conclusion is that we can study the effects of ECB conduct on the Euro value excluding the probabilities of 'external political pressures'.

Many clues support, actually, these assumptions: first, there is a problem, as we stressed, of consistency between the pegging of the exchange rate and a successful control of the monetary aggregates; second there is no unambiguous meaning of the concept of 'real misalignment'[8].

III. It is clear that the attempt to find a relation between monetary policy and the value of the exchange rate for an institution born only six months ago is very troublesome and can give rise to several misunderstandings.

We think, however, that the effects of the monetary strategy of the ECB on the Euro external value can help to examine crucial issues, such as the roots of the reputation and

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[5] The peculiarity of the Maastricht Treaty is not the commitment of distinctive powers on the exchange rate to *two* institutions because this happens in the institutional relations between the Treasury Minister and the Central Bank in many western countries. The peculiarity comes from the statement of relative powers of two *super-national*, i.e. Union, institutions.

[6] Consequently the Council, acting in the direction of consistent relations with the ECB, decided on December 1997 to give general orientations only in the case of a 'real misalignment' of the Euro.

[7] These are the evaluations by De Grauwe (1997) and Eichengreen (1998).

[8] From a strictly theoretical point of view a misalignment implies a deviation of the real exchange rate from its underlying *equilibrium value*. The problem is that the notion of equilibrium value, both in the theoretical models and in the policy measures, refers to *several* notions of the equilibrium value of the exchange rate. For example, the following notions of equilibrium are possible:
(i) the overall equilibrium of the Balance of Payments;
(ii) the equilibrium on Current Account;
(iii) the value that does not boost speculative attacks on the foreign exchange market;
(iv) the value that is consistent with the achievement of price stability;
(vi) the value that allows the end of a "beggar thy neighbour" dispute at international level.

the credibility of a new born institution, the role of private operators' confidence in the monetary policy transmission mechanism, the complex nature of the relations between interest rate and exchange rate.

In the next sections we shall discuss the basic features of the monetary policy of the ECB; the theoretical underpinnings of this strategy and the likely connections with the evolution of the exchange rate of the Euro, whose trend has been regularly weakening, as we can see in See Figure 1.

IV. The theoretical pillars of european monetary authorities' conduct that have been restated in several official publications of the ECB give the first step of our analysis[9]. Its conduct can be ascribed to the conventional theory on monetary policy[10], which, jointly with the main restatements[11], can help us to build a simple model of the monetary policy strategy of the ECB**.**

The overriding priority is given by the price stability. Officially the target is pursued assigning money a prominent role. In such a case the ECB period loss function should be indicated by the equation (1):

$$(1)\quad L_t = \frac{1}{2}\left(\Delta m_t - \Delta m^*\right)^2$$

where Δm_t denotes the (log) quantity of money growth and Δm^* the money-growth target.[12]

The loss function in (1) can be considered a " strict money targeting' in the sense that the central bank varies the level of the instrument variable, i.e. the rate of interest, in the case of every deviation of money growth from the target growth. Actually the ECB pursues a 'pragmatic money targeting" because it decided to follow a practice of "interest rate smoothing"[13] and the price stability is pursued evaluating the inflationary

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[9] See Bean (1998); European Central Bank (1999a) and (1999b), the Monthly Bulletin and the speeches of President and Members of Governing Council of the ECB.

[10] See McCallum (1999) and Wyplosz (1999).

[11] Svensson (1999).

[12] The monetary aggregate selected as a reference indicator is M3.

impact of a broad category of financial and real variables[14]. Hence monetary policy does not react mechanistically to money growth deviations.

The ECB decided not to pursue a strategy of inflation targeting. The effects of this decision have been largely discussed both for the efficiency of the targeting both for its implications on the issues of the transparency and the accountability of the new central bank.[15]

It is important for our discussion to emphasise that the money targeting, whatsoever is its version, does not determine a lower bound for the inflation rate[16] and this limitation has, as we shall see, crucial effects, on industrial confidence in the case of a decreasing rate of inflation.

The equation (2) describes the equilibrium on the money market:

$$\textbf{(2)}\quad m_t - p_t = \kappa_1 y_t - \kappa_2 R_t + \eta_t$$

where a stable demand is supposed to depend on the nominal interest rate and output. This stability, which has been questioned by several authors because of the uncertainty in Eurosystem money and financial market, is supposed to prevail in the medium term as outcome of an appropriate money supply policy build that can avoid the insurgence of a 'Goodhart Law' phenomenon.[17]

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[13] A central bank chooses a smooth path of the interest rate when there is a partial adjustment to the variables included in the reaction function and the smoothing is reflected by the presence of the lagged interest rate in the central bank's rule. See Clarida et al. (1999), p.54. The rationale of interest rate smoothing is discussed in Goodhart (1998) and Woodford (1999).

[14] Angeloni et al. (1999) group potential indicators into five broad classes: "gap" measures; labour cost measures; exchange rates and international prices; asset prices and survey-based measures of expectations.

[15] The first issue is discussed by Mishkin (1998); Rudebusch and Svensson (1999); Svensson (1999). The second issue is discussed by Buiter (1998); Buiter (1999); Castren (1999); Faust and Svensson (1999); Valila (1999).

[16] The only explicit lower bound for inflation is given, according to the ECB, by the exclusion of the deflation from the definition of price stability. Svensson calculates that price stability for the ECB 'below "2%" seems to be an inflation target of 1.5%. This value is determined from an estimated trend growth of real GDP 2-2.5% per year and an assumed trend decline in velocity of 0.5-1%. But the rate of inflation of the Euro area is today well below 1%. For similar calculations see von Hagen (1999 a).

[17] The position has been held by Issing, member of the Executive Board of the ECB, who, referring to the German experience, writes:"…supply and demand effects cannot be clearly distinguished…the money supply process may also influence the relationship between the money stock and the trend of GNP, and its stability. If the central bank's policy rule remains unchanged…the empirical 'money demand' parameters should be more stable". Issing (1997), pp.76-7. More recently Coenen and Vega (1999) presented

The EMU-wide aggregate demand is contained in the equation (3):

(3) $y_t = \sigma_1 E_t \Delta\pi_{t+1} - \sigma_2 \left(R_t - E_t \Delta\pi_{t+1}\right) + v_t$

The equation (3) is an 'expectational' IS whose value depends on an instrumental short-term nominal interest rate and on inflation expectations. Precisely y_t denotes the log of output, E_t is the expectation operator conditional on information available at time t, π_{t+1} is the inflation rate at time $t+1$, R_t is the nominal interest rate at time t and v_t is a stochastic term.[18]

The short-run assessments on aggregate demand are, according to the ECB, less important than the key medium-run links between the price stability, real economic growth, and the rate of unemployment[19]. These links work on the demand side through the positive effects on the confidence of investors given by reliable definite prices. Stable prices, further, minimise the inflation risk premium in long-term interest rates, thereby stimulating investment and growth.[20]

The aggregate supply is given by the equation (4):

(4) $\pi_t = \phi_1 E_t \Delta\pi_{t+1} + \phi_2 \left(y_t - y^*\right) + u_t$

a traditional 'expectations-augmented' Phillips curve.

The last equation is the ECB reaction function:

(5) $R_t = \mu\left(\pi_t - \pi^*\right)$

that reflects the role assigned to the inflation target in interest rate variations.

The basic points, if we relate the framework to ECB conduct, are that this conventional model[21] does not need a money-demand equation, such as the equation **(2).** It merely

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estimates that support the ECB' view on a stable money demand in Euro area, while Arnold and de Vries (1998) emphasise that the EMU changes in monetary policy and money demand could invalidate the forecasts of EMU-wide money demand stability.

[18] A more complete specification of the aggregate demand equation could include the real exchange rate, $\left(s - p + p_w\right)$, as in Monticelli and Tristani (1999), and the unanticipated government expenditure shock, $\left(g_t - E_t g_{t+1}\right)$, as in McCallum (1999).

[19] Issing (1999).

[20] The benefits of price stability for real economic growth and employment are summed up in European Central Bank (1999a), p.40.

determines the amount of money, but no money term, m_t, or real balance term, $m_t - p_t$, appear in the IS relation.

Further, if .we consider the monetary aggregate of the Loss Function in the equation **(1)** as an official target rather than an operative guide-line[22], we can conclude that, in synthesis, the actual conduct by the ECB, is laying on the conventional theory on monetary policy[23], that sets an 'expectational' IS-type relation, the equation **(3)**, a price-adjustment equation, the equation **(4)**, and a monetary authorities' reaction function, the equation **(5)**.

It means that the findings of a likely connection between the ECB conduct and the exchange rate of the Euro must not focus the growth of monetary aggregates, because they are not central in the transmission mechanism from monetary policy to the external value of the european currency[24], the consistency of the main-stream theory with the founding of a new-birth reputed and credible central bank, aware of the effects of the effects of its own conduct on the level of economic activity, the inflation rate and the exchange rate.

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[21] The same conclusion on the current relevance for the actual central banking of this conventional model have been achieved by Clarida et al. (1999) and Goodfriend and King (1997). The first label this model as "New Keynesian", the second "New Neoclassical".

[22] This means that the actual loss function of the ECB, as Svensson argued[22], could be given by the equation **(1a):**

(1a) $L_t = \frac{1}{2}\left(\pi_t - \pi^*\right)^2$

Svensson labels the case of a formal statement of the monetary aggregates supremacy as an "inflation targeting in disguise". See Svensson (1999). "The fact is that actual central banks in industrial countries conduct monetary policy in a manner that is more accurately depicted by writing R_t rather than m_t as the instrument or operating variable." McCallum (1999 Apr), p.24. "Under an interest rate policy, one can use the LM equation to determine the effects of policy changes on the stock of money, but one need not employ it for any other purpose." Kerr and King (1996), p.51.

[23] See McCallum (1999) and Wyplosz (1999).

[24] It is not by chance that no appraisal of the conduct of the ECB regards the degree of achievement of the monetary aggregate M3. "President Duisenberg's comments on ECB Council meetings commonly paid little, if any attention to monetary developments, instead they focused on short-term interest rates and exchange rate movements. This creates the impression that the Council itself largely disregards the variables that allegedly are at the centre of its strategy." von Hagen (1999 a), p.10.

V. If the ECB actual strategy can be related to the principal propositions of the main-stream analysis it is necessary to start from its founding issue, i.e. the issue of monetary policy time consistency.[25]

It is useful to recall the major conclusions reached by the conventional framework moving from the time-consistency constraint:

(i) the central bank credibility is founded on policies that are consistent with earlier plans and announcements and, hence, on the ability to precommit to policies;

(ii) this commitment implies the preference for a rule instead of discretionary policies that is the only way to achieve the 'minimum' inflation rate;

(iii) the rate of inflation is minimised because the rule avoids the insurgence of an inflationary bias, that arises from the central bank's desire for an unemployment rate below the natural rate joined with its inability to credibly commit to a low inflation rate;

(iv) the rules and the elimination of the 'inflation bias' determine the reputation and the credibility of the central banker that would be lost if he deviates from the 'minimum inflation' solution;

(v) the reputation of the central bank is safer if its preferences differ from those of the elected government; hence it is optimal that the government appoints a central banker who places greater relative weight on the inflation objective than does society as a whole;

(vi) this kind of appointment defends the independence of central bank and grants a lower average inflation and a greater real economy performance.

VI. The debate originated from the distinguishing features to be related to a reputed and credible central bank is now enlarging and deepening.[26]

For our purposes we shall regard the issues pertinent to clarify the relationship between the ECB monetary strategy and the evolution of the Euro exchange rate.

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[25] Following the pioneering paper by Kydland and Prescott (1977) the well-known seminal contributions are Barro and Gordon (1983), Rogoff (1985), Alesina and Summers (1993). An excellent analytical review of this literature is contained in Walsh (1998). For an exposition of the ECB conduct using the Barro- Gordon model and Rogoff's contribution see De Grauwe (1999).

The first and more puzzling issue is the concept of credibility. The notion of credibility included in the benchmark model is strictly connected with the time consistency.[27] The time consistency issue arises from the belief in a systematic inflationary bias in the behaviour of the central bank: the latter desires to stabilise output around a value that exceeds the economy's equilibrium output.[28] But this belief neither is supported from a theoretical point of view, nor is recent history kind to the view that central banks suffer from an inflationary bias.[29]

In addition if we investigate the credibility issue, we find that in the ruling literature the notion is related to a "precommittment" and/or "strong aversion to inflation": the loss of reputation, hence, arises if the central bank deviates from the low-inflation solution. Following Blinder, we can instead suppose that " a central bank is credible if people believe it will do what it says." [30] It means, in our opinion, that credibility, and hence reputation, depend on more complex, and perhaps, cogent conditions such as:

i) the referral to a specific model of the working of the monetary policy when the central bank announces its final targets;
ii) the implementation of measures consistent with the underlying model;
iii) the public's subjective confidence that the goals could be, in principle, achieved.

In a different but similar way Vickers argues, correctly, that monetary policy must be conducted in a complex and not mechanical way.[31]

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[26] Forder, for example, criticises the alleged relationships between independence and inflation. See Forder (1998).

[27] We accept the definition by Walsh: " A policy is *time consistent* if an action planned at time ***t*** for time ***t+1*** remains optimal to implement when time ***t+1*** actually arrives." See Walsh (1998), p.323.

[28] The reasons can be based on the presence of labour-market distortions, monopolistic competitive sectors, and political pressure on the central bank.

[29] "…the monetary authorities of many countries, especially in Europe, have displayed a willingness to maintain their tough anti-inflation stances to this very day, despite low inflation and persistently high unemployment. Whether or not you applaud these policies, they hardly look like grabbing for short-term employment gains at the expense of inflation." Blinder (1998), p.41. McCallum thinks inappropriate to presume that a central bank would, in the absence of a tangible precommittment, inevitably behave in an 'inflationary bias fashion'. See McCallum (1997).

[30] Blinder (1999), p.4. and Blinder (1996).

In our opinion, if we consider the first semester of ECB conduct, it is possible to state that the condition **(i)** was *perhaps* satisfied, the condition **(ii)** was *partially* satisfied, the condition **(iii)** was *unsatisfied*.

If the ECB and the Council members theoretically agree with the Blinder's notion of credibility, it is not sure the ECB is conducting a monetary policy strategy consistent with its declarations.[32] For example the interest rate cut on April 1999 was not justified by the money growth that was exceeding the target value; further, the official positions of the ECB Council on the weakening trend of the Euro against the USD have been confusing and conflicting.[33]

The accent on price stability as a primary root of credibility and reputation for a new born central bank according to the european monetary authorities is relevant because the policy implication of this belief is a disinflation target achieved through a peculiar and, as we shall see, risky strategy.

VII. The discussion of the previous sections aimed to emphasising how the ECB monetary strategy was set up consistently with the assumptions of the mainstream literature on central banking. The question we raise regards, generally, the matching of these assumptions for a new-born institution and particularly, the specific strategy, i.e. a strict or pragmatic money growth targeting.

The dispute is not directed against the goal of price stability in itself. This goal is the institutional commitment of the Maastricht Treaty; the historical duty of a central

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[31] Vickers states that the conduct of monetary policy works from a' core model', 'assumptions and judgements' and 'other models' to arrive through 'forecast' and 'other issues and policy judgements' to 'policy'. See Vickers (1999).

[32] The ECB conduct has been evaluated as "an exercise in confusion". See von Hagen (1999a), p.8. The Economist (1999a) writes that the ECB "…has often failed to speak with a single consistent voice. This has sown and hurt its fragile credibility…Clearly, the ECB's top brass are still learning how to communicate with the markets."

[33] " Another indication of the ECB's weak commitment to its own strategy is the fact that its president sometimes argues that the Bank would intervene in the case of exchange rate misalignments, and yet denies that the ECB pursues an exchange rate target via-a-vis the dollar. As long as the Bank refuses to explain what would be an appropriate equilibrium exchange rate, or by what criteria the Bank would assess the existence of misalignments, such opaque statements can only create confusion." von Hagen (1999a), p.10.

banker[34]; the resolute condition by Bundesbank to confer its powers to a european institution[35]; the hope by the Eurosystem to inherit the credibility of the Bundesbank.[36] The real problems are connected with the dangers of this specific monetary strategy in a phase of recession of the Euro Area (see Table A) existing at the start of EMU and inspired by the Maastricht policy mix of monetary and fiscal restriction, as it is presented in Figure 2.[37]

The choice of monetary targeting, within a framework of tight monetary stance, has the outcome of a gradual reducing of the price increases without the definition of a lower bound for the inflation rate.[38] The absence of a lower bound of prices has, in a climate of recession and falling prices, harmful effects on the expectations of the agents. Keynes, first, understood the relevance of the problem:

> "If the reduction of money wages is expected to be a *reduction relatively to money-wages in the future*, the change will be favourable to investment, because…it will increase the marginal efficiency of capital; whilst for the same reason it may be favourable to consumption. If, on the other hand, the reduction leads to an expectation, or even to the serious possibility, of a further wage-reduction in prospect, it will have precisely the opposite effect. For it will diminish the marginal efficiency of capital and will lead to the postponement of investment and of consumption."[39]

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[34] The importance of price stability as a nominal anchor for the monetary authorities is reaffirmed in Haldane and Quah (1999).

[35] Krugman (1998a).

[36] Svensson (1999) and von Hagen (1999b)

[37] See De Grauwe (1998). Jackman (1999) stresses the effects on the european rate of unemployment of the participation in EMU. Solow (1999) discusses the connections between the monetary policies and unemployment in Europe in the last decade.

[38] "…what we appear to have is a range of inflation rates deemed consistent with price stability. The floor could be 0% HICP inflation or something a bit higher. The range is not symmetric or otherwise centred. There is no value of inflation rate inside the range such that, if inflation were to threaten to go below (above) it (over a horizon for which policy could be expected to influence it) there would be a presumption that policy would be relaxed (tightened). So we know what it is not (an inflation target), but we still don't know exactly what it is." See Buiter (1999), p.16.

[39] Keynes (1936), p.263. It is right to remind two features of Keynes approach modified in the present EMU context. The first is that Keynes refers to money wages and not to prices reductions; this is the result of Keynes choice in the *General Theory* to deflate nominal quantities in terms of unit of wage. The second is Keynes reflects on a reduction of prices instead of a reduction of inflation. Nevertheless the relevance of the assessments is invariant.
It is interesting and, perhaps, unexpected to find a similar reasoning in the last Annual Report of the Bank for International Settlements, when it deals with the issue of the consequences of declining prices. "The achievement of price stability, and the likelihood of sometimes having to conduct monetary policy when prices are actually falling, poses a number of questions for central banks. Among these is whether an explicit objective for price stability *is useful to prevent a decline in prices from generating extrapolative*

Thus the specific situation of the Euro area and the relevance of a "Keynes effect" establish the supremacy of inflation targeting on monetary targeting and, perhaps, this phenomenon has been neglected by the critics of the ECB strategy[40].

The clear-cut definition of an inflation-forecast targeting as an intermediate target is useful not only for the transparency and the accountability of the central bank, but for private agents too who are, therefore, aware of the bottom value of the nominal anchor for their decisions both on demand and supply sides.[41] In the Euro area the industrial producer's prices have been falling in the first quarter of 1999, and the phenomenon, as we can see in Table B, holds for manufacturing intermediate goods and capital goods.

The problems raised by Keynes, and in the British tradition, by the Bank of England emphasise the crucial issues of the central role of expectations and of confidence in the major markets, the real, the financial and the foreign exchange markets.

The ECB, in its actual conduct, neglected these issues although they are crucially present in the conventional literature and formally recognised by the central european institution.[42]

The agents' expectations and confidence are pivotal in a twofold respect: first, central bank credibility is itself an important part of the transmission mechanism of monetary policy; further, a central bank must be aware of all the possible effects of its strategy on markets expectations.

As regards the first issue we leave the assumption that the credibility of a central banker could be reduced to a time consistent rule. If we agree with the more articulated evaluations, i.e. by Blinder and King, it is clear that the central bank must be aware of

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expectations of future price decline." "…episodes of declining prices are…likely to be of concern to the extent that *they last long enough to engender expectations of continuing price falls*." BIS (1999), p.77 and p.81, Italics added. An opposite position to Keynes' view on the effects of falling prices is contained in Pigott and Christiansen (1998).

[40] An accurate review of the implications and difficulties of falling prices for corporate planning is contained in The Economist (1999c).

[41] It is not by chance that the introduction of inflation targeting by the Bank of England and the consequent lowering of the inflation rate did not raise the same troubles as in the Euro area. See King (1999a). Haldane and Read (1999) test the credibility of the new monetary regime in the United Kingdom in 1992 through the assessment of yield curve movements. The advantages of the strategy of inflation targeting are stressed, evaluating the conduct of the ECB, by Deutsche Bank (1999b).

[42] See, for example, Issing (1999).

its degree of credibility among the private agents as a part of the transmission mechanism of monetary policy.[43].

This means that if monetary policy is aiming to reduce permanently the inflation rate the scenario of 'perfect credibility' would arise if the private sector recognises and fully believes that the announced deflationary policy will occur as planned and the monetary authorities are able to ensure, in presence of consistent behaviour of the agents, that price stability is accompanying with a recovery of aggregate demand and production. If both the conditions are satisfied the costs can be reduced to a trivial amount and the 'sacrifice ratio', i.e. the input costs associated with disinflationary policies, is insignificant.[44]

In the case of the ECB a full credibility is far from being reached and there is no sign, except for the very last period, that the lowering of the inflation rate is coincident with an improvement of real activity.[45] More generally Jackman recently writes:

> "…the forward looking approach to inflation expectations built into many Barro-Gordon style models…does not accord with the evidence. Whether this is because people are not initially convinced that the new institutions will deliver what is promised of them, or whether there are deep initial forces which take time to work through, is unclear. But

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[43] The steps of Issing deductions are remarkable. He agrees with the definition by Blinder of credibility. Hence Issing argues that " Central bank credibility will enhanced (impaired) if there is a close (loose) correspondence between its words and deeds.". Issing's conclusions, however, are not in favour of a more transparent explanation of the *modus operandi* of the ECB, but in the direction that " …that central banks must choose their words very carefully." Issing (1999), p. 24.

[44] There is evidence that central bank independence *per se* does not ensure a more favourable "sacrifice ratio". See United Nations (1999). An evaluation of the costs of disinflationary policies in US by the Federal Reserve Board/World Model in case of perfect and imperfect credibility is contained in Brayton, Levin, Tryon and Williams (1997). Goodfriend (1993), reviewing the disinflation process in US, reflects on how fragile the central bank credibility is and how potentially costly it is to maintain. Petlow and von zur Muehlen (1999) estimate, in a forward-looking model, the costs of learning a new rule of monetary policy that could be substantial. Martin and Salmon (1999) examine the empirical importance of uncertainty for monetary policy-making in the United Kingdom and they conclude that the optimal rule accounting for parameter uncertainty results in a less aggressive path for official interest rates than when parameter uncertainty is ignored. The literature that uses cross-country data to study the empirical relationship between inflation and economic growth reached inconclusive results. See Johnson, Small and Tryon (1999). King (1998) stresses the relations between credibility, predictability of policy and serious learning by both economic agents and the central bank. Huh and Lansing (1999) show how the rise in the interest rate during the Volcker's disinflation period in the US was the result of the interactions between adaptive expectations and partial credibility.

[45] The ECB Monthly Bulletin of July 1999 confirms that the overall output figures do not indicate improvements across all major categories of productions. See ECB (1999c). Gerlach and Scnabel (1999) discuss the potential utility of the Taylor rule as a benchmark for setting a counter-cyclical monetary policy in the EMU area. Deutsche Bundesbank (1999) expresses an opposite view, emphasising the shortcomings in the design of the Taylor Rule.

> *evidence…suggests that where countries have experienced high unemployment during the process of adjustment to the single currency, such unemployment is likely to persist rather than melt away in the new regime*."[46]

So far we have discussed the role of central bank credibility as a piece of the transmission mechanism of the monetary theory. A further problem concerns the role of expectations about the future course of the economy following policy actions and announcements.[47] The central feature is the confidence with which these expectations are held because the latter affect the prices and the quantities on the product market, the financial market and the foreign exchange market.

Specifically monetary policy influences expectations of participants in the financial market and in the "…other parts of the economy via, for example, changes in expected future labour income, unemployment, sales and profits."[48]. The policy implication of this interpretation of the transmission mechanism is that the direction of a monetary shock is hard to predict and can arise opposite paths.

The introduction of expectations in the modern textbook presentation could help us to understand the working of the transmission mechanism.[49]

Returning to the simple model of the ECB monetary strategy, let us restate and modify inconsiderable the expectational IS schedule:

(3a) $y_t - E_t y_{t+1} = -\sigma_2 r$

Let us simplify the aggregate supply equation:

(4a) $\pi_t = \phi_2 \left(y_t - y^* \right)$

Finally we use a 'Fisher equation' to explicit the relation between the nominal interest rate, R_t, and the real interest rate, r_t, in the equation **(6):**

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[46] See Jackman (1999), p.3, Italics added.

[47] A wise view is contained in the Report prepared by the Bank of England staff under the guidance of the Monetary Policy Committee. The British tradition on the "art of central banking" and a deep-rooted conception let the MPC argue that the monetary policy works largely via its influence on aggregate demand and has little direct effect on the trend path of supply capacity. See Bank of England (1999a). More recently King reinstated the real effects of monetary policy in the short run and that:"…a central bank has 'constrained discretion' about the horizon over which to bring inflation back to target; that is, a choice about how to trade-off variability of output against variability of inflation. This choice…reflects a choice about whether inflation or output should bear the strain of the initial impact of any shock. *And it is at heart of public debate over monetary policy.*" See King (1999b), p.13, Italics added.

[48] Bank of England (1999a), p.6.

(6) $R_t = r_t + E\pi_{t+1}$

Combining the equations **(3a), (4a)** and **(6)** we obtain:

(7) $y_t - y^* = -\sigma_2 (R - r) + \sigma_2 \phi_2 (E_t y_{t+1} - y^*)$

The crucial point in equation **(7)** is that expected future output has a greater than one – for-one effect on current output and it is magnified by the value of ϕ_2 and σ_2, i.e. the parameters that link, respectively, the interest rate to the aggregate demand and the output to inflation.

When, for instance, decreasing output is expected in future, it will be accompanied by a decreasing inflation rate, because the Phillips curve working. With the consequent lower expected inflation at date *t* the real interest rate will be higher and aggregate demand will be lower at a particular nominal interest rate. Hence the 'policy multipliers' depend crucially on the assumptions on inflation and output expectations by consumers and investors.[50]

In the case of the Euro area the ECB probably overlooked the importance of firms expectations whose declining trend is depicted in Figure 3 and the interrelated connections among confidence, output and prices are clearly visible in Figure 4.[51]

An additional problem is provided by the consideration that neither can confidence be confined to a single market, for example the product market, nor can private agents be thought of as operators in a specific market. If we suppose the existence of an agent whose portfolio assets are split between real, domestic financial assets and foreign financial assets, it follows that the degree of confidence in the real market affects the confidence and the behaviour of the same agent in the internal and external financial markets.

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[49] We follow the approach by Kerr and King (1996).

[50] "Thus, consumption and investment theory suggest the importance of including expected future output as a positive determinant of aggregate demand. We will consequently employ the expectational IS function as a stand-in for a more complete specification of dynamic consumption and investment choice." Kerr and King (1996), p.55. An equivalent emphasis can be found in Bank of England (1999a), p.8.

[51] The usefulness of business surveys in forecasting output movements in the european area is established in Santero and Westerlund (1996). The severity of monetary stance is confirmed by Deutsche Bank that considers, for all the period of existence of the Eurosystem, average three months money market rates well above those calculated using its own version of Taylor Rule. See Deutsche Bank (1999c).

VIII. Following this interpretative hypothesis we assume that the external value of the Euro is the last effect of the portfolio's asset substitution from real and financial domestic assets to external financial assets. More precisely the increasing weakness of the Euro against the Dollar is the upshot of a declining confidence of agents in the product and financial Euro markets in the Euro area[52] and of consequent portfolio investments in Dollar denominated assets.[53]

The role of confidence is not stressed in the three major models of the exchange rate, the monetary model, the overshooting model and the portfolio balance model. Nonetheless, it is possible that confidence and expectations deriving from the fundamentals or from news about fundamentals affect the exchange rate, even if the fundamentals themselves do not influence the exchange rate in the manner suggested by the three major exchange rate models[54].

The Bank for International Settlements actually shares this view:

> The Euro's introduction on 1 January 1999 prompted strong demand for the new currency, which brought about an appreciation against the dollar…Very shortly after, however, *market participants refocused on the uncertainty about economic growth and persistently high unemployment rates affecting a significant part of the euro area. The steady depreciation of the euro between January and April 1999 can be explained by the divergent trends in economic activity in the United states and large parts of the euro area…Although the amount by which the ECB decided to ease monetary policy on 8 April took market participants by surprise, the euro hardly moved against the dollar in the following days.*[55]

IX. The next step in evaluations of the effect of the ECB monetary policy on the agent's confidence concerns the European financial market. We utilise, for this end, the term structure of interest rates as an indicator of market expectations of the stance of

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[52] Common sense connects the depreciation of the Euro vis-à-vis the Dollar with the relative contingent vigour of the US economy. This is the official statement by the ECB and its president Duisenberg (see for example Duisenberg 1999) and it is to some extent authentic. But the crucial problem is the rationale of this statement.

[53] According to the latest data published by the ECB, in the first six months of 1999 the portfolio investment account showed net outflows totalling EUR 91.5 billion, compared with ECU 56.4 billion in the first half of 1998. See ECB (1999d).

[54] Hopper (1997).

[55] BIS (1999), pp.109-110. Italics added. Earlier Financial Times (1999a) and, surprisingly, the International Monetary Fund stated a similar opinion. "…the depreciation of Euro since its introduction reflected…uncertainties about economic prospects in the euro-area…*It was particularly important at the early stages of the ECB, in view of the uncertainties in the outlook for the euro area and the global economy, that the public understand and have confidence in the monetary framework*." See IMF (1999), p.3. Italics added.

monetary policy. The idea is that the central bank affects directly the short end of the yield curve, while the long end will be indirectly affected through the influence on long-term expectations on inflation and real activity.[56]

If monetary policy is capable of altering agents' long-term expectations, a predictive power has to be recognised to the long-term nominal interest rates and to the yield curve spread. [57] More specifically an increase in the central bank rate or a perceived hard stance of monetary policy tends to reduce the yield curve spreads and to flatten the yield curve; moreover the extent of flattening of the yield curve could be related to the credibility of the central bank move. The yield curve spread that it is usually examined corresponds to a forward interest rate from three months to ten years into the future.[58] The utilisation of this indicator for the Euro area is shown in Figure 5: the trend of the overnight rate, which we assume as proxy of monetary policy direction[59], is opposite to the direction of the spread. It could be argued that in the first six months of Eurosystem's working the overnight rate rise has been followed by a reduction of the spread value.[60]

The opposite movements of the two variables could not help to confirm the hypothesis that the disinflationary policy by the ECB could have produced a lowering of

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[56] See Estrella and Mishkin (1995).

[57] The Bank of England macroeconometric model of the UK economy specifies the long-term nominal interest rates given by short-term interest rates and the difference between expected inflation one year ahead and the inflation target. See Bank of England (1999b).

[58] The ten-year interest rate can be decomposed into expected real interest rate and expected inflation components. The former could be associated with the expectations of future monetary policy and, hence, with future real growth; the latter may be informative, too, about future growth. See Estrella and Mishkin (1996).

[59] It would be correct to utilise the repurchase rate, i.e. the rate on main refinancing operations by the ECB. But the Governing Council decided a fixed rate tender procedure that was from January to April 1999 3% and, after, was lowered to 2.5%. Hence we use the EONIA, ("euro overnight index average) as the closer variable to the repurchase rate. The working of fixed rate tender as a floor for the price of liquidity to banks is explained in De Grauwe (1999).

[60] The literature on the importance of the term structure of interest rates for monetary policy is very extensive and can be related to two issues. The first debates the relation between the stance of monetary policy and the yield curve; the second discusses the validity of the yield curve as a predictor of agents' confidence and recession. Fleming and Remolona (1999) find that the announcements impose large shocks on the expected future interest rates. Bernard and Gerlach (1996) stress the utility of the yield curve to predict recessions, especially for German and US spreads. Goodfriend (1998) finds in the US

confidence in the European financial market, emerging as a diminishing difference between long and short-term interest rates.

A further analysis of the term structure of interest rates curve can help us to ascertain the existence of two problems: the first is connected with movements in the yield curve at the time of the launch of the Eurosystem and the ECB; the second relates to the effects of the initial manoeuvres of new monetary authorities on the financial market. For what concerns the reaction of financial agents to the new monetary regime the experience of United Kingdom can be helpful. It is opinion of the Bank of England[61] that in a framework of fully transparent and credible policy, institutional and/or operative monetary changes will not be a source of instability of the yield curve, because there will be no news in monetary policy itself.[62] Actually the yield curve does shift following policy changes. These movements can be ascribed to different information the private sector has from the monetary authorities: there are the possibilities of *imperfect credibility*, in case of effects of private information on policy targets *and imperfect transparency*, in the case of a different understanding of the transmission mechanism of monetary policy by the private sector.[63] The conclusions are that the degree of transparency affects inversely the movements of short-maturity interest rates, while the degree of credibility is likely to show up in smaller movements in longer-maturity interest rates.[64]

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case serious pitfalls in using the yield curve in the outlook for the economy. Deutsche Bank (1999b) does not consider the yield curve an alternative indicator in comparison with the real short-term interest rate.

[61] Considerations that follow utilise the arguments by Haldane and Read (1999).

[62] The argument is simple and straightforward.
Assume, as previously, that the monetary policy rule is given by equation **(α)**:

(α) $R_t = \mu\left(\pi_t - \pi^*\right)$

Equation **(β)** describes the link between forward interest rates and the expected path of future official rates:

(β) $R_{t,j} = E_t\left(i_{t+j}\right)$

where $R_{t,j}$ is the j-period forward interest rate, E_t denotes the expectations of private agents based on information up to time period t, and R_{t+j} is the official interest rate prevailing at time $t+j$.
Hence the yield curve depend on market's guess about actual and expected official rates. If some of the terms in the rule of equation **(α)** will alter, i.e. π^* or μ, the yield curve will jump.

[63] See Haldane and Read (1999) p.173.

We can examine the evolution of European yield curve in light of British experience, analysing jointly Table C, that contains information on the values of the main interest rates at different maturity in period January-June 1999, and Figure 6 that depicts the slope of the yield curve in the same period.

The main results from the interest rates values and the yield curves could be summarised in the following assessments: during the period January-June we observe a high volatility of the curve before and after the reduction by the ECB in April of the official discount rate; furthermore the movements seem less dampened for the longer-maturity rates, particularly the five and ten years interest rates. Utilising the methodology proposed by Haldane and Read, we could suppose that the European financial market signalled a problem of imperfect credibility of monetary authorities.[65]

The position and the steepness of the yield curve can be useful moreover to lighten some likely effects on the financial market of the first actions of European monetary authorities, analysing again Table C and Figure 6.

It is possible to observe that the lowest steepness of the yield curve is exhibited in the period January-March 1999, at the beginning of the Eurosystem; during these months the curve is flatter than in May 1998, the period in which agents' confidence on the goods market begin to fall and than in May-June 1999, when the lowering of the repurchase rate by the ECB had positive effects on the yield structure, particularly on the longer-term interest rates, raising the spread between ten year and three month interest rates.

Finally we can use the framework discussed above to verify the effects of the main monetary events in the Eurosystem examining the response of the yield curve when the ECB started operating, at the beginning of January, and when the ECB decided, on April, to lower the repurchase rate. Table D summarises the empirical results. The first column shows the observed response values of different-maturity interest rates to the

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[64] Haldane and Read show that in the UK experience yield curve jumps were numerous and significant between 1984-92 against the dampening of the shifts after the introduction of the inflation targeting regime.

[65] "…[when] the market does not completely believe that the monetary authorities will adhere to their announced targets, there is a problem of imperfect credibility. Alternatively, the targets themselves may be imprecisely specified. In both case, monetary policy embodies news, because the public are learning about the true targets of the monetary authorities through their monetary policy actions." See Haldane and Read (1999), p.173.

launch of Eurosystem and to official setting of the repurchase rate by the ECB; the second column shows the observed response values of the same rates to the variation of discount rate on the last April.[66] The final column shows the difference of the response between the two events.

As regards the rates' average response to the birth of ECB it is useful to remember that the first column shows the interest rate response on January 4 in comparison with the reference values of 25 December 1998. Previously, on 3 December, all the national central banks of the states adopting the Euro from the start of Stage Three decided to lower their key central rates to 3% (with the exception of Italy), and later, on 22 December 1998, the Governing Council of the ECB decided that the first main refinancing operation of the Eurosystem would have been at a fixed rate tender of 3%. The settlement of this operation took place on January 7 1999.[67] Hence the latter data can be considered the beginning of a real operational Euro-financial market. This is the reason to verify the response in this specific day. The official repurchase rate on 7 January was 3%, while the Euro area repurchase rate, weighted with national GDP, has been estimated, at the end of December 1998, at 3.09%[68]. In the end the difference of the repurchase rate before and after the Eurosystem launch is negligible and amounts to 0,09%. In this sense the rates response can be considered the effect of the new monetary institution, and in effect the interest rate maturity register significant variations. In particular, over the period 4 January-7 April, the one-month interest rate registers an average decrease of –0,1697, that is the biggest response in different-maturity interest rates. The smallest response is shown in the ten-year rate, while three-month and five-year rates present similar average responses.

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[66] The values of the columns are obtained using the dispersion measure:

$$x = \frac{1}{n} \sum_{i=1}^{n} \left(x_i - x_0 \right)$$

where x is the value shown in the columns, x_i are the observed values and x_0 is the reference (average) value. In the first column x_0 is the last official value published by ECB, 25 December, 1998, of different-maturity interest rates before the launch of Eurosystem; in the second column x_0 is given by the values of the same rates on 7 April, the day before the variation of official discount rate.

[67] The chronology of the events and the daily decisions are reported in European Central Bank (1999a).

[68] See Dresdner Kleinwort Benson (1999).

The second column of Table D shows the response of some components of the yield curve to the decrease of repurchase rate to 2.5% decided by ECB on 8 April 1999. The figure indicates a different behaviour in comparison with the movements at the beginning of the year. In this occasion while the short-term rates decline, though of by a lesser amount than the key central bank rate, the five years and ten years rates increase. The figures clarify some key findings: first, both the events, the launch of the Eurosystem and the monetary policy shock on April, are characterised by bigger movements in short-maturity interest rates. If we refer to the distinction settled by Haldane and Read between imperfect transparency and imperfect credibility, we could conceive that the ECB is still suffering a lack of transparency, presumably about the actual inflation target of monetary authorities. There is, however, a difference between the two episodes: the monetary decisions of April were approved to the financial market: the upshot is, certainly, an U-turn of interest rates spread immediately after 8 April, as possible to check in Figure 7.
It is not possible to assess now whether the flatness of the yield curve is, in the European case, an useful indicator of *future* economic growth[69]; nevertheless the reactions to monetary policy and the co-movement with the evolution of industrial sentiment allow the curve to be considered an helpful indicator of actual and past confidence in the financial market.

X. The explanation of the gradual depreciation of the Euro against the Dollar can be found in the relative business cycle conditions in the two economies and, as we mentioned in the previous paragraphs, this is the explanation suggested by the Eurosystem official institutions.
Such an explanation is in our opinion right as far as it concerns the short run, but these institutions did not support the explanation by proper theoretical clarifications.

[69] Dotsey (1998) considers the spread a less useful indicator in the recent years to predict real growth. In the same direction Deutsche Bank (1999b) thinks the real short-term interest rate a more powerful indicator than the yield curve.

In principle a rationale foundation to the statement could be found applying two opposite approaches.[70]

The first approach is given by a Fleming-Mundell model in a case of a fiscal expansion within a framework of a small economy and 'relatively' high capital mobility assumptions: under this hypothesis when the real product of a country rises following the expansionary fiscal policy, the worsening trade balance is more than offset by the net capital inflows caused by the increase of domestic interest rate above the world interest rate.

A second possible approach is given by the Current Account Monetarist (CAM) model[71]that assumes the stability of the demand for money function, the purchasing power parity and the law of one price in asset markets. By these assumptions the CAM model shows how, *ceteris paribus*, an increase of real income in the domestic economy relatively to the "world" economy determines an appreciation of national currency.[72]

It is clear that both the assumptions of the Fleming-Mundell approach and of CAM model are not fitting the actual position of european and Us economies.

The Bank for International Settlements provides, perhaps, a more fruitful approach for International Settlements. The BIS thinks that the steady depreciation of the Euro can not be imputed to the divergent trend, by itself, in economic activity in the United States and large parts of the Euro area; the divergent trend of relative real growth is relevant as far as it affects agents' confidence in the two markets.[73]

The evidence seems to suggest that an interest rate differential between interdependent economies is only a necessary condition; the sufficient one is that a growing economy is able to attract foreign capital from the sluggish one only if in the latter the status of

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[70] A clear comparison between the Fleming-Mundell model and the monetary approach is contained in Kenen (1996).

[71] See Frenkel et al. (1980).

[72] The central feature of CAM model is the log-linear equation:

$$s = (m - m_w) - \lambda y + \lambda_w y_w - \rho_w R_w + \rho R$$

where s is the exchange rate, m, y, R the domestic values of money, output and interest rate, while m_w, y_w, R_w are the same variables referred to the 'World Economy'.

[73] "The Euro's introduction…prompted strong demand for the new currency, which brought about an appreciation against the dollar…Very shortly after, however, *market participants refocused on the*

industrial sentiment and financial market's confidence sets capital free to move towards the growing economy whose bonds and shares are more profitable. The relative evolution of sentiment and confidence could, in our opinion, explain huge capital movements for a given interest rate differential between two differently growing economies.

Actually capital outflows from the Euro area towards the US have been, as we shall argue later, very volatile and have not been strictly connected to interest rate differentials and covered interest parity, as represented in Figure 8.

From Figure 8 it is possible to observe that the maximum negative values of the interest rate differential and covered parity are reached in June, but in the same month portfolio investment of the Euro area showed net outflows bigger than the previous months when the interest rate differential was lower.[74]

The phenomenon is visible in Figure 9 that includes the values of industrial sentiment, the interest rate differential and net portfolio investment in the Euro area. It is clear that, in presence of a favourable circumstance given by the higher return on US dollar denominated assets, the capital outflows fluctuated in closer connection with the evolution of industrial sentiment.[75] The exception is in April, when the ECB lowered the repurchase rate: the immediate effect was broad capital outflows from the Euro area; the monetary relaxation, however, helped the recovery of real confidence and, after a month, net capital outflows began to decrease.

We can conclude that the status of domestic goods and financial markets determine, in the presence of an advantageous interest rate differential, the external value of a currency, as the Euro value indicates in the first two quarters of 1999.[76]

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uncertainty about economic growth and persistently high unemployment rates affecting a significant part of the euro area." See BIS, p.109; Italics added.

[74] See European Central Bank (1999d).

[75] In the same period compared with the strong interest by issuers in international bonds denominated in euros, demand by asset managers for such securities seems to have been subdued. Some doubt on a growing share of Euro in international private assets is contained in McCauley (1999).

[76] The role of interest rate expectations and, therefore, of confidence on the financial market is also considered, in addition to the rate differential, in the econometric model of Deutsche Bank for forecasting the Euro-US Dollar exchange rate. See Deutsche Bank (1999d). The Bank of England ascribes the recent partial recover of the Euro to agents rising confidence and better forecasts for growth. See Bank of England (1999c).

What we do stress is that the weakness of the Euro is the result of the peculiar effects of ECB conduct on agents expectations in the presence of disadvantageous relative returns for European assets, but we do not claim the actual value of the Euro is a problem in itself. Several circumstances help the Euro area to benefit from, or at least not be damaged by, the depreciation of its currency against the US dollar[77]: the Euro zone is relatively self-contained; large economies, especially Germany and Italy, increase their exports; the depreciation is supposed to partially offset the deflationary bias of the ECB[78]. In addition empirical estimates[79] show an excessive exchange rate volatility, as the Euro has been experiencing, does not produce certain effects on international trade; a real trade-off does exist, however, between smoothing the movement of the exchange rate and interest rate stability.

The weakness of the Euro is a problem if we consider the currency value as a result, *ceteris paribus*, of *actual* confidence and for its consequences on *forward* expectations of financial markets.[80]

Actually recent literature stresses the importance of "market sentiment" on exchange rate determination [81]. This approach considers the existence of serious flaws in the principal models of exchange rate, that is the monetary model, the overshooting model and the portfolio balance model. The major flaws are ascribed to the relevance conferred to current fundamental economic variables: money supplies, interest rates and output levels of countries.[82]

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[77] See Financial Times (1999b).

[78] Krugman (1999).

[79] Scheide and Solveen (1997).

[80] "…others see it as a part of the ECB's job to avoid exchange –rate swings because they make it tougher for businesses to plan…The nervousness of financial markets is such is such that they seize on bad news and ignore the good- early this month, the euro barely budged when figures were published showing quarter-on-quarter growth for the euro-area of 0.5% than expected. The market's attitude makes it unlikely that intervention would have much effect." The Economist (1999b).

[81] Hopper (1997) gives a plain exposition of the 'market sentiment approach'.

[82] Really the most sophisticated portfolio balance contributions include the influence of subjective variables, more or less connected to the agents' confidence, such as the risk disliking or the reluctance to accept very volatile returns. See, for a representative example, Lewis (1988).

Actually economic fundamentals are supposed to influence not directly the exchange rate but indirectly through the effects they have on market participants expectations and confidence, i.e. how they interpret the values and/or announcements of fundamentals.[83] It follows that a monetary policy measure does not have an unambiguous significance for the agents[84] and give paradoxical results.[85]

Following in substance the 'market sentiment approach', more recently, the conventional wisdom that high interest rates stem capital flight and currency depreciation has been disputed.[86] Unorthodox effects on capital flows are connected with the risk premium:

> "If raising interest rates increases the probability associated with a default on outstanding debt, the result can be a worsening of the country's capital account position…*A country facing capital flight due to a crisis of confidence might therefore be plunged into a situation in which reducing interest rate might be the appropriate policy."*[87]

The results of this approach depend crucially on the postulated relation between interest rates and probability of default, that is the explicit phenomenon of a lack of confidence in real and financial evolution in country markets.

If we link the foregoing arguments to the Euro case it is necessary to link the evolution of capital outflows from the Euro area with the external European currency value, assuming expectations and confidence of private operators jointly affect the two phenomena.

The Figures 10-11 show the tendencies of portfolio investment of the Euro zone for the total net flows, in Figure 10, and for the main components, i.e. shares, bond and money market instruments, in Figure 11. At a glance we can ascertain that net capital flows are,

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[83] This alternative view allows a partial efficacy to the "news approach", whose pioneer studies are Branson (1983) and Edwards (1983).

[84] The same assessment is stated by Bank of England (1999a).

[85] A significant experience is provided by the exchange rate of Swedish krona in the early 1990s. Although the Swedish central bank raised the short-term interest rate to 500% the result was a depreciation of the national currency. The Swedish experience is mentioned by Financial Times (1999a) to confirm the uncertain effects of interest rate policy on the Euro exchange rate.

[86] Pakko (1999).

[87] See Pakko (1999), p.2, Italics added. Pakko quotes two eloquent statements by Sachs (1998) and Krugman (1998b). The former writes: "Investors do not gain confidence when short-term rates are pushed to dozens per cent.", while the latter writes: "I have heard some people propose…: if you cut interest rates this will strengthen the economy, and the currency will actually rise. This is as silly as it sounds."

with few exceptions, constantly negative since the launch of Eurosystem, and, from Figure 11, the trend regards both equities and bonds.

The role of market sentiment and expectations in the currencies market can be examined making use of the techniques utilised by the Bank of England to extract information from the 'over-the-counter' currency options markets.[88] The basic point is that option prices provide a picture of the market views on their future evolution.

The first use is the evaluation of implied volatility of option prices, which can be considered a measure of the degree of uncertainty that the market attaches to future movements in the exchange rate over the remaining life of the option. Figure 12 shows one and three-month implied volatility for Euro-Dollar. Both measures have been decreasing since the launch of European Monetary Union and we can affirm that, from the middle of February, the Euro-dollar exchange rate was perceived practically without uncertainties. Figure 13 shows the co-movements of decreasing values of implied volatility and, hence, of uncertainty on the foreign exchange market and of the Euro depreciation, presumably as market participants began to focus the financial effects of real growth divergence between the United States and the Euro area.[89]

Using the currency options prices, risk reversal suggests the probabilities attached to Euro value variations against the dollar. Figure 14 gives the time series of the three-month risk reversal: as it is possible to see the tendency is quite similar to the implied volatility one. The market starts from large and positive risk reversal, i.e. it shows higher probabilities attached to a large appreciation of Euro, and, on February, goes into expectations skewed in favour of a significant depreciation. The most remarkable exception is given in the period that follows the reduction of the repurchase rate by the ECB, reinforcing the view that the monetary policy relaxation could strengthen the Euro external value.

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[88] Cooper and Talbot (1999) give a meaningful contribution. Recently the Federal Reserve too utilises information from options market to analyse agents' behaviour in foreign exchange operations and the course of the US dollar. See Federal Reserve Board (1999a) and (1999b).

[89] "Over [the first] quarter [1999] the implied yield spread between September three-month Eurodollar and Euribor futures contracts widened 49 basis points, to 232 basis points." See Federal Reserve Board (1999b), p.396.

A further support for the value of risk reversal as a proxy for expectations of the future exchange rate is given by Figure 15 that gives the data on risk reversal against the Euro-dollar spot rate and confirms a similar co-movement.

XI.[90] The utilisation of a synthetic tool as the Vector Autoregression Models (VAR) can be used to check the validity of our framework.
The subject of interest in the following is to evaluate the VAR models designed to analyse the monetary policy transmission on the exchange rate in the Euro Area.
It is well known that the VAR system makes few assumptions about the underlying structure of the model, letting the data determine the model.[91] In our case the assumptions have been adequately specified in the previous paragraphs; now we want to verify that European monetary policy affects the Euro value through the agents responses on the product, financial and foreign exchange markets. Hence the VAR model has been utilised in two ways: the first one examines the effects on the operators confidence in the single markets; the second one analyses directly the effects on the Euro, using as proxy of monetary policy stance the overnight rate.[92]
In order to use VAR models for measuring monetary policy shocks in an open economy the identification problem, in our case the problem of the simultaneous feedback between the policy rate and the exchange rate has to be initially solved.
In other words it is necessary to separate the monetary policy authorities endogenous reactions to the exchange rate movements from the exogenous monetary shocks.[93]
A monetary policy shock is identified as the disturbance term in the equation **(8)**[94]:

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[90] This paragraph was written jointly with Carlo Altavilla.

[91] A clear exposition of an helpful application of VAR models and how the Bank of England uses them to produce forecasts and to examine the effects of economic shocks is contained in Bank of England (1999b).

[92] As we warned previously the overnight rate is not a monetary policy instrument; nevertheless it is the closest variable to the institutional instrument, the repurchase rate.

[93] See Favero and Bagliano(1999).

[94] See Christiano et al. (1998).

(8) $\mathbf{X}_t = f\left(\Omega_t\right) + \sigma_x \varepsilon_t^x$

where X_t is the monetary authorities' instrument, f is a linear function representing the monetary authorities' feedback rule, Ω_t is the monetary authorities information set and $\sigma_x \varepsilon_t^x$ is a monetary policy shock.

To proceed, we represent our VAR model as:

(9) $y_t = \Phi_1 y_{t-1} + \Phi_2 y_{t-2} + \ldots\ldots\ldots\ldots\ldots + \Phi_p y_{t-p} + u_t$

and precisely the column-vector y_t is given by:

(9a) $y_t = \left[OV_t \quad SPREAD_t \quad \Delta IS_t \quad \Delta RR_t \quad \Delta EXR_t \right]$

In the equation **(9a)** ***OV*** is the overnight rate in the Eurosystem, considered as a proxy of monetary stance, ***SPREAD*** is the Euro area interest rates spread between ten year and three month interest rates, ***IS*** denotes the Industrial Sentiment, ***RR*** is the Euro-Dollar Risk Reversal, used as expectations on the exchange rate, while ***EXR*** is the Euro-US Dollar exchange rate.

The three last variables are considered as first differences; hence ***ΔEXR*** is the Euro-Dollar exchange rate appreciation.

For each variable the Augmented Dickey-Fuller Test is following reported:

Augmented Dickey-Fuller Tests of Unit Root

Series	Test Statistic	95%Critical Value
OV	-4.8064	-3.4494
SPREAD	-4.1252	-3.4494
ΔIS	-17.375	-3.4497
ΔRR	-10.774	-3.4497
ΔEXR	-10.750	-3.4497

The above results display how the non-stationary behaviour of industrial sentiment, risk reversal and exchange rate disappear when the first difference is taken: the three variables are **I(1).**

On the other hand the overnight rate and the spread seem to be stationary.

After the ADF test, we selected the VAR order. Both the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC) selected the order **1**.

In the light of these a VAR(1) model has been selected.

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model

120 observations from 1 to 120.

Order of VAR = 6.

List of variables included in the unrestricted VAR:

Overnight - Spread(10y-3m) - Industrial Sentiment - Risk Reversal -Exchange rate

Order	LL	AIC	SBC	LR test	Adjusted LR test
6	726.5274	630.5274	499.6128	------	------
5	710.0230	630.0230	520.9275	CHSQ(16)= 33.0087[.007]	25.9980[.054]
4	700.3784	636.3784	549.1019	CHSQ(32)= 52.2980[.013]	41.1905[.128]
3	691.1200	643.1200	577.6627	CHSQ(48)= 70.8147[.018]	55.7744[.206]
2	679.6783	647.6783	604.0401	CHSQ(64)= 93.6982[.009]	73.7977[.188]
1	671.6830	655.6830	633.8639	CHSQ(80)= 109.6887[.015]	86.3920[.293]
0	60.7950	60.7950	60.7950	CHSQ(96)= 1331.5[.000]	1048.7[.000]

In order to solve the identification problem we first transform the equation **(8)** in its moving average representation:

(9) $y_t = \xi(L) u_t$

where $\xi(L) = \Phi(L)^{-1}$.

As we have not yet introduced any economic structure the equation has to be transformed in a structural moving-average representation of the form:

(10) $y_t = \Psi(L) \varepsilon_t$

where ε_t is a vector of serially uncorrelated structural residuals. To obtain such a structural form we have to impose 25 restrictions. Ten of these restrictions, i.e. $n(n-1)/2$ restrictions, derive from the constraint that exogenous shocks have to be

orthogonal to each other, while the residual $n(n+1)/2$ restrictions are identified by the Cholesky decomposition.[95]

By these assumptions it is possible to analyse the dynamic response of y_t to a monetary shock. So we tried to measure the time profile of the effect of innovations on the future state of the dynamic system through an Orthogonalized Impulse Response Analysis. The results are shown in Figure 16 and Figure 17.

The evidence from impulse response analysis permitted to identify that the transmission of a 1% shock hitting the overnight rate at time ***t*** on the exchange rate at time ***t+j*** lead to a depreciation of the Euro against the Dollar.

The Risk Reversal response confirm its predictive power over the exchange rate while the interest rate spread seems to have a strictly inverse movements respect to the overnight rate. Finally, the decrease in industrial sentiment proves the negative reaction in real market expectations in response to a restrictive monetary stance.

Moreover, we analyse an impulse response to a permanent monetary shock, i.e. a stable increase of the overnight rate. The main difference between a temporary and a permanent shock, whose effects are shown in Figure 18 and Figure 19, is that the latter has a stronger effect on the steady-state rate of the variables.

The difference is both in timing and in magnitude. The permanent shock produces a huge divergence of the spread from its steady state. Moreover, the initial appreciation of the exchange rate in response to a temporary shock now disappears.

The results of the VAR models are consistent with the assumptions of the research: in both cases a monetary tightening is associated with lower confidence in the three markets and lead to Euro depreciation.

XII. In conclusion we can sum up the whole framework and the principal contentions of the research.

The aim of the research was the evaluation of the exchange rate of the Euro after the first six months of its existence and the roots of its initial weakness.

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[95] By this procedure five restriction are generated by imposing unitary coefficient on the principal diagonal, while the last $n(n-1)/2$ restrictions are obtained setting the elements above the principal diagonal of the Ψ_0 matrix equal to zero.

The main hypothesis is that the ECB has an undivided responsibility, for given international conditions, in the actual management of Euro, without external political pressures.

For our purposes we present a simple summary model of the monetary policy strategy of the ECB**,** where the overriding priority is given to price stability. This goal is pursued assigning, officially, money a prominent role. Actually the central bank pursues a 'pragmatic money targeting', a procedure that allows the ECB not to set a lower bound for the inflation rate. This peculiarity has adverse consequences on market confidence in a case of recession and decreasing inflation rate.

Generally the conduct by the ECB has been connected with the conventional theory on monetary policy that includes an interest rate instrument, an IS relation and a price-adjustment equation. In such a case we raised the issue of whether the conventional model is well-suited to determine the behaviour of a new central bank that has to gain reputation and be aware of the effects of the transmission mechanism of its monetary policy.

The most puzzling issue is the concept of credibility. The notion of credibility included in the benchmark model is strictly connected with time consistency. The ECB is interpreting the time consistency exclusively as a problem of behaviour consistent with the goal of a minimum, not predetermined, inflation rate. Such a conduct has, in a climate of recession and falling prices, bad effects on the expectations of the agents, and does not help to create a broad based credibility.

These problems, raised firmly by Keynes, emphasise the issues of the crucial role of expectations and confidence in the real, financial and foreign exchange markets. In the case of the Euro area the ECB probably overlooked the importance of agents expectations or how the degree of confidence in the real market affects the confidence and the behaviour of the same agents in the internal and external financial markets.

The next step was the evaluation of the monetary policy consequences on financial market. We utilise the term structure of interest rates and the yield curve as proxies of market expectations. The results are that currently the European financial market signals a problem of imperfect credibility of the monetary authorities.

Finally we analyse directly the roots of the Euro's external value. The prevailing version of Euro weakness against the US dollar is found in the relative business-cycle

conditions in the two economies. The evidence seems to suggest that interest rate differentials are only a necessary condition, because a growing economy is able to attract foreign capital from a sluggish one only if in the latter the status of industrial sentiment and financial market's confidence set capital free to move towards where bonds and shares returns are more profitable.

Moreover the 'market sentiment approach' disputed, recently, the conventional wisdom that high interest rates stem capital flight and currency depreciation and we think the paradox is meaningful for the Eurosystem. Without fail net capital flows are, with few exceptions, negative since the birth of European Monetary Union and it discloses a declining confidence on foreign exchange markets likewise on product and financial markets.

The sentiment and expectations in the currencies market has been examined extracting information from the currency options markets and prices, and particularly through the values of risk reversal. The major findings are that the market starts from large and positive risk reversal, i.e. it shows higher probabilities attached to a large appreciation of the Euro, and that gradually moves towards expectations skewed in favour of a significant depreciation. The most remarkable exception is given in the period that followed the reduction of the repurchase rate by the ECB, reinforcing the view that monetary policy relaxation could strengthen the Euro external value and permanent capital outflows are not a mechanical response to an easier monetary stance.

The last step was the building of a Structural Vector Autoregressive Model to check the validity of the assumed relation between the monetary policy and the Euro exchange rate, according to a transmission mechanism based on three variables representative of the confidence on real, financial and foreign exchange market, respectively the industrial sentiment, the interest rates spread and the risk reversal.

The results of the tests are not inconsistent with the assumptions of the research.

The results concern a short period, i.e. the first semester of 1999, and, of course, can not be considered, in any way, conclusive. Nevertheless they suggest that the outcomes of monetary policy, in particular if we refer to a new institution, are more difficult to foresee than is commonly supposed.

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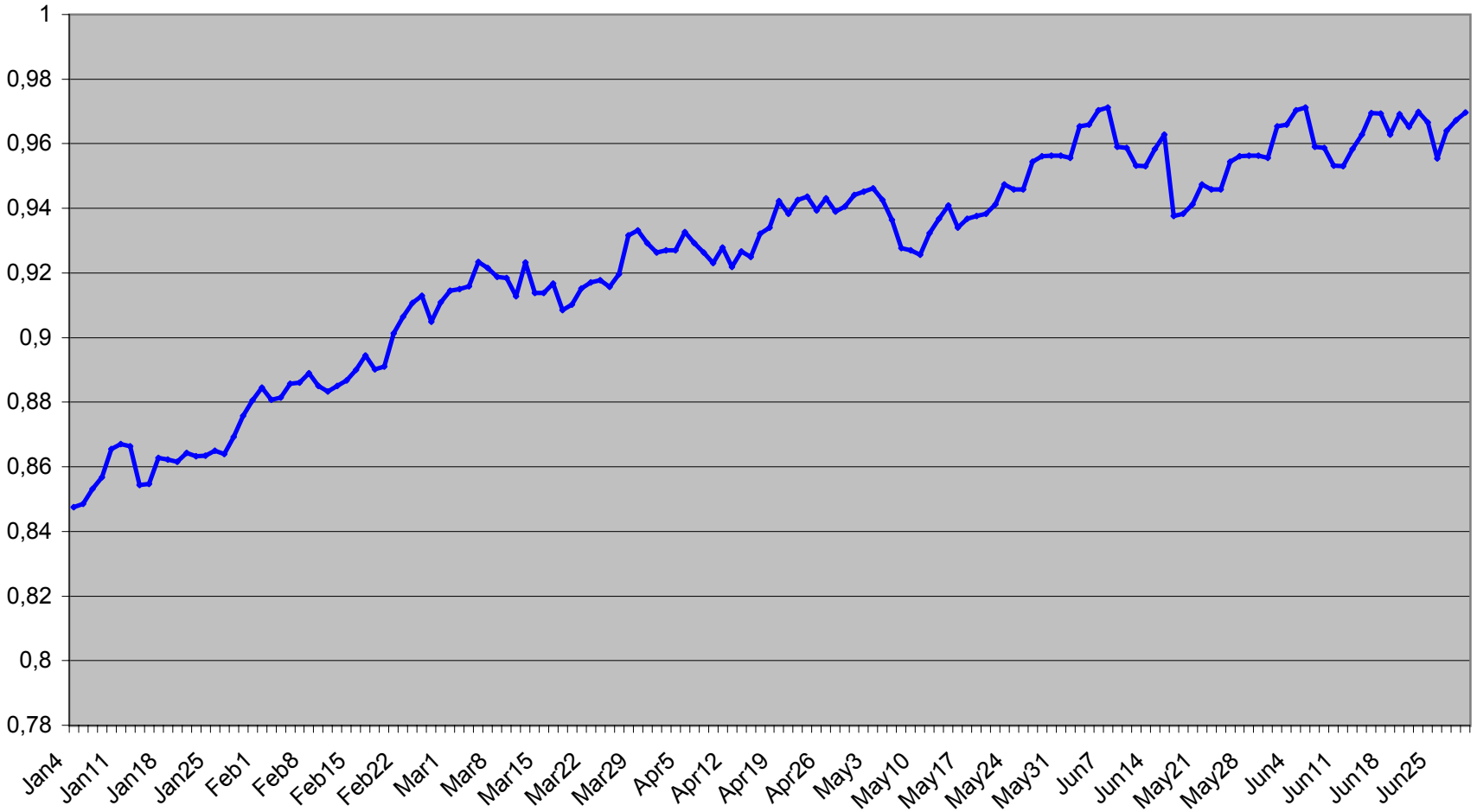
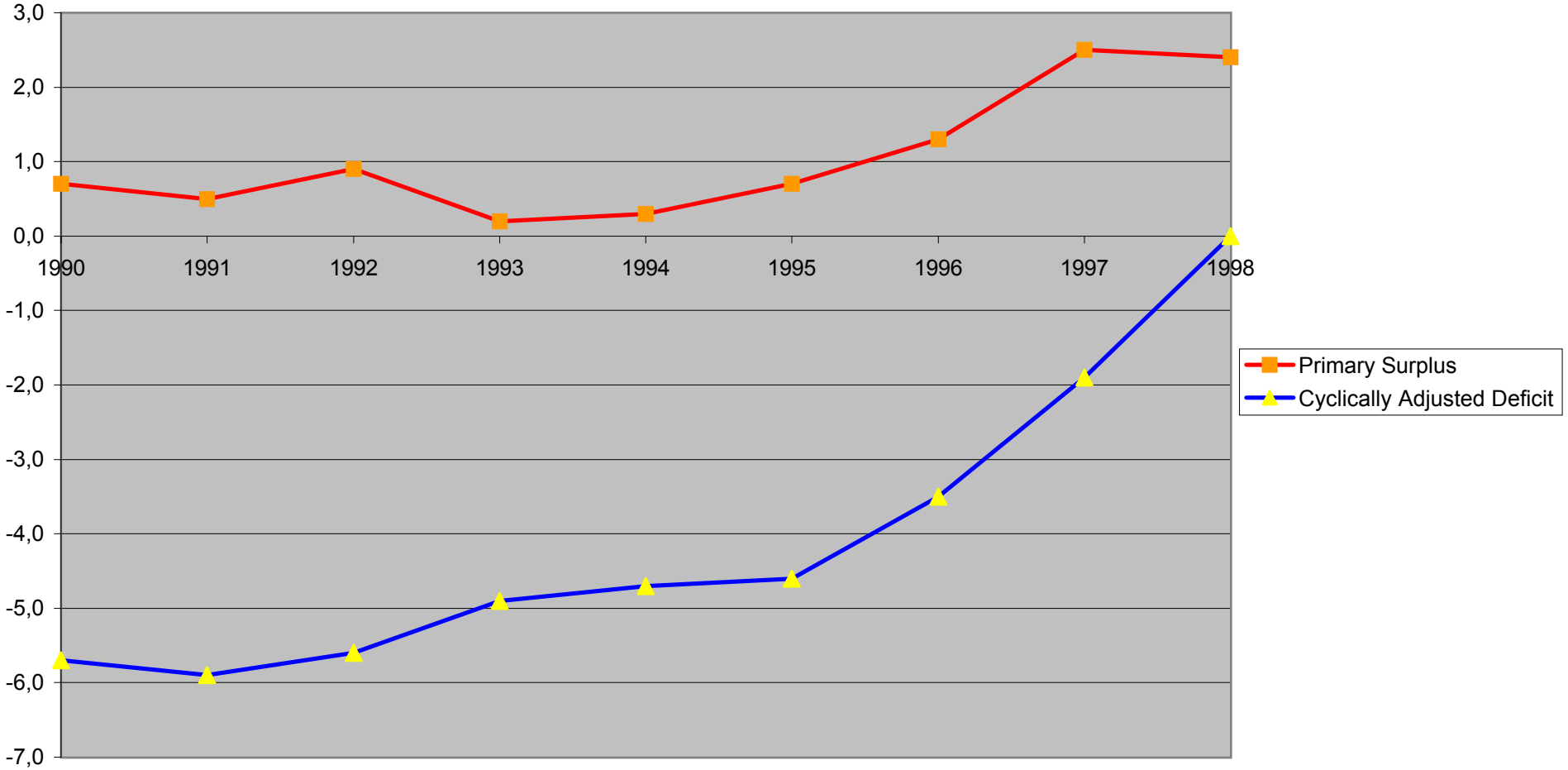
Fig.1 The Exchange Rate Euro-US Dollar
(Daily Observations, January-June 1999)



Source: Financial Times

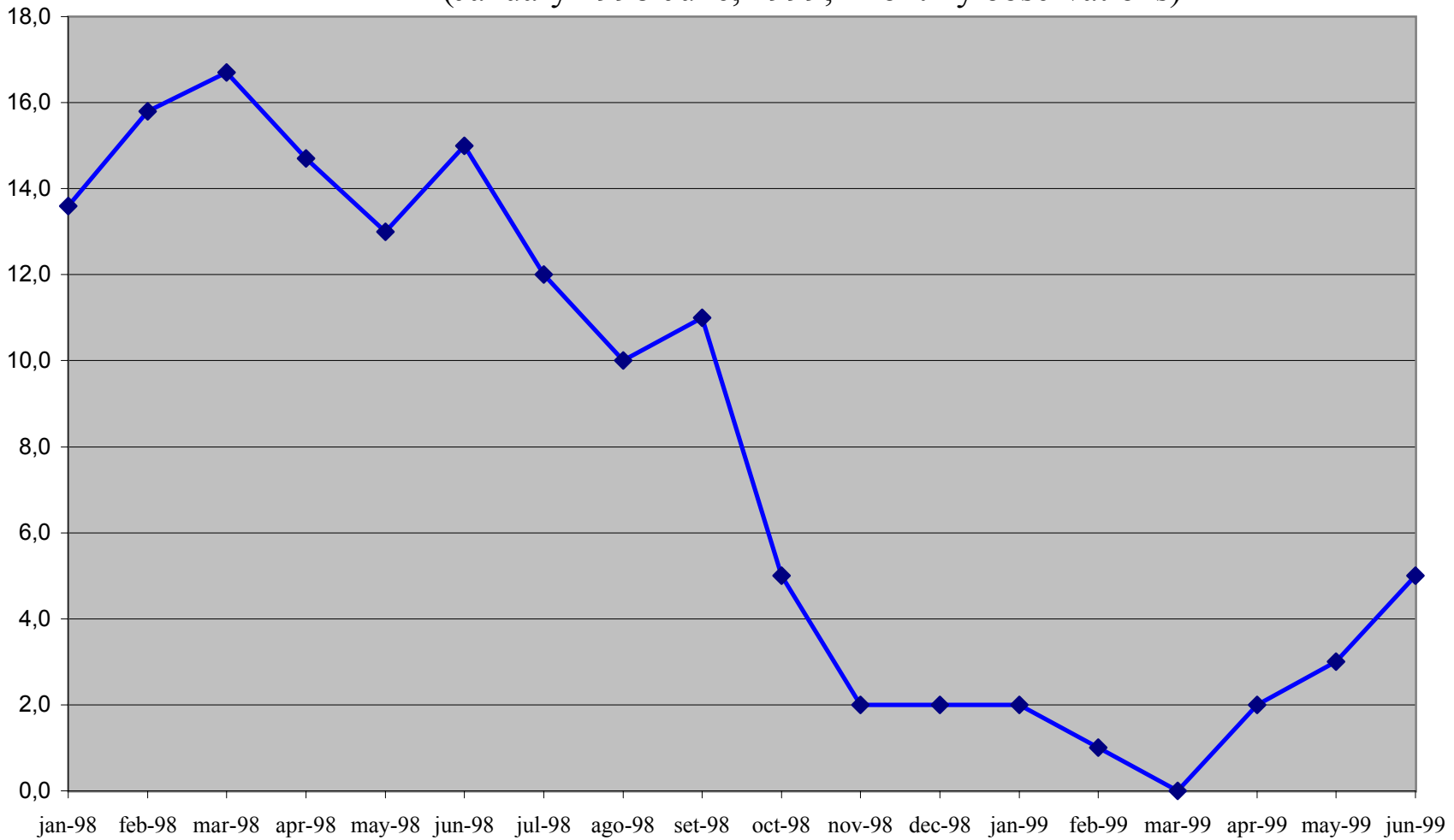
Fig. 2 Euro Area. General Government Fiscal Policy Position 1990/1998
(percentage of GDP)



Source: European Central Bank

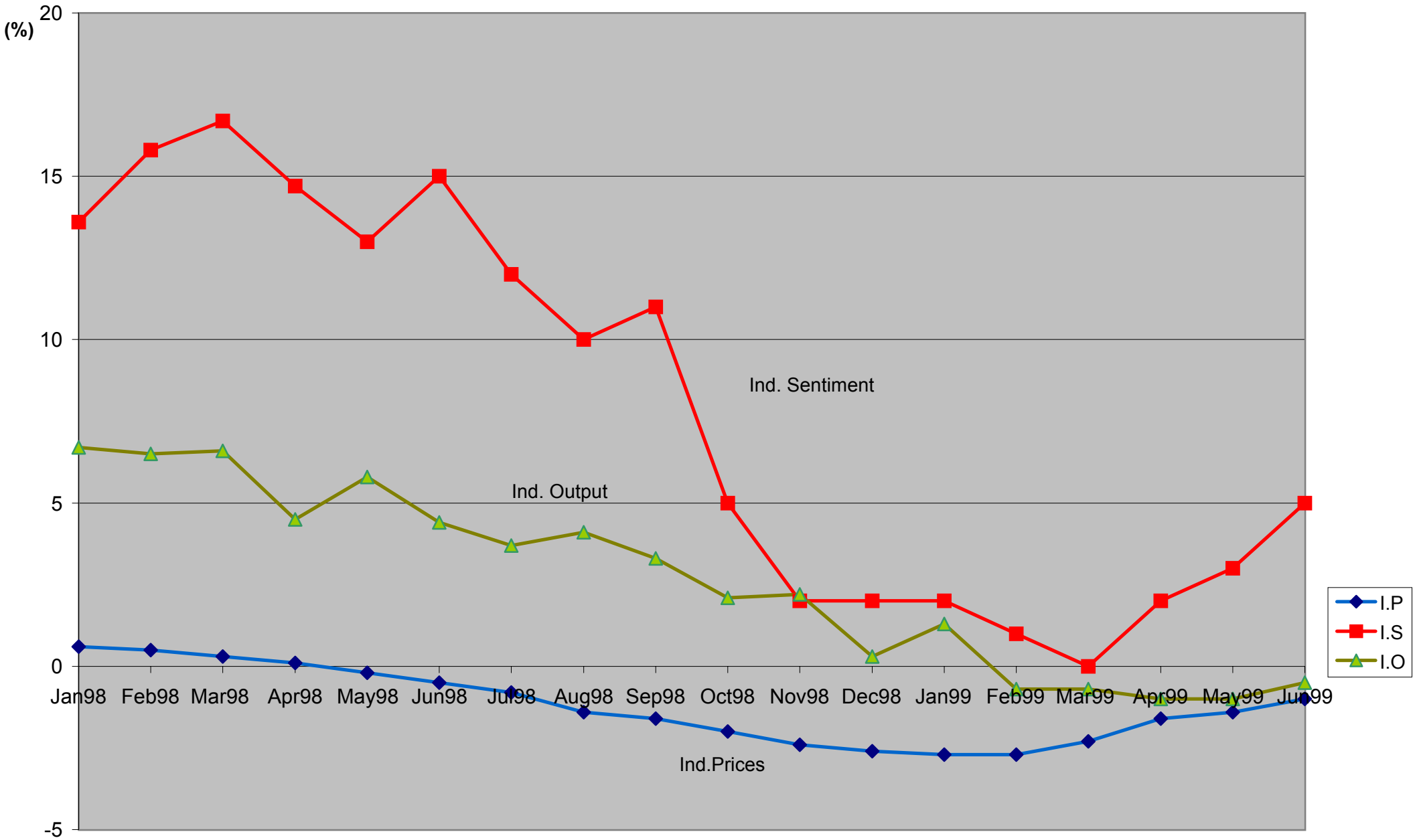
Fig.3 Industrial Sentiment in the Euro Area

(January 1998-June, 1999; monthly observations)



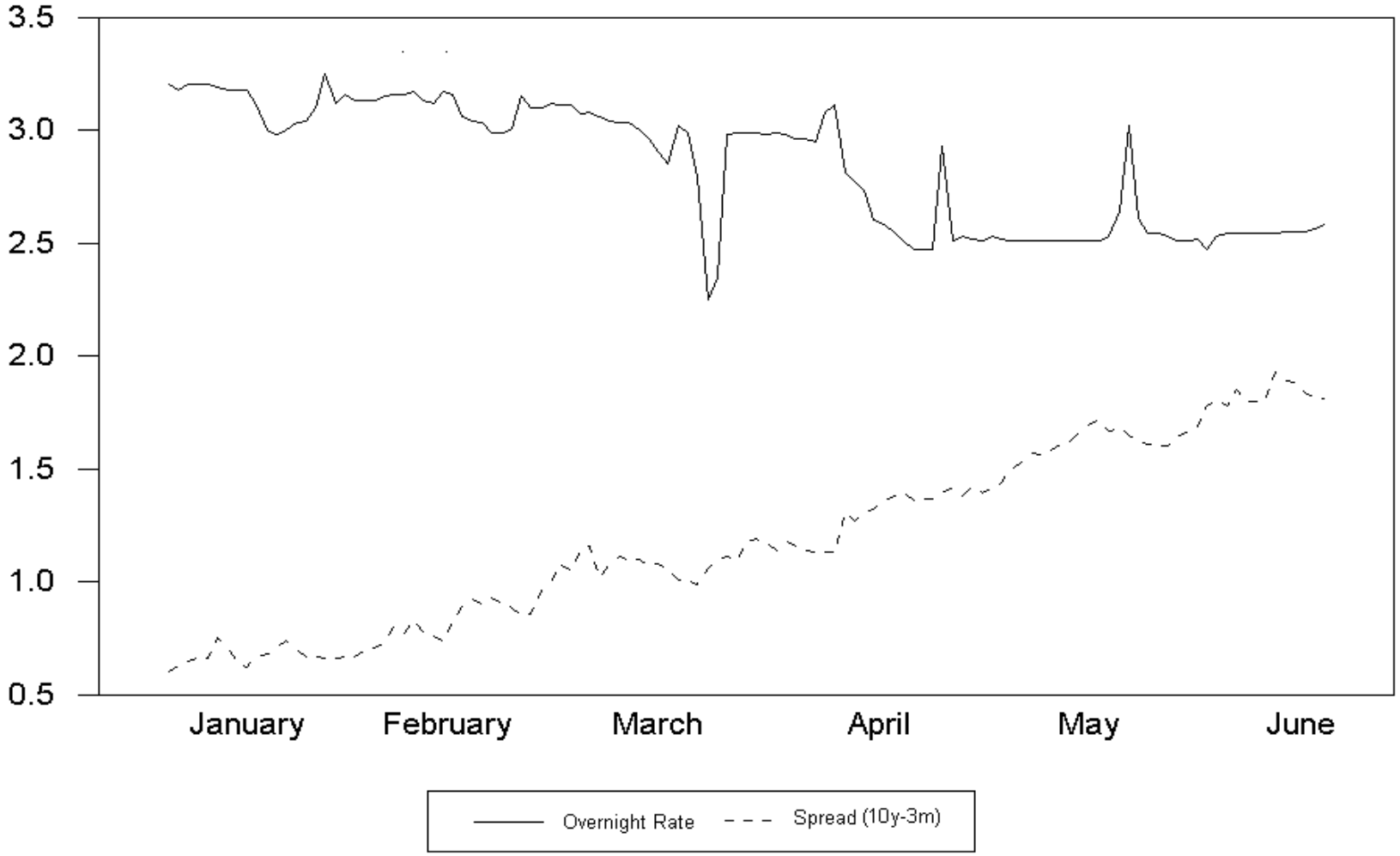
Source: Dresdner Kleinwort Benson

Fig.4 Euro Area Industrial Variables



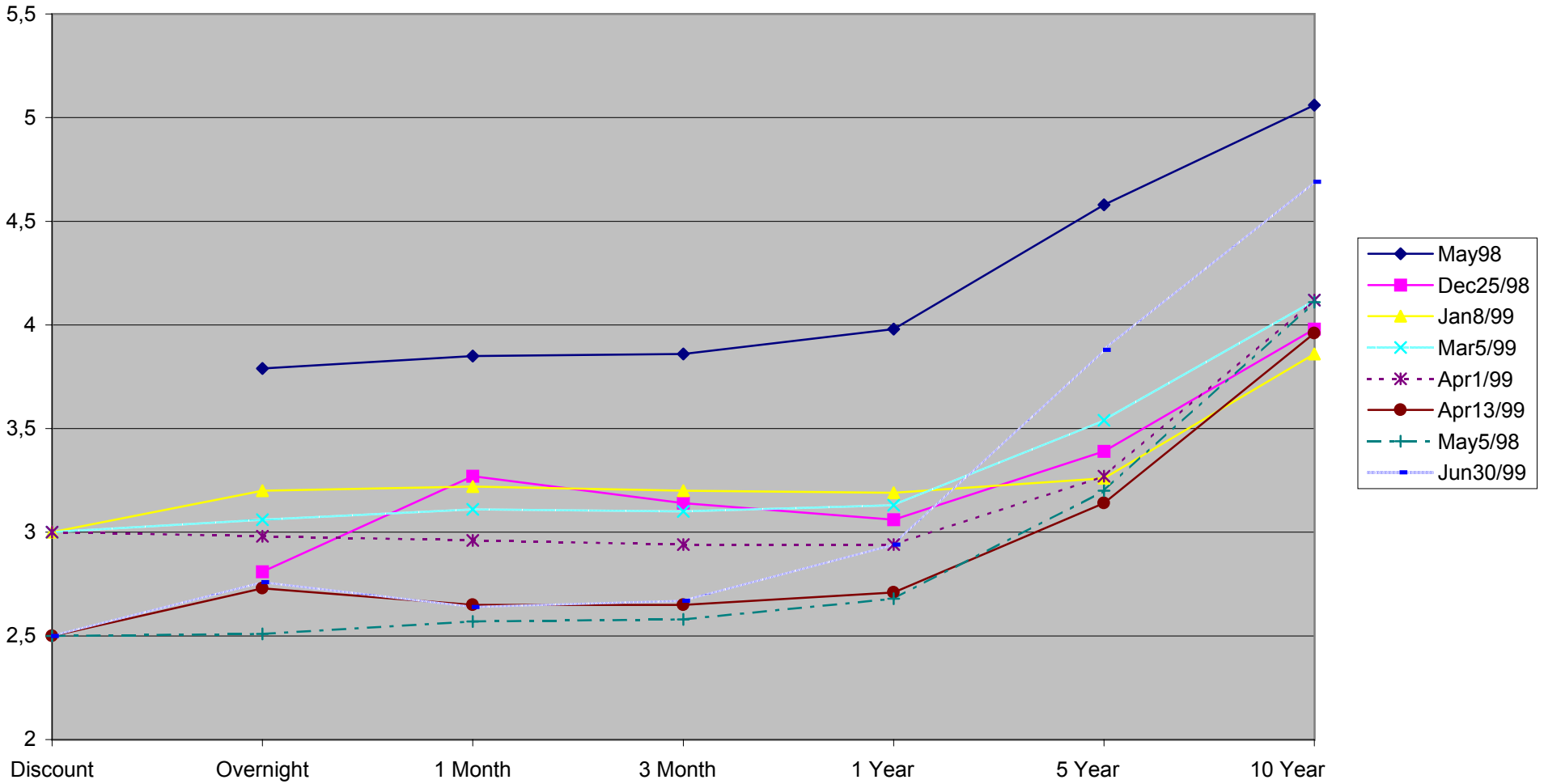
Source: Dresdner Kleinwort Benson Limited

Fig.5 Euro Area.The Overnight Rate and the Interest Rate Spread
(January-June 1999)



Source:De Nederlandsche Bank

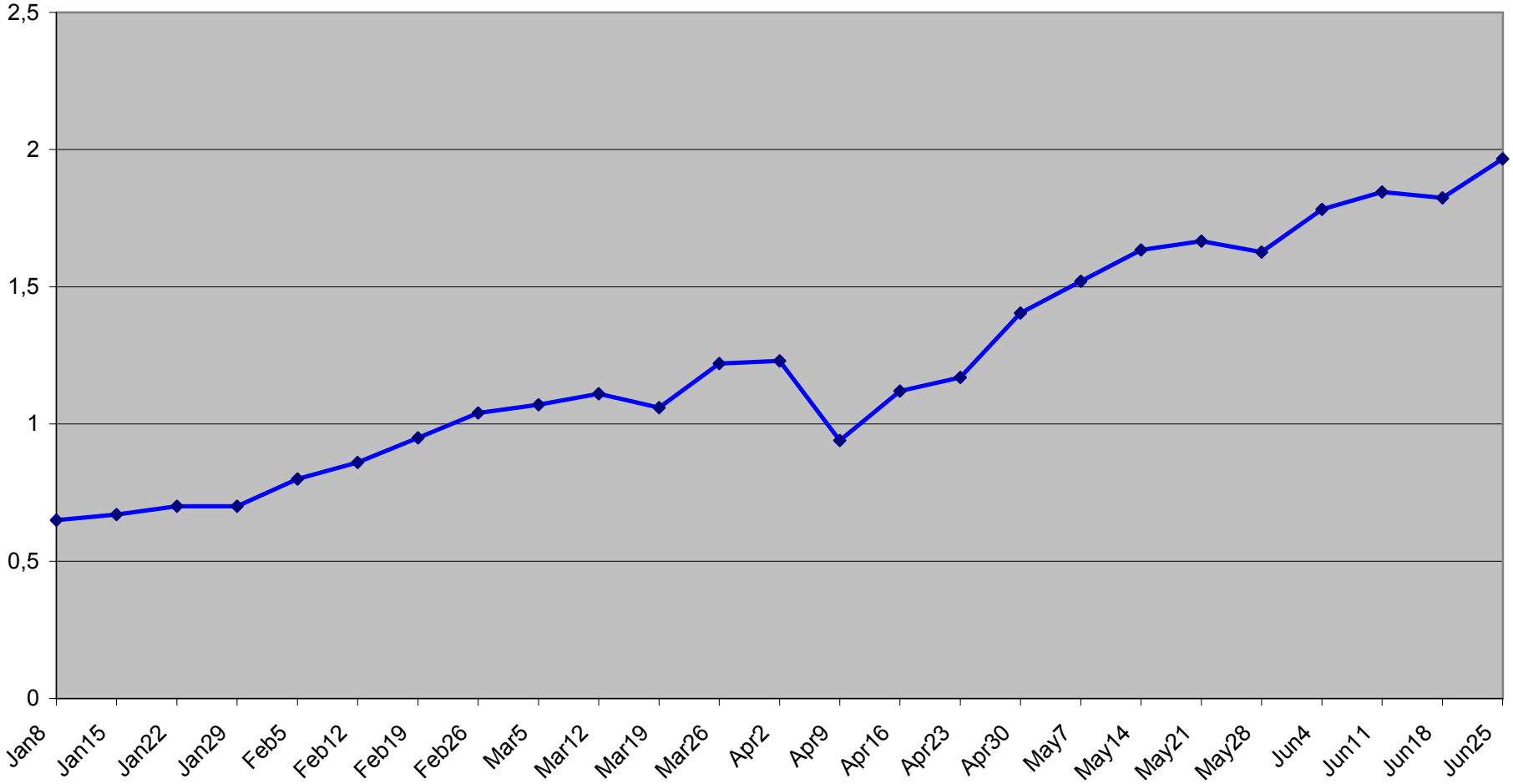
Fig.6 Euro Area. The Yield Curve



Source: ECB and De Nederlandsche Bank

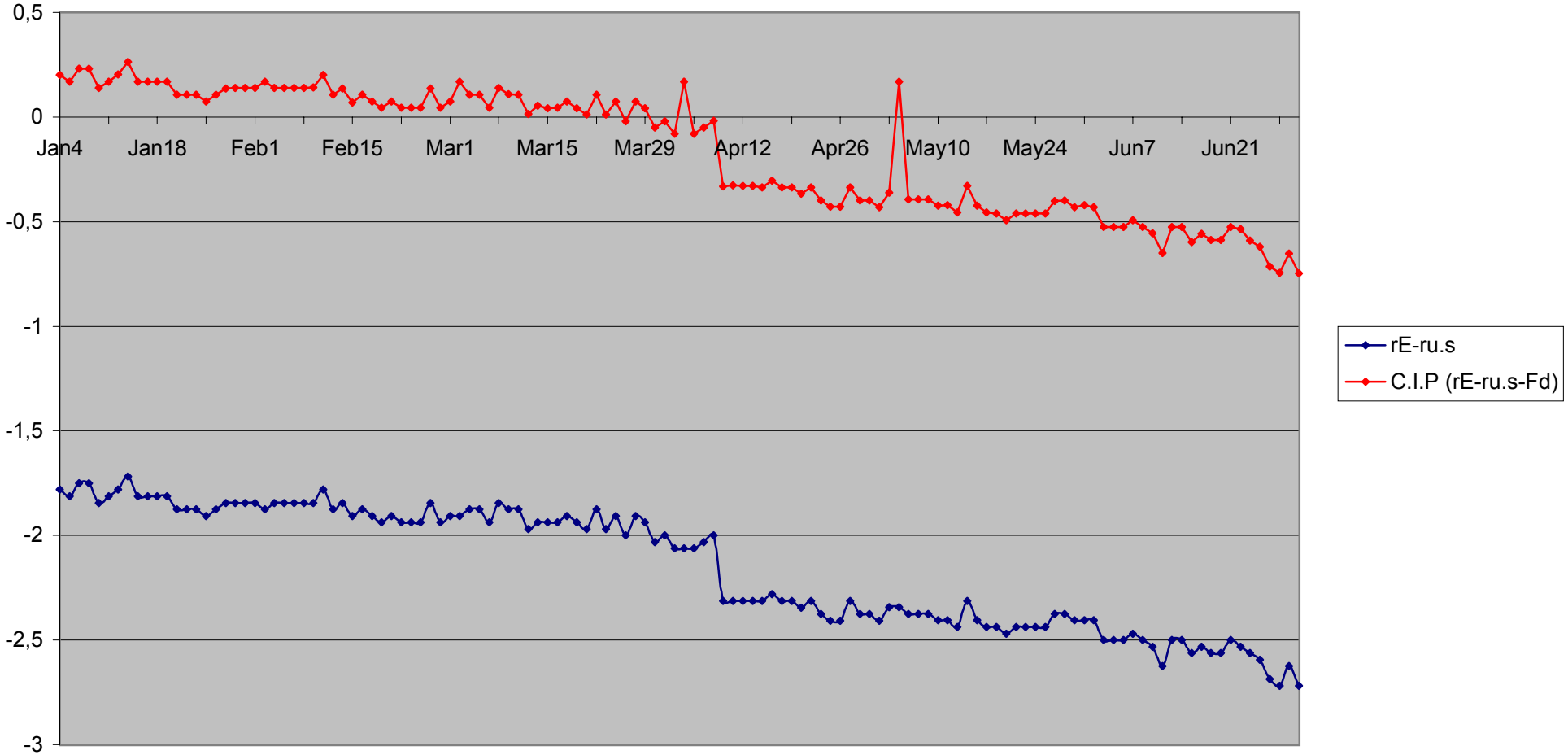
Fig.7 Euro Area Interest Rate Spread (10y-3m)

(weekly observations)



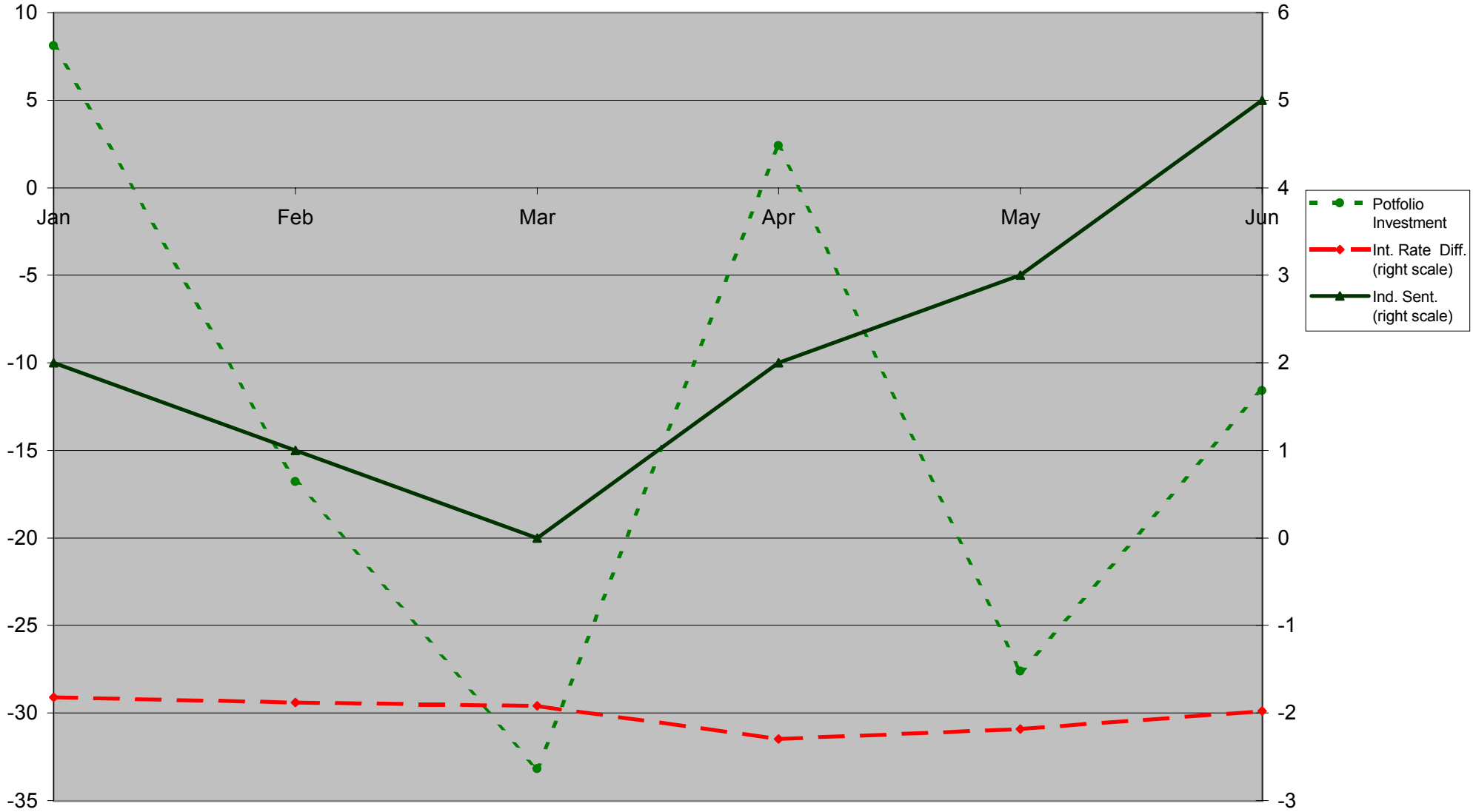
Source: De Nederlandsche Bank

Fig. 8 EuroArea and USA. Interest Rate Differential and Covered Interest Parity (daily observations; January-June 1999)



Source: Financial Times

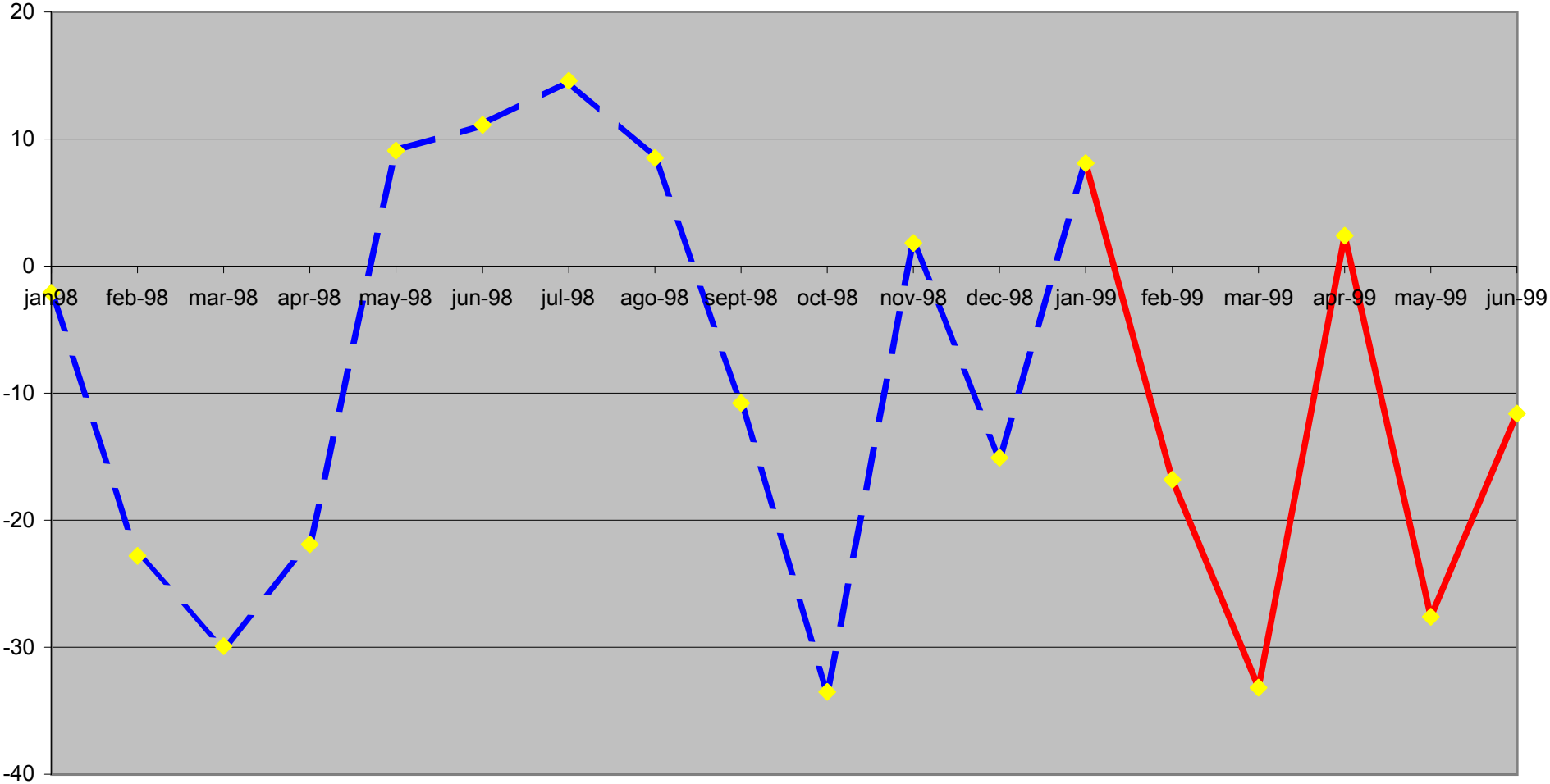
Fig.9 Euro Area. Interest Rates Differential, Industrial Sentiment and Portfolio Investment
(monthly observations; January-June 1999)



Source: European Central Bank; Dresdner Kleinwort Benson; Financial Times.

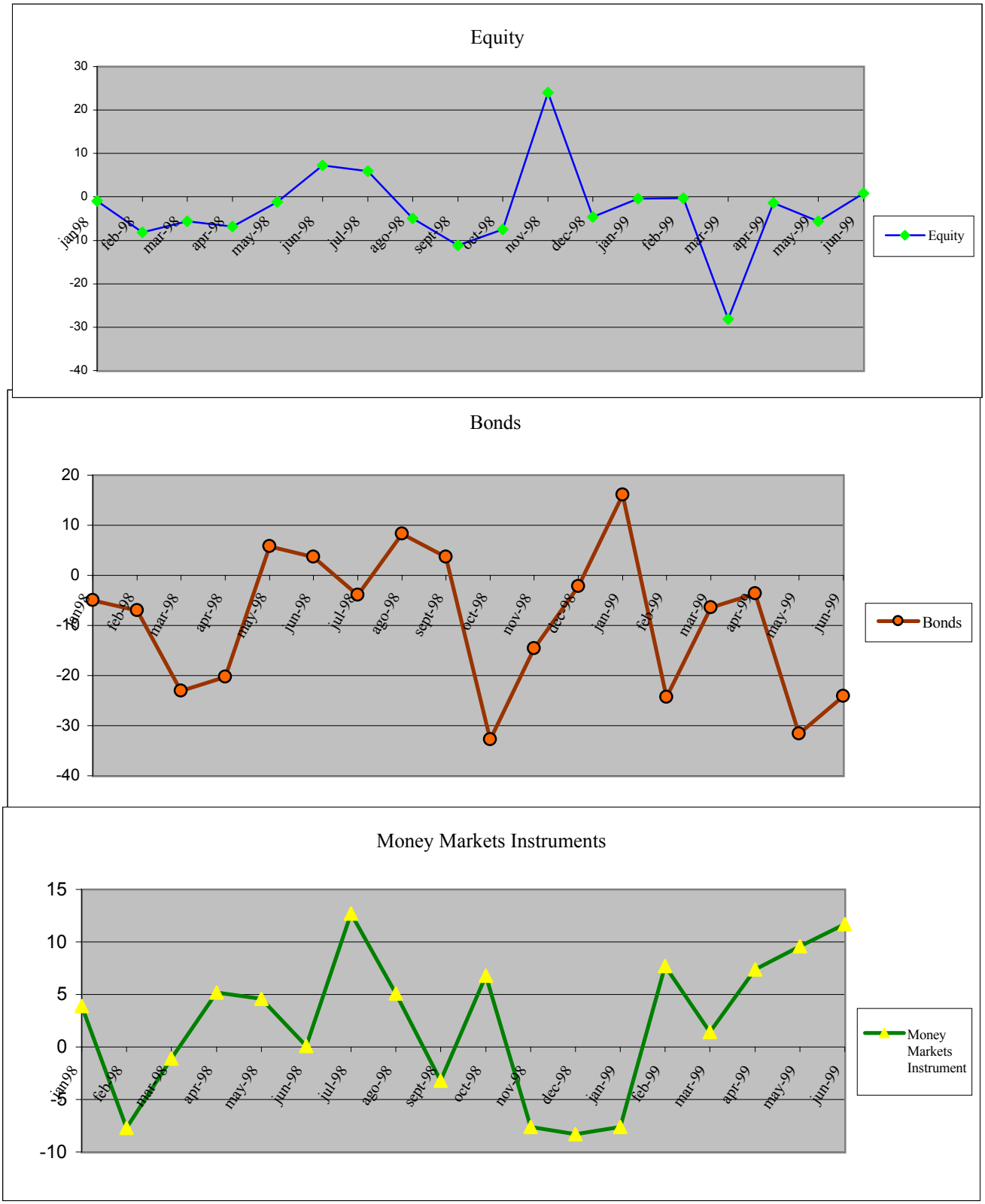
Fig.10 Euro Area Portfolio Investment

(Euro billions; net flows)



Source: European Central Bank

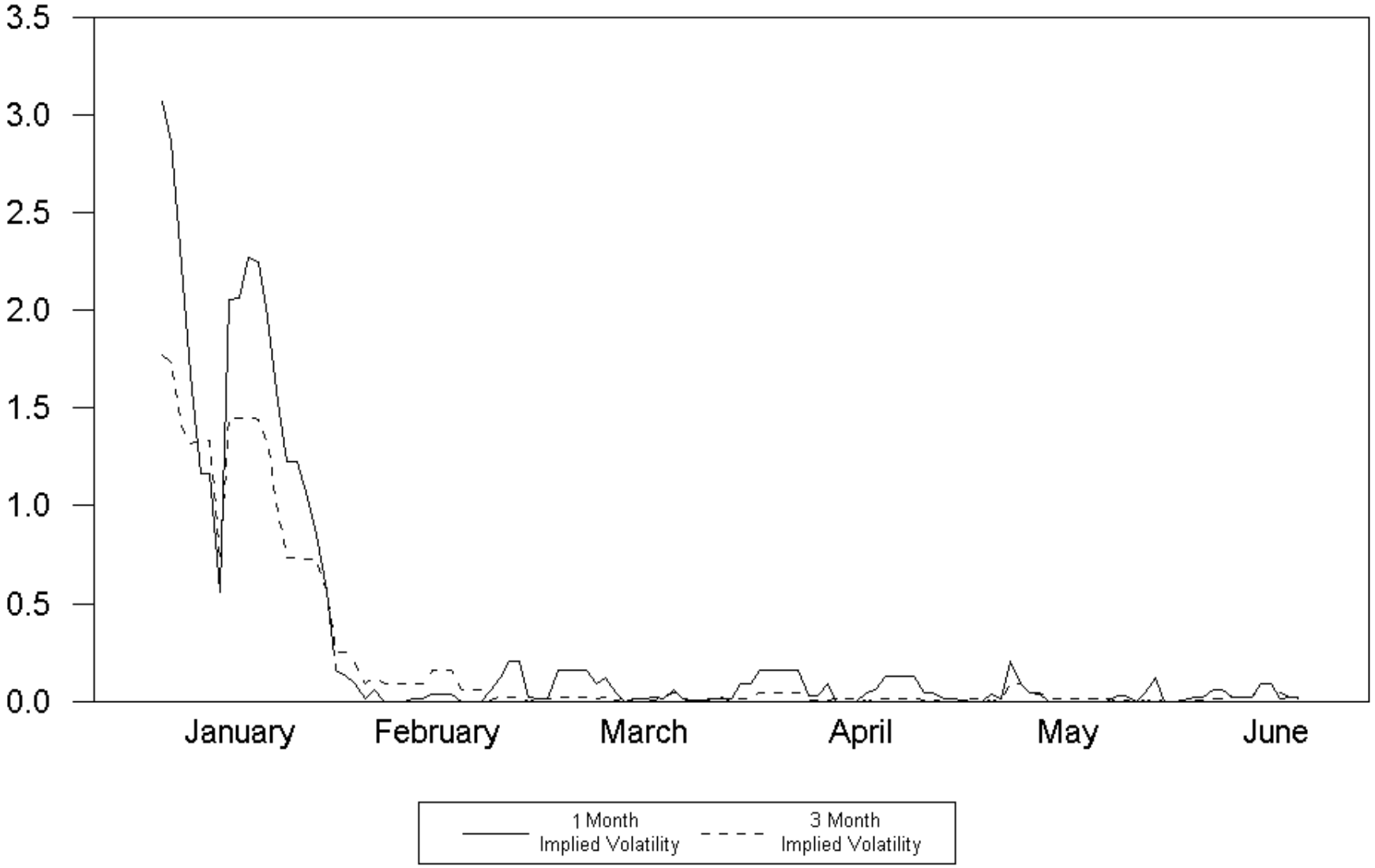
Fig.11 Euro Area. Portfolio Investment Items



Source: European Central Bank

Fig.12 Euro-Dollar 1 Month and 3 Month Implied Volatility

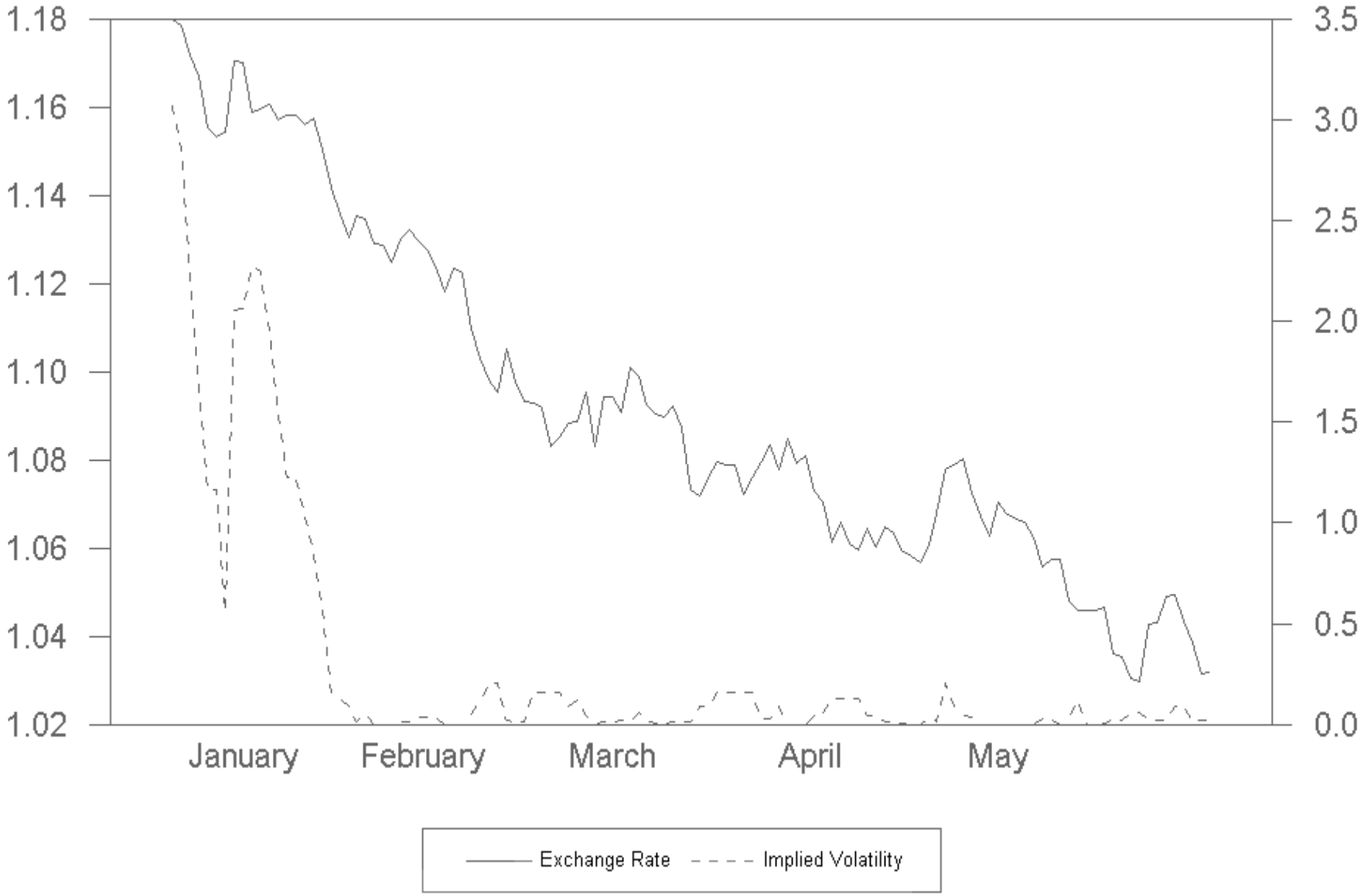
(Daily Observations; January-June 1999)



Source: J.P.Morgan

Fig. 13 Euro-Dollar Exchange Rate and Implied Volatility

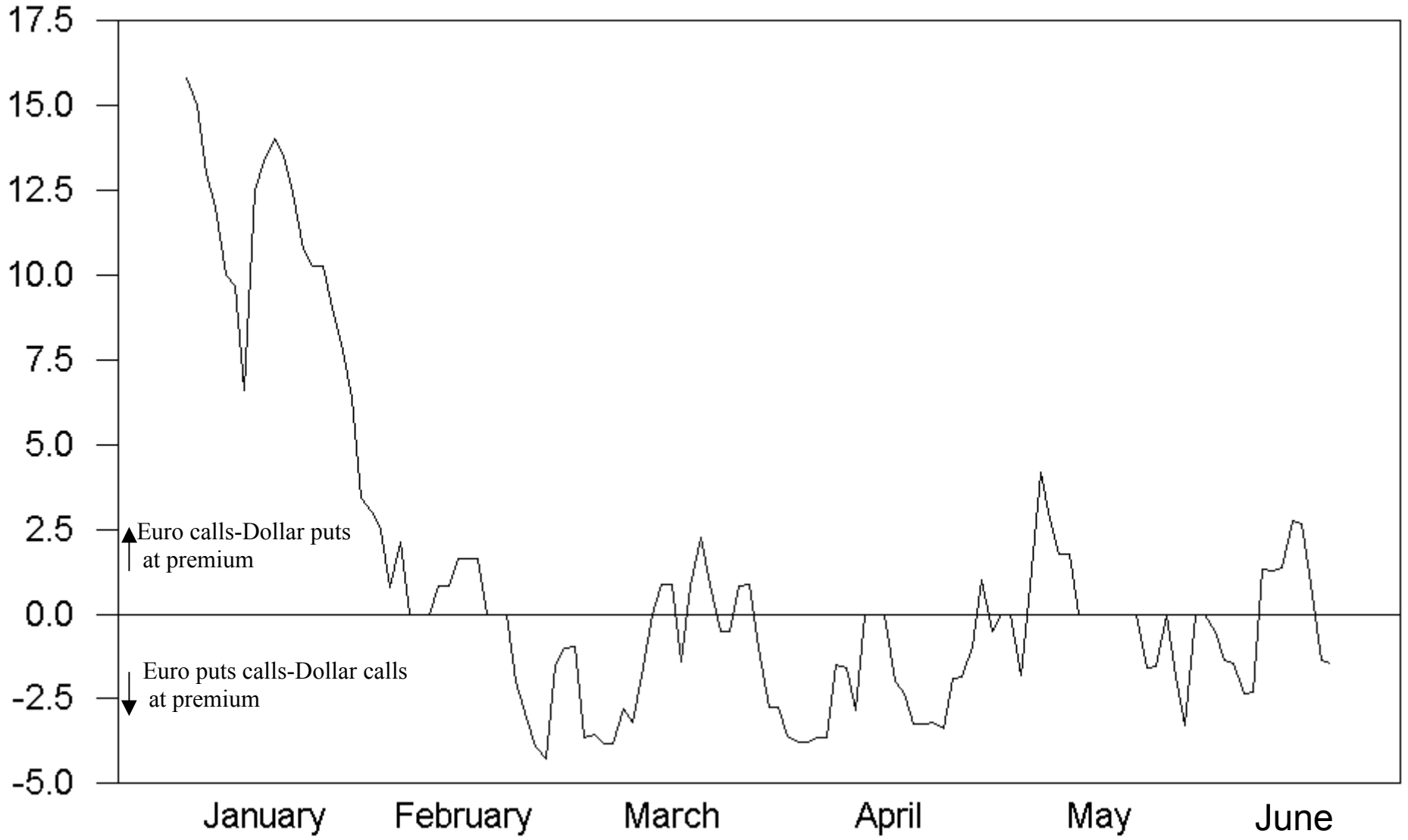
(Daily Observations,January-June 1999)



Source: J.P. Morgan

Fig.14 Three-Month Euro-Dollar Risk Reversal

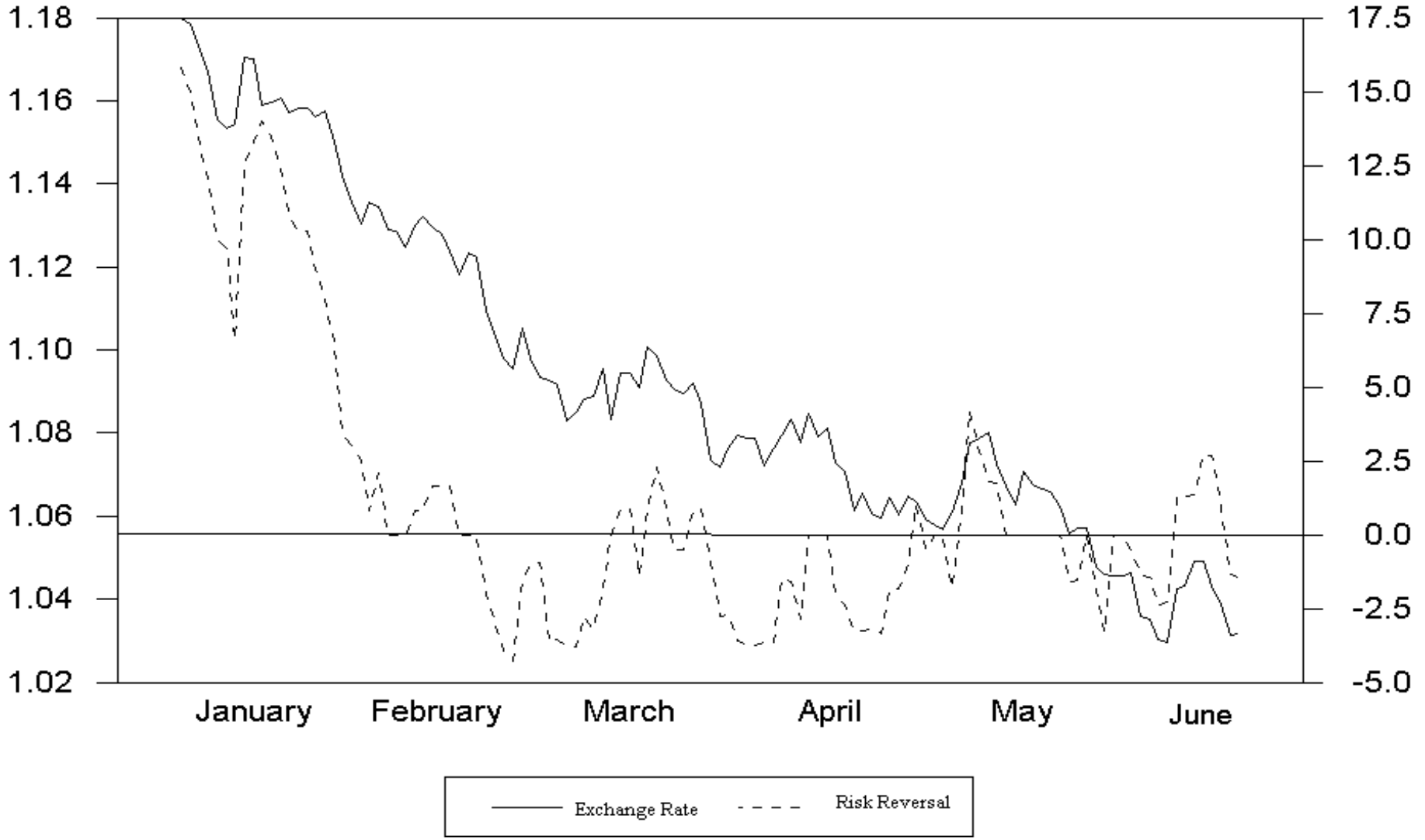
(January-June 1999; daily observations)



Source: J.P. Morgan

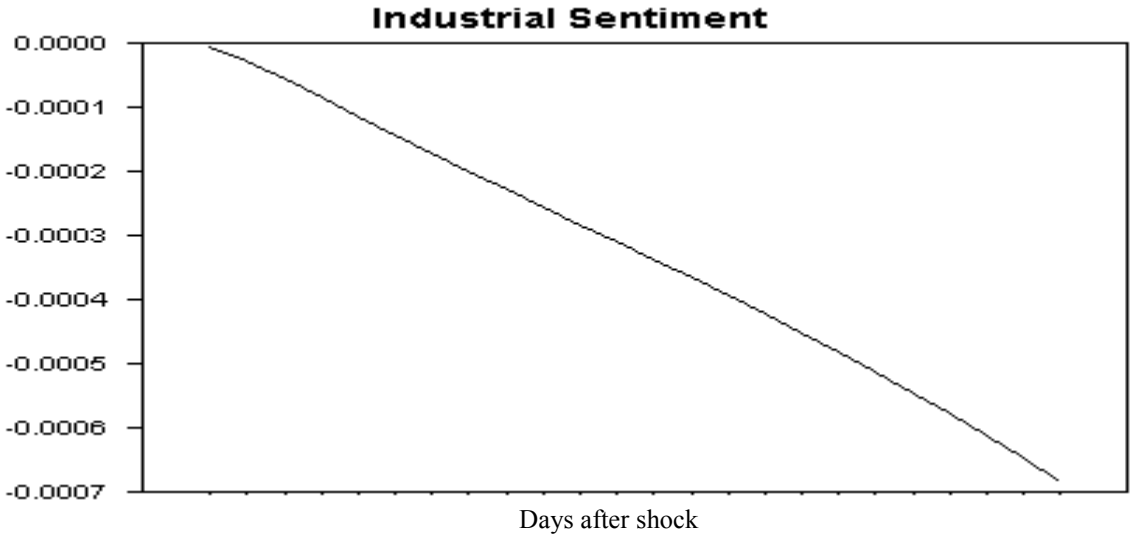
Fig.15 The Euro-Dollar Exchange Rate and the Risk Reversal

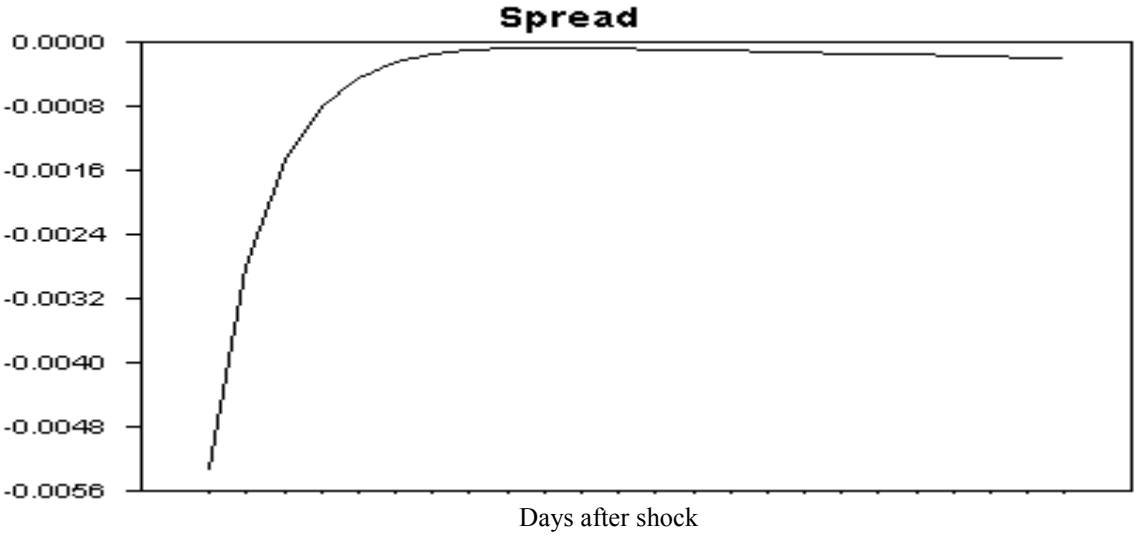
(Daily Observations; January-June 1999)



Source:J.P. Morgan

Fig.16 Ortogonalized Impulse Responses to One SE Shock in the Equation for the Overnight Rate





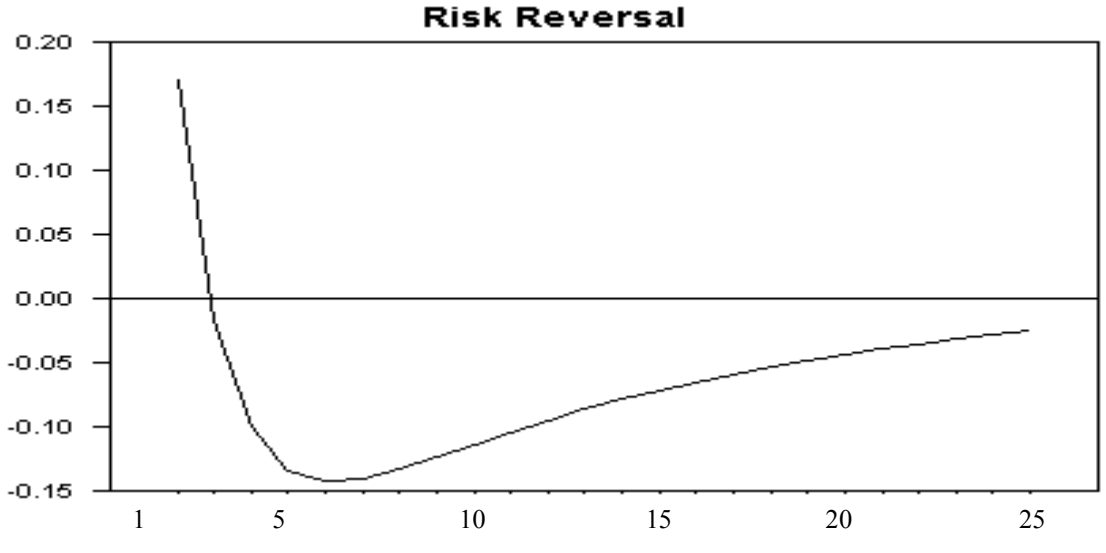


Fig.17 Orthogonalized Impulse Responses to One SE shock in the equation for the Overnight Rate

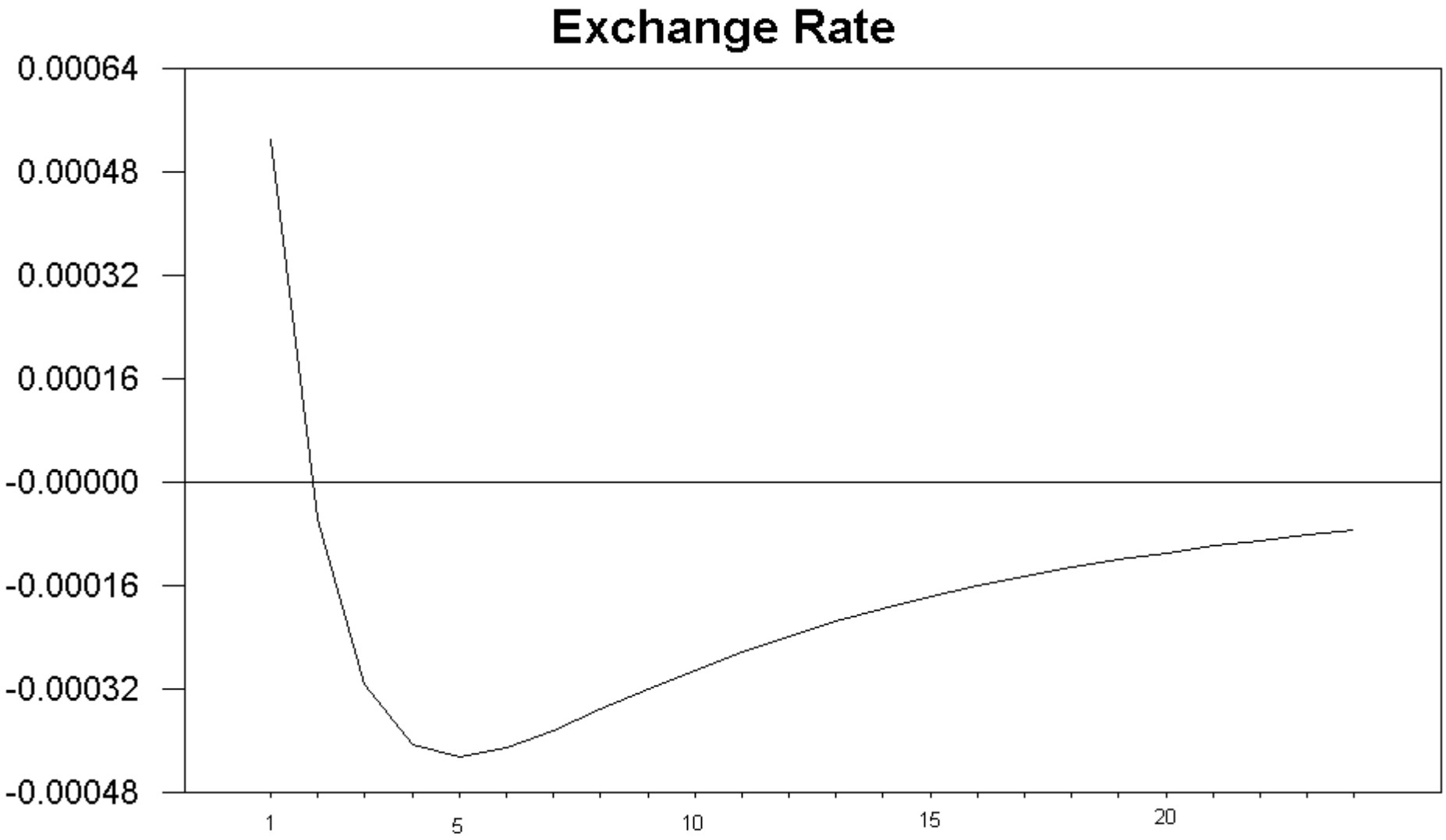


Fig.18 Orthogonalized Impulse Response a Permanent Shock in the Equation for the Overnight Rate

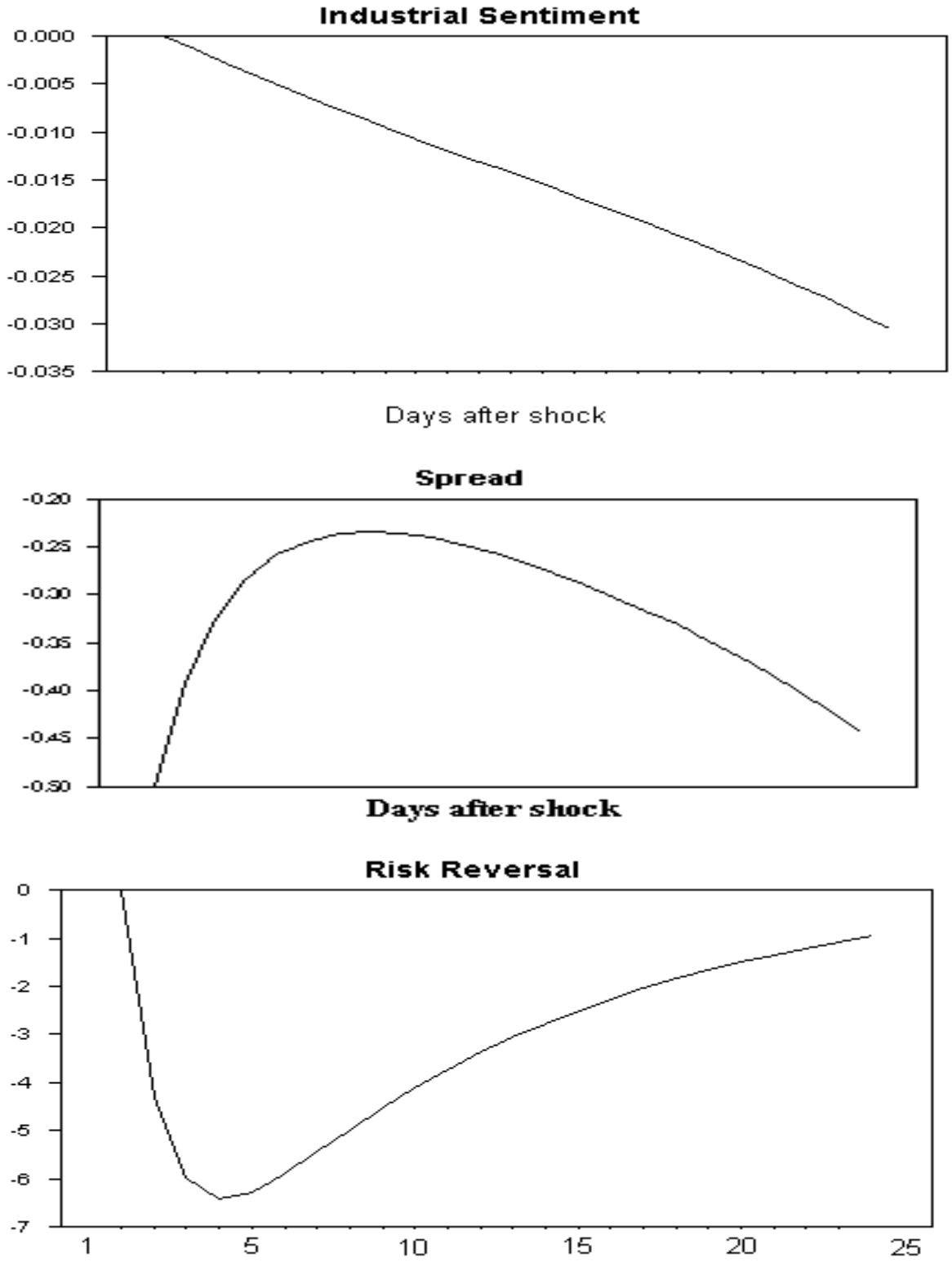
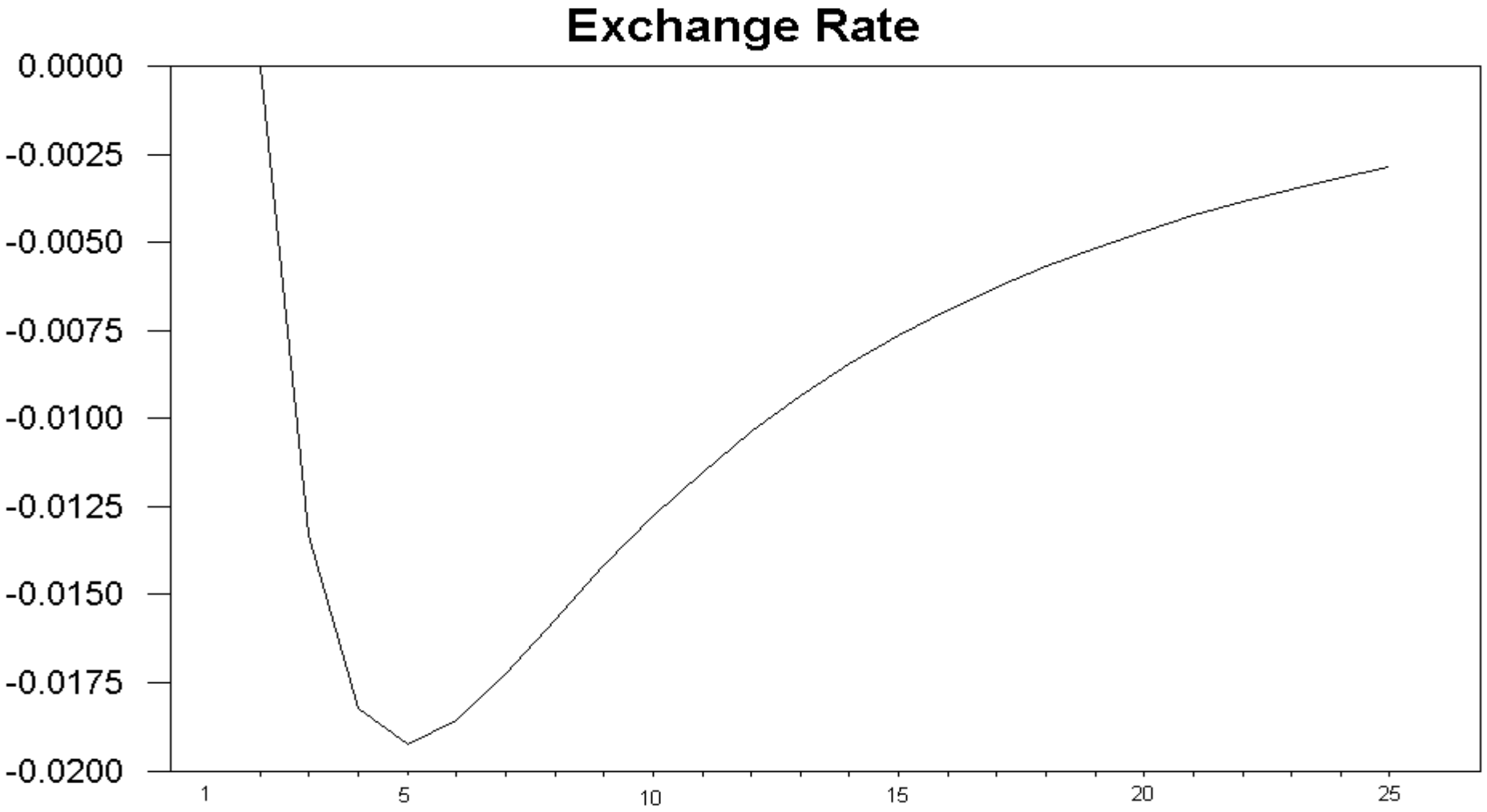


Fig.19 Orthogonalized Impulse Responses to a Permanent Shock in the Equation for the Overnight Rate



Tab. A Euro Area. Real Economy Indicators (annual percentage changes)

	GDP	*GFCF*	*IND PROD.(exc. construc.)*	*MANUFACT PROD.*	*CAPITAL GOODS PROD.*
1997 Q4	3,2	2,8	5,9	6,4	6,8
1998 Q1	3,4	5,8	6,5	7,5	9
Q2	2,7	3,2	4,7	5,3	7,2
Q3	2,5	4,1	3,9	4,2	6,6
Q4	2	3	1,2	1,1	3,8
1998 Oct			2,9	3,7	6,9
Nov			2,6	2,5	5,4
Dec			0	-0,4	3,2
1999 Q1	1,8	3,9	0,1	-0,3	0,8
1999 Jan			1,1	0,9	3,9
Feb			-0,6	-1,4	0,2
Mar			-0,1	-0,4	-1,2
Apr			-0,7	-0,8	1

Source: Eurostat

Tab. B Industrial and Commodities Prices in the Euro Area (Annual Percentage Change)

	Industrial Producers Prices			
	Total (exc. Constr.)	*Manufacturing*	*Intermediate goods*	*Capital Goods*
1998 Q1				
Q2	-0,2	0	-1,1	0,5
Q3	-1,3	-1,1	-2,9	0,7
Q4	-2,3	-2,1	-4,5	0,3
1999 Q1	-2,5	-2,1	-4,7	0,2
1999 Jan	-2,7	-2,3	-5	0,2
Feb	-2,7	-2,2	-4,9	0,2
Mar	-2,3	-1,7	-4,3	0,2
Apr	-1,6	-1,2	-3,3	0,3

Source:European Central Bank

Tab. C Euro Area. The Term Structure of Interest Rates

_	May 98	Dec25	Jan 8/99	Mar5/99	Apr1/99	Apr13/99	May5/99	Jun30/99
Discount			3	3	3	2,5	2,5	2,5
Overnight	3,79	2,81	3,2	3,06	2,98	2,73	2,51	2,76
1 Month	3,85	3,27	3,22	3,11	2,96	2,65	2,57	2,64
3 Months	3,86	3,14	3,2	3,1	2,94	2,65	2,58	2,67
1 Year	3,98	3,06	3,19	3,13	2,94	2,71	2,68	2,94
5 Years	4,58	3,39	3,26	3,54	3,27	3,14	3,2	3,88
10 Years	5,06	3,98	3,86	4,12	4,12	3,96	4,11	4,69

Source: ECB and De Nederlandsche Bank

Tab. D Yield-Curve Response (January-June 1999)

Interest Rate Maturity:	Average Interest Rate Response (4Jan-7Apr)	Average Interest Rate Response (8Apr-30Jun)	Change in Response since 8April
1 Month	-0,1697	-0,33267	-0,16297
3 Months	-0,06149	-0,288	-0,22651
5 Years	-0,0715	0,14308	0,21458
10 Years	-0,00806	0,2215	0,22956

Source:European Central Bank