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the System of European Central Banks*

Money matters for inflation
in the euro area

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CONTENT

SUMMARY

PART 1
ECB independence and price stability

The success of the stability oriented monetary policy of the ECB depends on the acceptance of the bank's *institutional set-up*. In this context, the ECB's political independence seems to be of the utmost importance. However, important pillars for safeguarding the bank's political independence – such as, for instance, governments' adherence to the European Stability and Growth Pact and the acceptance of the *division of labor* between fiscal and monetary policy – have been repeatedly called into question. For instance, *calls for a better dialog* between fiscal and monetary policy may sound well-intentioned at first glance. At second glance, however, there should be little doubt that such a cooperation, if put into practice, would run the risk of undermining the political independence of the ECB, thereby posing a risk to the stability of the euro. That said, the ECB is well advised to continue to reject proposals for a *better policy mix*. – Ongoing and improved explanation of the advantages of having an independent central bank is needed to keep alive public support for the current institutional monetary arrangement in the euro area.

PART 2
Monetary policy and structural reforms

What role does monetary policy play for structural reform in open economies? Empirical estimations were performed with panel data for 23 OECD countries from 1970 to 2000. Structural reform was measured by the Economic Freedom of the World index, whereas the monetary policy constraints were measured by a monetary commitment index and the prevailing exchange rate regime. – Our results provide little evidence for the hypothesis that a discretionary monetary policy promotes structural reform and economic freedom. The results strongly argue against those views maintaining that a business cycle oriented and lax monetary policy has never and nowhere been detrimental for employment. In fact, our results show that discretionary monetary policies tend to lead to a lower degree of structural labor market reform and, hence, to lower employment. That said, the ECB should pursue a medium- to long-term oriented monetary policy if it wants to strengthen growth and employment in the euro area via supporting reforms.

PART 3
A critical view of the real interest rate concept

The concept of the *neutral (real) interest rate* (NRIR) – as implied by the *Taylor rule* – recommends monetary policy to set real interest rates at a level that closes, or at least smoothes, the output gap. We argue that such a policy, if put into practice, would entail substantial pitfalls. First, monetary policy is an inadequate tool for influencing real GDP: the central bank's impact on long-term interest rates and GDP is actually small (or not existing); to make things

worse, a cyclically oriented policy would provoke the well-known *time-lag problem*. Second, and perhaps most importantly, the NRIR concept is not necessarily compatible with price stability, as it ignores the impact of credit and money growth on inflation. – As a result, we are in favour of a long-term oriented monetary policy that has a strong focus on money and credit growth and asset prices. Such a monetary policy would not only be compatible with the objective of price stability. It would also reduce the risk of the economy falling into (a monetary induced) financial crisis which, in turn, could have a highly negative impact on output and employment.

PART 4
ECB monetary policy and euro inflation outlook

Even at a main refinancing rate of 3.25%, ECB monetary policy remains very expansionary. We forecast annual HICP inflation in 2007 to be 2.3% on average (including the German VAT hike). Due to strong excess liquidity, annual consumer price inflation is likely to remain at 2.3% in 2008. We recommend raising ECB rates further to around 4.0%, for reducing credit and money supply growth, thereby dampening inflationary pressure. – Our money demand analyses for the euro area suggest that, in recent years, *excess liquidity* might have been translating in great part into *asset price inflation* rather than consumer price inflation. The results indicate that headline M3 growth is actually much more closely related to the *ongoing loss of purchasing of money power of the euro* – that is consumer and asset price inflation – than may be widely believed. That said, for keeping inflation in check it seems advisable for the ECB to set interest rates in line with the signals provided by (trend) money supply (excess liquidity).

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Zusammenfassung

TEIL 1

Herausforderungen für die Unabhängigkeit der EZB

Der Erfolg der stabilitätsorientieren EZB-Geldpolitik hängt entscheidend von der Einhaltung der *institutionellen Spielregeln* ab. Hierzu zählt insbesondere die Wahrung der politischen Unabhängigkeit der EZB. In jüngster Zeit sind jedoch ihre Grundlagen – Befolgen des Stabilitätspaktes, Akzeptieren der Eigenständigkeit der Geldpolitik und des EZB-Auftrages durch die Regierungen etc. – immer wieder in Frage gestellt worden. Vor allem wohlklingende *politische Umarmungsversuche* in Form der Forderungen, die EZB-Politik müsse besser mit der Finanz- und Wirtschaftspolitik koordiniert werden, entpuppen sich bei genauem Hinsehen als Versuche, den Unabhängigkeitstatus der EZB zu unterwandern. Soll die Unabhängigkeit der EZB gewahrt bleiben, müssen Forderungen nach einem stärkeren Dialog nicht nur strikt zurückgewiesen werden. Vielmehr ist auch eine fortwährende öffentliche Aufklärung nötig, um den Konsens für die Unabhängigkeit der Notenbanken zu wahren und damit die Aussicht auf stabiles Geld zu verbessern.

TEIL 2

Geldpolitik und Strukturreformen

Welche Rolle spielt die Geldpolitik für Strukturreformen? Um diese Frage zu beantworten, wurden Daten aus 23 OECD-Ländern für die Zeit 1970 bis 2000 unersucht. Der Effekt von Strukturreformen wurde dabei anhand des *Economic Freedom of the World Index* operationalisiert, die Geldpolitik anhand eines geldpolitischen Regelbindungsindex und dem herrschenden Wechselkursregime. Die Ergebnisse der Untersuchung sprechen gegen die häufig geäußerte Meinung, dass eine laxe, konjunkturorientierte Geldpolitik einen positiven Beitrag zu Strukturreformen leistet (Bestätigung der *TINA-Hypothese*). Als Handlungsempfehlung lässt sich für die EZB-Geldpolitik ableiten, dass sie weiterhin eine mittel- bis langfristig orientierte Geldpolitik verfolgen sollte, wenn es gilt, Strukturreformen u. a. auf den Arbeitsmärkten – und damit letztlich Wachstum und Beschäftigung im Euroraum – zu unterstützen; eine konjunkturorientierte Politik wäre kontraproduktiv.

TEIL 3

Ein kritischer Blick auf das Konzept des „neutralen Zinses"

Eine Geldpolitik auf Basis des *(realen) neutralen Zinses* oder *Taylor Zinses* – wie derzeit in Fachkreisen vielfach propagiert – bringt viele Probleme mit sich. Erstens ist der neutrale Zins eine gänzlich unbekannte Größe, deren Schätzung erhebliche, wenn nicht gar unüberwindbare Schwierigkeiten bereitet. Zweitens werden die Möglichkeiten einer Konjunktursteuerung durch die Geldpolitik, auf die das neutrale Zinskonzept setzt, überschätzt. Drittens wird die *Time-Lag-Problematik* übersehen. Viertens ignoriert eine solche Poli-

tik, dass die Kredit- und Geldmengenexpansion langfristig entscheidende Größen für das Preisniveau darstellt. So könnte ein Notenbankzins, der dem neutralen entspricht, dennoch zu Inflation führen. – Wir favorisieren daher eine langfristig ausgerichtete EZB-Geldpolitik, die viel stärker als bisher das Zusammenspiel von Kreditexpansion, Asset-Preis-Entwicklung und Geldmengenwachstum betrachtet. Solch eine Politik würde nicht nur im Einklang mit Preisniveaustabilität stehen, sondern auch die Gefahr von Finanzkrisen, die zu schweren Wachstumskrisen werden können, abmildern.

TEIL 4
EZB-Geldpolitik – Rück- und Ausblick

Die Geldpolitik der EZB ist auch nach den jüngsten Zinsanhebungen auf 3,25% immer noch außergewöhnlich expansiv. Die Inflation der Konsumentenpreise dürfte trotz des Ölpreisverfalls 2007 (einschließlich des deutschen Mehrwertsteuereffekts) bei 2,3% liegen und wegen des starken Geldmengenwachstums auch in 2008 bei 2,3% verharren. Wir empfehlen, den EZB-Zins weiter anzuheben, um das übermäßige Wachstum der Kredit- und Geldmengen und damit den Inflationsdruck einzudämmen. Dies dürfte einen EZB-Leitzins von ungefähr 4,0% erforderlich machen. – Unsere Analysen zur Geldnachfrage im Euroraum deuten darauf hin, dass die *Überschussliquidität* sich weniger in Konsumentenpreisen als vielmehr in Vermögenspreisen zu entladen scheint (*Asset Price Inflation*). Die Befunde deuten an, dass der Zusammenhang zwischen Geldmengenwachstum und *tatsächlicher* Geldentwertungsrate enger zu sein scheint, als vielfach angenommen wird. Soll also der Geldwertschwund verhindert werden, d. h. Konsumenten- als auch Vermögenspreisinflation, muss sich die EZB mit ihrer Zinspolitik viel enger an den Geldmengensignalen orientieren als sie es bisher getan hat.

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PART 1
Challenges to ECB independence

CONTENT: *1.1 The importance of political independence – 1.2 ECB political independence and involvement with EU institutions. – 1.3 Identifying risks to independence.*

SUMMARY: *The success of the stability oriented monetary policy of the ECB depends on the acceptance of the bank's institutional set-up. In this context, the ECB's political independence is of the utmost importance. However, important pillars for safeguarding the bank's independence – such as, for instance, governments' adherence to the European Stability and Growth Pact and the acceptance of the "division of labor" between fiscal and monetary policy – have been repeatedly called into question. For instance, latest calls for a better dialog between fiscal and monetary policy may sound well-intentioned at first glance. At second glance, however, it should become clear that any such coordination, if put into practice, would run the risk of undermining the political independence of the ECB, thereby posing a risk to the stability of the euro. That said, the ECB is well advised to continue to reject proposals for a better "policy mix". – Ongoing and improved explanation of the advantages of having an independent central bank is needed to keep alive public support for the current institutional arrangement.*

1.1 The importance of political independence

Price stability has become a widely accepted goal of monetary policy, and an *independent central bank* is an institutional arrangement that can help to achieve it. As a result, independent central banks have become a major characteristic of government controlled paper money standards in the more recent history. The hallmarks of central bank independence – that is the autonomy from the government interference in day-to-day policy – were identified by David Ricardo in 1824:

> "It is said that Government could not be safely entrusted with the power of issuing paper money; that it would most certainly abuse it (…). There would, I confess, be great danger of this if Government – that is to say, the Ministers – were themselves to be entrusted with the power of issuing paper money. But I propose to place this trust in the hands of Commissioners, not removable from their official situation but by a vote of one or both Houses of Parliament. I propose also to prevent all intercourse between these Commissioners and Ministers, by forbidding any species of money transactions between them. The Commissioners should never, on any pretense, lend money to Government, nor in the slightest degree be under its control or influence (…)."[1]

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[1] Quoted from Fraser, B. W. (1994), Central Bank Independence: What Does it Mean?, in: Reserve Bank of Australia Bulletin, December, pp. 1.

TIME INCONSISTENCY

Theoretically speaking, the notion that monetary policy, if left in the hands of politicians, might be subject to an *inflation bias* has its root in *time-inconsistency*, a theoretical concept developed by Kydland and Prescott (1977).[2] In a simple model version, it is assumed that monetary policy makers favour high employment and dislike deviations of inflation from the envisaged rate. What is more, policy makers can act discretionary (or *ad hoc*), that is they can change policy from one period to the other. It is actually *discretion on the part of policy makers* that may result in a conflict between the employment and inflation goal.

Once market agents have made their contracts on the basis of expected inflation, monetary policy may want to deliver higher-than-expected inflation, as by doing so real wages can be lowered and output increased. After having suffered from *surprise inflation*, however, market agents would no longer believe in the central bank's inflation promise; the latter would no longer be credible. In fact, people would expect inflation to be higher than promised. According to theory, a discretionary monetary policy therefore imparts an *inflation bias* to the economy, and the outcome would clearly be sub-optimal: inflation would be higher than needed, without increasing employment.

Making central banks politically independent is nowadays seen as a measure for circumventing the time-inconsistency problem, which might arise if and when governments are allowed to have access to the printing press on a day-to-day basis.[3]

DIMENSIONS OF INDEPENDENCE

The discussion about central bank independence tends to focus on two key issues: First, there is the dimension that encompasses those institutional characteristics that insulate the central bank from political influence in setting the goal of monetary policy. Second, there are the dimensions that include those aspects that allow the central bank to freely implement policy in pursuit of monetary policy goals. With Debelle and Fischer (1994), these two aspects are called *goal independence* and *instrument independence*; in this context we also refer to *financial independence.*

— *Goal independence* refers to the central bank's ability to determine the goals of its policy without the direct influence of the government. In

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[2] It was applied to the problem of monetary policy by Barro, R., Gordon, D. (1983), A Positive Theory of Monetary Policy in a Natural Rate Model, in: Journal of Political Economy, Vol. 91, pp. 589 – 610.

[3] For a critical look at solving the inflation bias by central bank independence, see, for instance, Fuhrer, J. C. (1997), Independence and Inflation Targeting: Monetary Policy Paradigms for the Next Millennium, in: New England Economic Review, January/February, pp. 19 – 36.

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the euro area, the ECB's primary objective, that is price stability, is laid out in Article 105 (1) of the Maastricht Treaty ("Treaty"). It is upon the ECB to specify that objective and translate it into an operational goal. Seen from this viewpoint, the ECB has actually a rather high level of goal independence.

— *Instrument independence* refers to the central bank's ability to freely adjust its policy tools in pursuit of the goals of monetary policy. The ECB has all instruments (open market instruments, lending and deposit interest rates, etc.) at its disposal which are widely seen as a prerequisite for determining credit and money supply in the euro area.

— *Financial independence* shall guarantee that the central bank is financially autonomous. This, in turn, shall allow the bank to, for instance, hire staff and pursue research projects without having to seek government approval.

What is more, stable money requires *sound public finances*. Fiscal policies can undermine confidence in a stability-oriented monetary policy if private agents come to expect that excessive government borrowing will ultimately be financed through money creation (*inflation tax*). The European Stability and Growth Pact (SGP), which was adopted in 1997, is a rule-based mechanism for constraining fiscal policies via rules, as it lies in the temptation for governments to spend more than they can afford and pass the burden onto future taxpayers.[4]

1.2 ECB political independence and involvement with EU institutions

POLITICAL INDEPENDENCE

The ECB has been granted full institutional independence by the Treaty.[5] The latter explicitly stipulates that neither the ECB nor any member of its decision-making bodies shall seek or take instructions from Community institutions or bodies, from any government of a Member State or from any other body. The Community institutions and bodies and

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[4] In a monetary union among sovereign states, the deficit bias of fiscal policy is likely to be exacerbated. The adoption of a common currency eliminates the exchange rate risk and the associated interest rate risk premia among the participant countries, thus blunting the discipline normally exerted by financial markets on governments' fiscal behaviour. As national financial markets become more integrated, sovereign issuers can draw on a larger and more liquid currency area-wide capital market. A government that increases its deficit will be able to finance the additional expenditure more easily because the cost of the additional borrowing in terms of higher interest rates is, at least partly, spread across the entire currency area. See, ECB (2004), Fiscal policy influences on macroeconomic stability and prices, in: Monthly Bulletin April, pp. 45 – 58.

[5] See ECB (1999), The institutional framework of the European System of Central Banks, in: Monthly Bulletin July, pp. 55 – 63.

the governments of the Member States have undertaken to respect this principle and not to seek to influence the members of the decision-making bodies of the ECB in the performance of their tasks.

The concept of independence was further specified by the European Monetary Institute in its Convergence Report (March 1998), which was endorsed by the ECOFIN Council in its recommendation to the Council under Article 109 j (2), last paragraph, of the Treaty. Independence means financial and institutional independence (as outlined above). The Treaty establishes that the ECB has its own budget, independent from that of the European Union. This makes it impossible for Community institutions to interfere with the administration of the ECB and keeps the budget separate from the financial interests of the Community.

The Statute protects the *personal independence* of the members of the ECB's decision-making bodies, stipulating:
— a minimum renewable term of office of five years for governors of the national central banks;
— a non-renewable term of office of eight years for members of the Executive Board, a system of staggered appointments having been applied for the appointment of its first members;
— removal from office only in the event of incapacity or serious misconduct; and
— competence of the European Court of Justice to settle any disputes in these matters.

Further provisions supporting to the ECB's political independence (and, at the same time, contributing to fiscal discipline) are the prohibitions of monetary financing of budget deficits and of any form of privileged access for the public sector. Article 101 of the Treaty forbids the ECB and the NCBs to provide monetary financing for public deficits using "overdraft facilities or any other type of credit facility with the ECB or with the central banks of the Member States". Article 102 of the Treaty prohibits any measure that may establish privileged access to financial institutions for governments and Community institutions or bodies. In addition to increasing the incentives to pursue sound public finances and prudent fiscal policies, these provisions contribute to the credibility of the single monetary policy in the pursuit of price stability.

Moreover, the Statute enables the ECB to adopt autonomous rules for its personnel, prohibiting other Community institutions from having any influence on the conditions of employment for staff of the ECB. The institutional independence is established in the provisions already mentioned. Furthermore, the competence of the European Court of Auditors has been limited to an examination of the operational efficiency of the management of the ECB, while the accounts of the ECB are audited by independent external auditors.

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Figure 1.1. – Official involvements of the ECB with EU institutions

Body/ forum	Main tasks	Membership
European Parliament (established 1958)	• Co-legislator with the EU Council on a wide range of EU laws. • Conducts confirmation hearings of persons nominated to manage Community institutions and bodies, including the ECB.	• Currently 626 Members of the European Parliament. • Organised in eight political groups, along the lines of ideological orientations.
EU Council (ECOFIN) (established 1958)	• To take decisions on issues related to Title III, Chapter 4 of the Treaty (Capital and payments), and Title VII (Economic and monetary policy). • To co-ordinate the general economic policies of the Member States.	• Economics or Finance Minister from each Member State (or a representative authorised to bind the government of that Member State). • The European Commission shall be invited. • The ECB shall be invited in cases where it exercises its right of initiative, or when the EU Council is discussing matters relating to the objectives and tasks of the ESCB.
Eurogroup (established 1998)	• To provide a forum for discussion among Ministers on issues connected with "their shared specific responsibilities for the single currency".	• Economics or Finance Ministers of the Member States participating in the euro area. • The European Commission, and the ECB when appropriate, are invited to take part in the meetings.
Economic and Financial Committee (established 1999)	• To keep under review the economic and financial situation of the Member States and of the European Community and to report regularly thereon to the EU Council and to the European Commission, in particular on financial relations with third countries and international institutions. • To deliver opinions at the request of the EU Council or of the European Commission, or on its own initiative for submission to those institutions. • To contribute to the work of the ECOFIN Council and to carry out other advisory tasks assigned to it by the EU Council. • To examine, at least once every year, the situation regarding the movement of capital and the freedom of payments.	• The Member States, the European Commission and the ECB are each represented by two members. • The two members appointed by the Member States shall be selected respectively from among senior officials from the administration and the national central bank.
Economic Policy Committee (established 1974)	• To contribute to the preparation of the work of the EU Council by providing analyses, opinions on methodologies and draft formulations for policy recommendations, particularly on policies for improving growth potential and employment. • To provide advice to the European Commission and the EU Council. • To provide a framework for Macroeconomic Dialogue at the technical level.	• The Member States, the European Commission and the ECB are each represented by no more than four members.
Macroeconomic Dialogue (established 1999)	• To exchange information and opinions on how to design a macroeconomic policy in order to contribute towards higher levels of employment on the basis of strong, non-inflationary, growth.	• The Member States are represented by a ministerial "Troika" from the current, subsequent and preceding presidencies, selected from the ECOFIN and Social Affairs Council. • The European Commission, the ECB and a non-euro area national central bank also participate. • The social partners are represented by EU-level federations of employers and trade unions.

Source: ECB (2000), The ECB's relations with institutions and bodies of the European Community, in: Monthly Bulletin October, pp. 49 – 64 (62).

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Figure 1.2. – Involvement of high-ranking ECB officials

Level of ECB participation	Frequency of meetings/ subgroups	Other observations	Body/ forum
President or Vice-President; other members of the Executive Board report on specific topics	• Hearings of the ECB before the Economic and Monetary Affairs Committee in principle four times a year. • Presentation of the ECB's Annual Report to a plenary session. • ECB officials can be invited before a parliamentary committee whenever a need arises.	Monetary dialogue between the ECB and the European Parliament is a core element in the process of holding the ECB accountable.	**European Parliament**
President/Vice-President, or, exceptionally, other members of the Executive Board of the ECB	• Usually once a month. • Twice-yearly informal meetings, national central banks, the ECB and the European Commission are invited. • Various sub-structures, Committee of Permanent Representatives (COREPER) and working groups.	The ECOFIN Council is one of the compositions of the EU Council. Generally, the EU Council is the main legislator at the European level, in many cases in co-decision with the European Parliament.	**EU Council (ECOFIN)**
President and Vice-President, or, exceptionally, other Executive Board members	• Usually once a month, before the ECOFIN meetings.	The Eurogroup is an informal entity which was established on the basis of a Resolution of the 1997 Luxembourg European Council. The Eurogroup has no legal basis in the Treaty and has, as such, no legislative powers.	**Eurogroup**
Vice-President, and a member of the Executive Board; two senior staff members act as alternates.	• Usually once a month. • Sub-structures include committee of alternates and various working groups (e.g. Financial Experts Group; Working Group on EU Government Bonds and Bills; Working Group on Statistics; Euro-Coins Subcommittee) which meet to prepare EFC meetings.	Successor to the Monetary Committee (established 1958). Provides the main framework within which the dialogue between the EU Council and the ECB can be prepared and continued at the level of senior officials from ministries, national central banks, the European Commission and the ECB.	**Economic and Financial Committee**
3 ECB staff members	• Usually once a month. • Various subgroups (e.g. a working group on structural reform indicators) meet to prepare EPC meetings.	Work focuses mainly on structural issues. Organises an annual in-depth review of structural reforms in the Member States; the resulting Annual Report on Structural Reforms feeds into the elaboration of the Broad Economic Policy Guidelines.	**Economic Policy Committee**
President or Vice-President and one accompanying person	• Twice a year (spring and autumn). • The Macroeconomic Dialogue at the technical level prepares meetings at the political level. • A steering committee provides support.	The Macroeconomic Dialogue is otherwise known as the "Cologne process". It forms part of the European Employment Pact and is intended to complement the "Luxembourg process" (employment policy strategy) and the "Cardiff process" (reform of capital and product markets).	**Macroeconomic Dialogue**

Source: ECB (2000), The ECB's relations with institutions and bodies of the European Community, in: Monthly Bulletin October, pp. 63.

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ECB POLITICAL INVOLVEMENT WITH EU INSTITUTIONS

The ECB has a variety of political involvements with institutions and bodies of the Community. Such an involvement is based, on the one hand, on its statutory obligations, since the Treaty itself provides for a number of forms of interaction between the ECB and other policy-makers of the EU, ranging from consultation to policy dialogue and regulatory competences. On the other hand, the ECB's relations with the institutions and bodies of the Community are motivated on functional grounds, in that contacts with other policy-makers contribute towards the proper fulfilment of the ECB's functions and tasks.

At the same time, the specific institutional status of the ESCB and the ECB, notably their independent status and primary objective of maintaining price stability, are expected to set clear parameters for the degree of any such involvement. Figures 1.1 and 1.2 provide an overview about the manifold involvements of the ECB with EU institutions. Taken as a whole, the involvement of the ECB with EU institutions, especially those of high-ranking ECB decision makers, appears to be relatively broad based.

1.3 Identifying risks to political independence

Looking at the more recent past, there were a number of developments which could suggest a growing disrespect for the (very pillars of the) political independence status of the ECB. Any violation of these pillars could, if left unattended, weaken the bank's ability to deliver stable money going forward. In what follows, we will note some of these challenges.

CHALLENGES

Lack of structural reforms. An ongoing lack of structural reforms, accompanied by lacklustre output and employment gains, would most likely provoke calls for a policy of easy money. In fact, ongoing high unemployment and disappointing income gains could even erode the consensus for having a price stability oriented monetary policy in the euro area: hoped for output gains from an expansionary monetary policy might supersede the currently prevailing consensus that inflation has to be avoided, as it is a societal evil.

CALLS FOR POLICY COORDINATION. In April 2006, Jean Claude Juncker and EU Commissioner Joachim Almunia wrote a letter to ECB President Jean-Claude Trichet, demanding frequent meetings with the openly declared objective of seeking an ex ante coordination between fiscal and monetary policy (FAZ, 12 June 2006, p. 2). There should be little doubt that such a coordination would, if put into practice, be as-

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sociated with the risk of undermining the political independence of the ECB

Under such an arrangement the ECB would most likely be asked to deliver a *growth supporting policy*, that is lowering rates against the fiscal authorities' promise of reigning in government spending. However, do fiscal authorities really have an incentive to deliver on such a promise after the central bank has lowered rates? Without a binding pre-commitment on the part of fiscal authorities it would actually be naive on the part of the central bank to enter such a trade: the teachings of *time-inconsistency* would strongly argue against it (see box below).

In addition, it is highly questionable as to whether monetary policy would actually be in a position to exert a systematic impact on growth and employment – that is benefit growth and employment other than by safeguarding the value of the currency. Having said, it has to be welcomed that ECB President Trichet, in the June 2006 ECB Press conference and also before the EU Parliament, openly rejected Mr Juncker's calls for closer coordination between ECB policy and other policy fields of the EU.

To co-operate or not to co-operate?

The pros and cons of co-operation between monetary and fiscal policy is nowadays examined by taking recourse to game theory.[6] Here it can be shown that, under specific conditions, co-operative solutions lead to better outcomes for all players. The absence of co-operation, in turn, may lead to struggles and inconsistent policies.[7]

Co-operative games can take place if players are able to commit themselves to binding agreements before executing their strategies. However, co-operative games are difficult to implement between monetary and fiscal authorities, especially so if the latter are independent and might not be willing to pre-commit to politically unfavourable policies.[8]

The literature has also analysed pre-commitment strategies that may enable to safeguard independence while allowing for co-operation. One element of this strategy is to attribute clear objectives to monetary and fis-

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[6] For an overview, see, for instance, Blackburn, K., Christensen, M. (1989), Monetary Policy and Policy Credibility: Theories and Evidence, in: Journal of Economic Literature, Vol. 27, pp. 1 – 45.

[7] See Blinder, A. (1982), Issues in the Coordination of Monetary and Fiscal Policies, NBER Working Paper, No. 982. For problems of co-ordination, see Sargent, T., Wallace, R. (1981), Some Unpleasant Monetarist Arithmetics, in: Federal Reserve Bank of Minneapolis Review, Vol. 5, No. 3, pp. 1 – 17 for the implications on the consistency of policies.

[8] See Persson, T., Tabellini G. (1995), Double-Edged Incentives: Institutions and PolicyCoordination, in: Grossman G., Rogoff K. (eds.), Handbook of International Economics Vol. III (Amsterdam, North Holland).

cal authorities. Price stability is generally assumed to be the primary objective of monetary policy. However, it is much more difficult to devise a comparably clear objective for fiscal authorities.

Perhaps most importantly in this context, most studies assume that there is a *well-meaning government*, made up of politicians who are assumed to pursue the objective of *maximising public welfare*. In practice, however, isn't it more reasonable to characterize politicians, especially those who are subject to the *re-election restriction*, as *individual vote maximizers*? Taking such a starting point, most of the claims put forward in favour of improved cooperation between monetary and fiscal policy would no longer be convincing from a welfare enhancing point of view.

What is more, the theoretical work about optimizing monetary and fiscal cooperation usually assumes that monetary policy can exert a *systematic impact* on growth and employment. However, there are also plenty of other theoretical considerations which would argue in the opposite. Take, for instance, Robert E. Lucas model of the ineffectiveness of monetary (and fiscal) policy under rational expectations. Here, policies do not have any systematic impact on the real economy.

REPEATED CALLS FOR COOPERATION, *REPEATED* REJECTIONS. Ongoing calls for policy coordination, however, might become particularly problematic for the ECB (especially from a presentational point of view). Calls for policy coordination might be perceived in public as a well-intentioned attempt to improve macroeconomic policies. As a result, repeated rejections of such proposals by the ECB might arouse the impression that the central bank would deliberately resist a growth-friendly policy. This could, over time, undermine public support for an independent central bank – especially when output and employment gains remain disappointing.

CALLS FOR CHANGING THE ECB OBJECTIVE. On various occasions, (leading) politicians from euro area countries have been calling for changing the ECB's primary objective, that is maintaining price stability. For instance, the French politician Nicolas Sarkozy represents a case in point (FAZ, 24 June 2006, p. 14).

By doing so, the ECB's objective of price stability is cast as being an end in itself (*final target*) rather than a means to an end (*intermediate target*): as many studies show, low and stable inflation make a positive contribution to the functioning of the price mechanism, thereby allowing an efficient allocation of scarce resources which, in turn, support investment, growth and employment. So it would actually be counterproductive if the public at large would perceive the price stability mandate as running counter to the growth and employment objective.

ATTEMPTS FOR CHANGING THE ECB STATUS IN THE EU CONSTITUTION. The Treaty establishing a Constitution for Europe (European

Constitution) was agreed upon by the Heads of State or Government of the European Union (EU) during their meeting of 17 to 18 June 2004 in Brussels. In its first draft, price stability did not rank among the policy objectives of the EU (but was merely stated as an objective of the ECB). Only after strong criticism – especially from the Deutsche Bundesbank – the draft was amended accordingly. The incident may be taken as an indication that the independence status of the ECB might not always and everywhere be accepted.

WATERING DOWN THE EUROPEAN STABILITY AND GROWTH PACT. The Stability and Growth Pact, which was adopted in 1997, sought to strengthen fiscal discipline. In November 2003, the ECOFIN Council decided not to act upon the EU Commission recommendations to move to the next steps of the Early Deficit Procedure (EDP) for France and Germany and instead adopted "conclusions" putting the procedures in abeyance subject to certain undertakings by the countries concerned.[9] The deterioration of budgetary positions in recent years and the increasing reluctance to follow agreed rules and procedures eroded confidence in the EU fiscal framework and intensified criticisms of the SGP that have been voiced ever since its inception.

In addition to the *external challenges* noted above, the ECB itself may have taken a decision that might, over the medium- to long-run, weaken its independence status.

DOWNGRADING THE MONETARY PILLAR. In its strategy review on 8 May 2003, the ECB de facto downgraded the role of money in its strategy by making it a mere *information variable* rather than preserving it as an *indicator variable* of its policy strategy. In this context it should be noted that a prominent role for money serves a number of purposes.

Firstly, it contributes to the stabilisation of market agents' expectations as the central bank's reaction function becomes more transparent. Secondly, the central bank can signal to wage negotiation partners the amount of money it is willing to provide, thereby setting a strict limit for the funding of nominal wage increases through monetary policy. Thirdly, the pre-announcement of money growth enhances the accountability of monetary policy. And fourthly, a prominent role for money would provide the ECB with a *shield against political pressure* to trade off price stability against growth.

Without having established credit and money supply as key variables for a central bank's interest rate policy, there is not only the risk that *policy mistakes* might lead to inflation. On top of that, it might become increasingly difficult for monetary policy makers to reject political calls for an easier monetary policy – especially in periods in which there is a growing

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[9] For an overview about the reform of the SGP, see ECB (2005), The reform of the stability and growth pact, in: Monthly Bulletin August, pp. 59 – 73.

public willingness – motivated by populist short-term/short-sighted views – to trade off stable money against higher growth and employment.

CONCLUSIONS AND RECOMMENDATIONS

Looking at its track record, government controlled money can hardly be called a success story; only in recent years has worldwide (consumer price) inflation declined to more acceptable levels (see Figure 1.3.1). So it is certainly justified that in his work *Denationalization of Money*, Friedrich August von Hayek reminds the reader that the history of government controlled money is indeed one of relentless falsehood and fraud.[10]

Figure 1.3.1. – Consumer price inflation (% y/y)
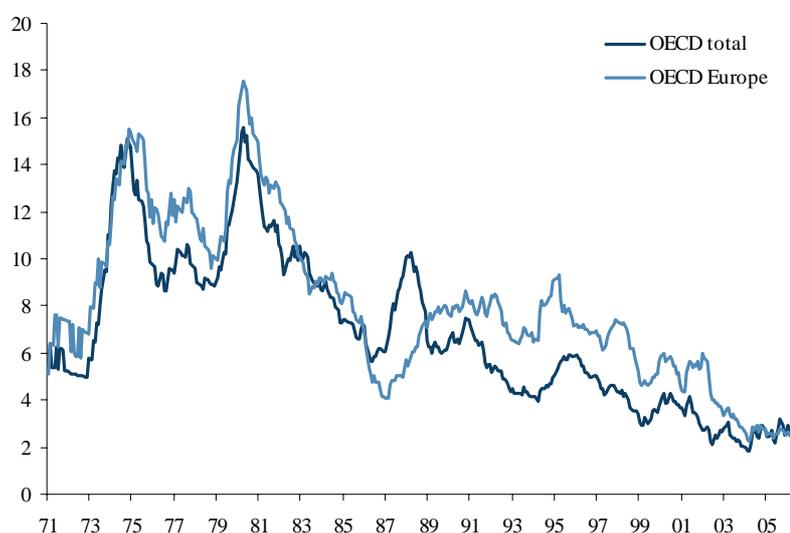
Source: OECB (via Bloomberg); own calculations. – Period: January 1971 to August 2006.

In view of the risks associated with today's government run paper money standard, Milton Friedman wrote: "(…) a world monetary system has emerged that has no historical precedent: a system in which every major currency in the world is, directly or indirectly, on an irredeemable paper money stand – directly, if the exchange the exchange rate of the currency is flexible though possibly manipulated; indirectly, if the currency is unified with another fiat-based currency (…). The ultimate consequences of this development are shrouded in uncertainty."[11]

Given the rather costly inflationary experience with government controlled money, and, in particular, the ongoing conflict between stable

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[10] Hayek, F. A. von (1977), Entnationalisierung des Geldes, Tübingen, Verlag J. C. B. Mohr (Paul Siebeck), pp. 11 – 12.

[11] Friedman, M. (1992), Money Mischief, Episodes in Monetary History, San Diego, New York, London, p. 249.

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money and governments' short-term interests, central bank independence seems to be an important ingredient for a credible monetary framework. As long as there is no other institutional arrangement available, which might solve inflation bias satisfactorily, it appears prudent to appreciate and preserve the concept of central bank independence.

That said, it appears to be productive to unmask, even at an early stage, any attempts which might compromise the independence status of the ECB. This can be best be done by, as we think, open public discourse. In this sense, William Poole notes: "*We should not, however, take that fact* [central bank independence, the authors] *as reason to assume that the issue is settled. We are bound to face stresses in the future when many will question these principles. Stating them now, defending them and explaining them, is our best hope for improving public understanding and maintaining the progress of recent years that is so evident to all central banks and students of central banking.*"[12]

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[12] Poole, W. (2002), Institutions for Stable Prices: How to Design an Optimal Central Bank, First Conference of the Monetary Stability Foundation
at the Regional Office of the Deutsche Bundesbank, December 2
(http://stlouisfed.org/news/speeches/2002/12_05_02.html).

PART 2
Monetary policy and structural reforms

CONTENT: *2.1 Monetary policy autonomy and structural reforms – the underlying theory – 2.2 Extension to the open economy – 2.3 Empirical analysis and policy conclusions*

SUMMARY: *What role does monetary policy play for structural reform in open economies? Empirical estimations were performed with panel data for 23 OECD countries from 1970 to 2000. Structural reform was measured by the Economic Freedom of the World index, whereas the monetary policy constraints were measured by a monetary commitment index and the prevailing exchange rate regime. – Our results provide little evidence to the hypothesis that monetary autonomy promotes structural reform and economic freedom. The results also strongly argue against those views maintaining that a discretionary and lax monetary policy has never and nowhere been detrimental for employment. Our results actually show that a discretionary monetary policy tends to lead to a lower degree of structural labor market reforms and, hence, to lower employment. Against this backdrop we would like to stress that the ECB should continue a medium- to long-term oriented approach if it wants to support growth and employment via structural reforms.*

2.1 Monetary policy autonomy and structural reforms – the underlying theory

The pressing problem of unemployment and the choice of the appropriate monetary policy strategy are crucial challenges in current academic and political debates. Although both issues are usually connected in the public discussions the academic discourse had neglected, until the mid-nineties, to provide rational arguments for such an interrelation. Until then, the incentives and disincentives for labor, product and financial market reforms on the one side and the benefits and costs of monetary policy rules on the other side had typically been analyzed in isolation.[13]

The pros and cons of different monetary policy strategies are usually investigated in the framework of Barro and Gordon (1983, 1983a) and Kydland and Prescott (1977). Both contributions focus on the time inconsistency of discretionary monetary policy (which presupposes monetary policy autonomy) and compare the efficiency of alternative monetary policy rules with the potential losses due to the inflexibility of rules under exogenous shocks. As possible solutions to the trade-off

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[13] The contents of this chapter heavily relies on Belke, Herz and Vogel (2006).

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between the time-inconsistency problem of discretionary monetary policy and the inflexibility of rule-based monetary policy, various rules have been proposed. Prominent examples of such limitations of policy autonomy are feedback-rules in connection with distinct commitment technologies, e.g. the independence of central banks or incentive schemes for central bankers (Walsh, 1995; Persson and Tabellini, 1993; Svensson, 1997).

However, the first-best solution to the time-inconsistency problem is to remove labor market rigidities, the fundamental cause of high structural unemployment (Svensson, 1997: 104, 109; Duval and Elmeskov, 2005: 5).[14] Yet, such a proposal could be regarded as rather naive from a public choice perspective, which emphasizes that labor market institutions, as an outcome of rational political choice, have to be implemented in the loss function of politicians. In this chapter, we argue that the design of labor market institutions can be interpreted as the result of utility maximizing political decisions. Therefore, it appears useful to augment the time-inconsistency models by an explicit consideration of labor market reforms.

Cross-country event studies are one way to empirically examine the impact of monetary policy strategies on the degree of economic reform in general. This approach has produced contradicting results, however. The U.S., e.g., are a monetary union with labor market institutions that encourage a low natural rate of unemployment. The EMS commitment was extremely helpful in fostering the reform process in the Netherlands and Denmark. The same holds for Austria under the DM peg (Hochreiter and Tavlas, 2005). In contrast, the U.K. and New Zealand experienced extensive labor market reforms without adhering to an international exchange rate arrangement. Hence, we choose an econometric analysis for a large sample of countries (and a large variety of reforms as well). Thereby, we go beyond the EMU case studies by van Poeck and Borghijs (2001), Bertola and Boeri (2001), and IMF (2004) which are rare examples of empirical investigations in this field.

The remainder of the chapter is structured as follows. This section 2.1 discusses the main arguments concerning the relationship between monetary policy autonomy and labor market reforms in open economies. Section 2.2 extends the analysis to an open economy framework. Finally, we also obtain testable hypotheses concerning the impact of monetary commitment in general and, more specifically, exchange rate flexibility on

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[14] OECD (2005) applies a consistent procedure to derive policy priorities to foster growth across OECD countries and identifies labor market reforms as being particularly important in, e.g., the Euro area. However, this does not at all imply that reforms in other areas are unimportant. Hence, we analyze a variety of different reform measures in the empirical part.

reforms in general, i.e. beyond pure labor market reforms. Panel estimates of the relationship between the degree of monetary commitment or the exchange rate regime and the degree of reforms in different areas are presented in section 2.3. The regressions include a set of additional variables and extensive robustness checks. Section 2.3 also contains our policy conclusions.

The discussion of the relation between the degree of monetary policy autonomy and structural reforms is characterized by a wide spectrum of conflicting views. A number of theoretical chapters investigate whether monetary commitments tend to strengthen or reduce the degree of reforms. Importantly, most of these arguments are derived from reforms of the labor market. We start with a sketch of the literature on monetary policy autonomy and reforms and refer to a prominent example of the loss of monetary autonomy, i.e. the irrevocable fixing of exchange rates under European Monetary Union (EMU). In the run-up to EMU a number of studies tried to assess the incentive effects of alternative monetary policy strategies on labor market reforms.

According to the proponents of a liberal view, EMU, as a classical variant of a rule-based monetary policy, should have a disciplinary impact on national labor markets (Duval and Elmeskov, 2005; Hochreiter and Tavlas, 2005). In the first place, EMU enhances the credibility of monetary policy and thereby lowers inflation expectations. Negative employment effects as a result of (too) high wage claims can no longer be accommodated by discretionary monetary policy. The responsibility of wage setters for unemployment increases significantly, because they no longer negotiate nominal but *real* wages. The responsibility for unemployment is more transparently assigned to the parties which negotiate the relative price of labor. In contrast, autonomous discretionary monetary policy makes it more difficult to remove market rigidities because there is still the option to solve or at least to shift the unemployment problem onto third parties. i.e. to *an expansionary monetary policy*.

Insofar as the single currency increases transparency, the costs of structural rigidities, as reflected in relative prices, become more evident. Lower trading costs and higher transparency jointly tend to foster competition in goods markets, which in turn reduces the available product market rents. If these rents are smaller, the incentives to resist reforms that prevent such rents to be captured are smaller as well. Overall, the incentives for extensive reforms of labor, goods, and capital markets increase under a regime of irrevocably fixed exchange rates (Alogoskoufis, 1994, Calmfors, 1997, Duval and Elmeskov, 2005: 6, Mélitz, 1997, and Sibert and Sutherland, 1997). If changes in monetary policy and the nominal exchange rate are not available, and if

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labor is immobile as is the case in most parts of the Euro area, there is no other option than to undertake reforms in order to facilitate the market-based adjustment to shocks. Hence, credible currency pegging has often been interpreted as a version of Mrs. Thatcher's There-Is-No-Alternative (TINA) strategy (Bean, 1998; Calmfors, 1998: 28; Saint-Paul and Bentolila, 2000). We intend to extend this TINA argument to countries beyond the narrow focus of the Euro area, which is what e.g. Duval and Elmeskov (2005) concentrate on.

However, there are also important arguments against a positive impact of monetary rules on economic reform. First, based on OECD macro model simulations it was often argued with respect to EMU that the so-called up-front costs of structural of labor market reforms may be larger within a currency union. This holds especially in large, relatively closed countries for which a real depreciation via lower inflation is not so effective in alleviating the necessary "crowding-in" effect. Removing restrictions in financial markets tend to stimulate demand more than labor market reforms and hence allow an easier and quicker "crowding-in" of reforms (Bean, 1998, Duval and Elmeskov, 2005: 10-12, Saint-Paul and Bentolila, 2000). Hence, the prior in this case would be that rule-based monetary policy regimes like, e.g., EMU, lead to more reforms in the financial market than in the labor market.

Second, Calmfors (1997) and Sibert and Sutherland (1997) argue that one should not expect from monetary policy with its mainly short-run real economy effects to diminish structural unemployment significantly. Hence, rule-based monetary policy does not necessarily imply more labor market reform pressure. In the same line, empirical analysis indicates that the capability of exchange rates to absorb asymmetric shocks to labor and goods markets is rather low. Hence, flexibility of exchange rates does not seem to be a good substitute for reforms and, hence, the degree of reforms is not necessarily higher under fixed exchange rates (Belke and Gros, 1999).

Third, some analysts support the view that rule-based monetary policy, at least if it takes effect through entering a fixed exchange rate regime, has no disciplinary effects on the wage setting process, but leads to centralization processes and a higher wage claims on the part of unions. Fourth, the limited evidence of price structure convergence for instance among core-EMS countries as compared with other countries speaks against any significant impact of credible exchange rate stabilization on product market competition. Hence, there are still product market rents to be captured and there will still be resistance to reforms (Haffner et al., 2000).

Fifth, during the discussions about the pros and cons of EMU at the end of the nineties it was also argued that market-oriented reforms could achieve a 'double dividend' if monetary policy was discretionary

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(autonomous). As a first effect reforms reduce – like a rule-based monetary policy – the costs of structural unemployment. They also lessen equilibrium inflation since they diminish the credibility problem of discretionary monetary policy. This second effect is absent in the case of rule-based monetary policy as a rule-based monetary policy does not suffer from a credibility problem by definition (Belke and Kamp, 1999). Hence, our central question relates to the correlation between reform intensity and the degree of autonomy of monetary policy, which might be determined to a large degree by the exchange rate regime, at least if the country is small and open (Duval and Elmeskov, 2005: 9 and 23 ff.). We focus on the notion of monetary policy autonomy instead of discretion since we consider autonomy as an important prerequisite of discretionary monetary policy. In this respect, our approach strictly follows Duval and Elmeskov (2005: 25) who measure the loss of autonomy of monetary policy by the degree of participation in any kind of fixed exchange rate agreement.

The usual result of this strand of literature is that for individual member countries a fixed exchange rate rule like EMU implies a lower degree of reforms than an autonomous monetary policy, where reforms reduce both unemployment and the inflation bias. In contrast, a rule-based monetary policy inside EMU limits the benefits of reforms to a positive impact on employment. Expressed more generally, the degree of reforms is therefore higher in the case of autonomous policy (discretion) and lower in the case of commitment. We address this hypothesis the Calmfors hypothesis throughout this chapter (Calmfors, 1997, 1998; Gruener and Hefeker, 1996).

Hence, our central question relates to the correlation between reform intensity and the degree of autonomy of monetary policy, which might be determined to a large degree by the exchange rate regime, at least if the country is small and open (Duval and Elmeskov, 2005: 9 and 23 ff.). We focus on the notion of monetary policy autonomy instead of discretion since we consider autonomy as an important prerequisite of discretionary monetary policy. In this respect, our approach strictly follows Duval and Elmeskov (2005: 25) who measure the loss of autonomy of monetary policy by the degree of participation in any kind of fixed exchange rate agreement.

2.2 Extension to the open economy case

As an extension of our theoretical considerations in section 2, we include openness of the economy in particular as we ask how the exchange rate regime affects reform intensity.[15] Economic openness gen-

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[15] Belke, Herz and Vogel deal with another extension of our simple model considerations concerning the Calmfors model. It relates to our approach to not only take

erally relates to the share of exports and imports in GDP. A stronger exposure of firms to international competition is often assumed to increase the pressure and the incentives for market-oriented reforms. In open economies, output and employment tend to be highly responsive to price competitiveness and, hence, incentives to undertake reforms are large (see, e.g., Katzenstein, 1985, and Nickell, 2005: 2-3).

However, empirical evidence is not especially supportive of the view that open economies are more likely to liberalize. Although Pitlik and Wirth (2003) report a positive impact of economic openness on market-oriented reforms, Herz and Vogel (2005) and Pitlik (2004) do not find robust significant coefficients of economic openness for their summary reform indicator. Only for trade policy there is a positive effect of economic openness on liberalization.

Section 2.1 indicates a possible solution to this finding. The key insight is that more open economies are more likely to implement rule-based exchange rate stabilization and, hence, generally implement less reform. Table 1 illustrates this empirical relation between economic openness and exchange rate policy. Exchange rate flexibility is measured on a scale from 1 (hard peg) to 4 (free float). The average and median statistics indicate that less open economies tend to have relatively flexible exchange rate regimes, whereas very open economies tend to favor currency pegs.

Table 1. – Economic openness and exchange rate regimes 1970-2000

Degree of openness (Trade/GDP)	Average	Median	Observations
< 0.25	2.65	2.93	60
0.25 – 0.75	2.27	2	471
0.75 – 1.25	1.98	2	200
> 1.25	1.51	1	59

Sources: The data on the exchange rate flexibility are taken from Reinhart und Rogoff (2002). We measure economic openness as the sum of exports plus imports relative to GDP. The data are extracted from the World Development Indicators Database (World Bank 2002).

As we use the term monetary policy rule in a general fashion, i.e. that it comprises both monetary and exchange rate policy, we equate flexible exchange rates with the case of autonomous and discretionary monetary policy and use the notion of a fixed exchange rate system in cases which we originally addressed as rule-based monetary policy. But is this generalization legitimate, i.e. to interpret our model also in terms of exchange rate regimes instead of monetary policy regimes?

As a stylized fact, the amount of money in an open economy is not determined autonomously by the central bank but is determined

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into account labor market reforms but also to include liberalizations in other policy fields.

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endogenously by the exchange rate regime (see, e.g., Annett, 1993: 25; Krugman and Obstfeld, 2003, chapters 16 and 17). From early political business cycle research it is well-known that especially in the case of small open economies there is little evidence of rational partisan cycles in the sense of high and increasing inflation under left-wing governments and low and diminishing inflation rates under right-wing regimes.[16] The standard literature generally traces the absence of partisan cycles back to the fact that small open economies tend to have fixed exchange rates which limits the ability to exert an ideologically motivated impact on inflation.[17]

Empirical studies of the rational partisan theory clearly show that left-wing governments are more likely to experience inflation, capital flight, current account deficits and currency devaluation.[18] Hence, we feel justified to equate a flexible exchange rate system with a regime of autonomous and discretionary monetary policy and a system of fixed exchange rates with a rule-based monetary policy regime. From this point of view, our previous arguments that have been elaborated for the concepts 'rule-based versus discretionary monetary policy' can be transferred to 'fixed versus flexible exchange rate systems' and be tested empirically in a straightforward fashion.

2.3 Empirical analysis and policy conclusions

HYPOTHESES

The following section investigates the existence of a significant empirical correlation between monetary commitment and market liberalization conditional on the additional impact factors, such as the macroeconomic environment and political or institutional restrictions to economic reform. Hence, we test for a significant coefficient of monetary commitment in regressions using reform indices as the dependent variable. From the preceding sections, we can derive the following hypotheses:

(1) If the view of an excessive intensity of reforms under monetary policy autonomy holds, labor market reforms will be stronger under higher monetary discretion, net of other factors.

(2) If the TINA-view of monetary commitment as a hard constraint is valid, one should expect the contrary, however. In this case mone-

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[16] See Alesina (1992: 13-14), Alesina and Roubini (1992: 680) and Annett (1993: 25 and 42).

[17] See Alogoskoufis, Lockwood and Philippopoulos (1992: 1384) and Ellis and Thoma (1990: 17 and 24).

[18] See Simmons (1994: 59), Ellis and Thoma (1990) estimate rational partisan theory approaches for open economies. In their study, party-specific inflation rates lead to party specific differences in exchange rate movements.

tary discretion negatively affects the degree of labor market re-
forms, net of other factors. According to the preceding sections,
this should be valid not only for labor market reforms but also for
complementary reforms in the goods and the financial markets
and, hence, in this sense also for a broader reform index. As stated
above, the latter comprises the major areas: i) money and banking
system, ii) government size, iii) freedom to trade, iv) market regu-
lation and v) labor-market regulation.

(3) If third factors dominate the relationship, monetary commitment
should have little effect on reforms, monetary commitment should
have little effect on reforms.

DATA AND DEFINITIONS
We estimate and test the conjectured impact of monetary com-
mitment on the degree of market-oriented reforms based on a panel of
23 OECD economies for the period 1970 to 2000.[19] Restricting our
empirical analysis to this group of countries ensures a relatively homo-
geneous institutional setup. As dependent variable we use the extent of
economic liberalization as measured by the Economic Freedom of the
World (EFW) index and the sub-indices *money and banking system, freedom
to trade, government size* and *labor market, credit and business regulation,* re-
spectively (Gwartney and Lawson 2003, Gwartney et al. 2003).

The empirical realizations of these indices range from one to ten,
with a high value corresponding to a high level of economic freedom.
The EFW index and the sub-indices are available in five-year intervals
over the period 1970-2000.[20] An increase in the index value indicates a
market-oriented reform. Hence, we use wider reform indicators and a
wider time span than Duval and Elmeskov (2005), who investigate data
from five policy areas: unemployment benefit systems, labor taxes, em-
ployment protection legislation, product market regulation and retire-
ment schemes.

Among the explaining variables, our discussion focuses on the
measure of monetary commitment (MC). Monetary commitment is ap-

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[19] The 23 OECD economies correspond to the category high-income industrialized
countries in the World Development Indicators database (World Bank, 2002) and
cover Australia, Canada, the former EU-15, Iceland, Japan, New Zealand, Norway,
Switzerland and the United States.
[20] We use the chain-weighted EFW index (Gwartney et al., 2003), which corrects
for the limited availability of some components over time. Such chain-linked cor-
rection is only available for the summary indicator, however. For the sub-areas
money and banking system, government size, freedom to trade, market regulation
and labor-market regulation, we have to rely on uncorrected data instead. Missing
data for indicator elements may distort the value of the sectoral indicators and dis-
tort the accuracy of these measures of economic reform.

proximated by the Freytag (2005) indicator. The MC indicator is a composed index, restricted to values between 0 and 1. Higher values indicate a stronger monetary commitment. MC consists of ten criteria such as the central bank's personal and political independence, the importance of price stability as an objective, and lending restrictions for the central bank (Freytag 2001, pp. 186-193). The index is calculated as the non-weighted average of these criteria and comparable to Cukierman's (1992, p. 381) indicator of central bank independence. In contrast to the latter, however, the variable MC includes information about external relations like the submission to an exchange-rate target, which appears quite appropriate in our open economy context (Freytag 2001).

There are two theoretical reasons for these extensions: first, with a political decision about the exchange rate regime, especially in the case of a currency peg, governments are able to counter the central bank's monetary policy – thereby seriously questioning central bank independence. Second, if monetary reforms are backed by an exchange rate peg as a nominal anchor; external aspects become constitutive elements of the new monetary commitment. The indicator is available for a set of high income countries only, which basically coincides with the 23 high-income OECD economies and also motivates our restriction to this country sample. The data are available at decennial frequency only.

As an alternative proxy to account for monetary commitment we use exchange rate flexibility (EXR) in our robustness checks. While the MC indicator includes legal aspects of the exchange rate regime and their impact on monetary commitment, it does not account for the de facto implementation of the exchange rate regime. As the de jure and de facto exchange rate regime of a country may considerably differ, we employ the Reinhart and Rogoff (2002) index of *de facto* exchange rate arrangements.[21] Reinhart and Rogoff (2002) distinguish between exchange rate pegs (1), limited flexibility (2), managed floating (3), and freely floating (4).[22] Thus, the index value increases in the *de facto* exchange rate flexibility. For our purpose and due to the time structure of the EFW data, we average the Reinhart and Rogoff (2002) index values over ten-year intervals. Note that the monetary commitment indicator MC and our measure of exchange rate flexibility both measure monetary policy autonomy, but on an inverse scale.

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[21] The de facto measure improves on the de jure classification of IMF (2003) since it takes into account that de jure exchange rate regimes are not necessarily applied in practice. This has especially been the case in developing countries but also in industrialized countries. Austria, e.g., had a de facto fixed exchange rate regime vis-à-vis Germany for a long time without being a formal member of the exchange rate mechanism of the EMS. See Hochreiter and Tavlas (2005).

[22] Reinhart and Rogoff (2002) include freely falling rates as an additional category. We add the cases of freely falling rates to the free-float category, however.

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The additional control variables that we consider include inflation, economic growth, real per capita GDP and openness as proxies of the pressure to reform. Data are available from the World Development Indicators database (World Bank, 2002). Economic openness is defined as exports plus imports relative to GDP. To account for the potential endogeneity and in accordance with other contributions (e.g., Herz and Vogel, 2005; Lora 2000; Pitlik 2004; Pitlik and Wirth, 2003), we use these variables in first lags.

A final set of controls accounts for political and institutional barriers to policy reforms. Here we include POLCON5 and the number of government changes. POLCON5 (Henisz, 2000, 2002) measures the effective political restrictions on executive behavior. It accounts for the veto powers of the executive, two legislative chambers, the subnational entities and an independent judiciary. The index ranges from zero to one, where a higher value indicates stronger political constraints on the government. Given the time structure of our dependent variable, we take average values of POLCON5 for the respective decade. If political constraints and economic reforms were negatively correlated, we should obtain a significant negative coefficient on POLCON5.[23]

GOVCHANGES counts the number of government changes in each period that entail a significant programmatic reorientation. The data are taken from Beck et al. (2001). One could argue that frequent changes shorten the administration's time horizon and cause a stronger discounting of positive future payoffs. If frequent government changes decreased the credibility and reliability of economic policy and the government's decisiveness to reform, we should expect a significant negative coefficient for GOVCHANGES.

2.3.3 Empirical model and results

EMPIRICAL MODEL

To empirically analyze the role of monetary commitment, economic crisis, and political as well as institutional features for economic reform we estimate the equation

$$\Delta EFW_{it} = \alpha_0 + \alpha_1 EFW_{i,t-1} + \alpha_2 MC_{it} + \alpha_3 ' X_{i,t-1} + \alpha_4 ' Y_{it} + \eta_i + \lambda_t + \varepsilon_{it} \text{,}$$

where ΔEFW represents our index of reforms, i.e. the change in economic freedom, or the respective sub-indices. MC is our measure of

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[23] Note that the political constraints may restrict changes in either direction, however. They may limit both liberalization and the restriction of economic freedom. Further evidence may be derived from an interaction between political constraints and the government's programmatic orientation. This extension is beyond the focus

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monetary commitment, X is the vector of macroeconomic variables (growth, inflation, openness, per-capita GDP), Y captures the political and institutional impact on the capacity to reform, and i is a country index. Most importantly and in accordance with the Calmfors perspective on labor market reform, we expect $\alpha_2 < 0$ for MC, and $\alpha_2 > 0$ under the EXR indicator, if monetary commitment and structural reforms were substitutes. The TINA-view should give the contrary, namely the inequalities $\alpha_2 > 0$ for MC and $\alpha_2 < 0$ for EXR.

We add time-specific effects (λ_2) to account for unobserved heterogeneity across time. The short time dimension of our sample complicates the use of country fixed effects. As there are three observations available per country at best, any estimate of individual effects would be very imprecise, and the insertion of country dummies would significantly reduce the degrees of freedom in the estimation. For this reason we do not include country dummies in our regression.

The empirical model includes the lagged dependent variable among the regressors, which biases OLS estimates. In a first step we apply the GLS estimator that allows estimation in the presence of both heteroskedasticity and first-order residual autocorrelation (Baltagi, 1995; Hsiao, 2003). Secondly, we present GMM system estimates (Arellano and Bover 1995, Blundell and Bond 1998). We report the one-step estimates with robust standard error, which are to be preferred with potentially heteroskedastic error terms (Arellano and Bond 1991).[24]

EMPIRICAL MODEL

This section presents the regression results for our sample of OECD economies. We report the regression results for *overall liberalization, money and banking system, government size, freedom to trade, market regulation* and the sub-index *labor-market regulation* as dependent variables. Table 2 displays the GLS panel estimates.

- Table 2 and 3 about here -

With the exception of overall market regulation, the initial level of economic freedom has a significant negative impact on the extent of subsequent market-oriented reforms in the GLS estimates. Higher initial levels of economic freedom reduce the scope and the need for fur-

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of this chapter, however. Herz and Vogel (2005) and Pitlik (2004) provide an in-depth discussion of the impact of political constraints.

[24] The Sargan test for instrument validity is taken from the two-step estimates, however, because the one-step statistics tends to over-reject the test in the presence of heteroskedasticity (Arellano and Bond 1991).

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ther liberalization. They indicate lower problem pressure. The negative coefficient values also indicate a conditional convergence in economic policy (Duval and Elmeskov, 2005: 23 ff.). The finding, however, weakens if we turn to the GMM estimates in Table 3.

The chapter's main focus is on the correlation of monetary commitment with market-oriented reforms. The GLS results indicate a negative correlation between monetary commitment and *money and banking sector* reform and a positive correlation between monetary commitment and labor-market reform. GMM estimation obtains a significantly positive commitment coefficient for labor-market and overall regulatory reform. Monetary commitment seems to be uncorrelated with trade policy, government size and the overall measure of economic freedom.

The negative GLS coefficient estimate for the impact of monetary commitment on money and banking sector reform may parallel the negative impact of the lagged dependent variable. Monetary commitment and sound money may be close proxies, in fact. Consequently, a high level of commitment may indicate little need for monetary reform and thus may explain the negative impact. More interesting in the light of the Calmfors hypothesis is the positive estimated relation between monetary commitment and both overall regulatory and labor-market reform. Although the Calmfors hypothesis essentially targets labor-market reforms, the estimate does not support its basic conclusion. We find no evidence for a negative impact of commitment on labor-market reform. Instead, both policies seem to be complements. This result supports the TINA-view of monetary commitment as a hard constraint.

Most of the control variables are insignificant in most cases. If anything, political constraints (POLCON) have a positive rather than a negative impact on economic reform. We find significant positive coefficients of POLCON for government size and trade liberalization. The results are compatible with the estimates of Pitlik (2004) for a larger and more diverse country sample and in line with his interpretation of political constraints as a commitment device. They may furthermore reflect the fact that constraints also tend to reduce the reversibility of reforms. The coefficient estimates for the number of government changes, which could be interpreted as an indicator for credibility and political commitment, are largely insignificant – a result which contrasts Herz and Vogel (2005) and Pitlik (2004) for larger country samples and shorter time intervals.

The macroeconomic control variables play a limited role in our regressions. High inflation which could indicate a greater need for reform has a robust and positive impact on overall economic liberalization and the fiscal sector and is also significantly positive in the GMM estimates

for market regulation. The result is qualitatively in line with Drazen and Easterly (2001) and Pitlik and Wirth (2003). However, one should bear in mind that both studies consider more severe crises in their broader country sample. Our results indicate that in OECD countries smaller increases in inflation suffice to trigger structural reforms than in low and middle income countries.[25] Higher growth as an indicator of either the ability to reform or the lack of pressure has a positive impact on money and banking system reform and a negative one on government size. The latter result coincides with the critical view that governments tend to react to fiscal pressure, but do not use good times for public sector consolidation.

The estimates for economic openness are generally insignificant. The same holds for per-capita GDP, except in the GLS estimate for monetary and banking reform. The insignificance of economic openness does not support the hypothesis that the exposure to world markets increases the pressure for liberalization and that it leads to stronger market-oriented reforms. The time dummies are significant in most cases and indicate that, on average, monetary sector reform was especially pronounced during the 1980s and that overall, government size, trade-policy and regulatory reform were particularly prevalent during the 1990s.

Taken together, the estimates do not support the hypothesis that monetary discretion promotes structural reforms and that monetary commitment and reforms are substitutes, net of other factors. In contrast, there is evidence for the TINA hypothesis in the area of market and especially labor-market regulation. Monetary commitment and structural reforms may be complements rather than substitutes in the field of regulatory reform.

ROBUSTNESS CHECKS

To check our results with respect to the key hypothesis, we apply an alternative indicator for monetary commitment, namely *exchange rate flexibility*. In an open economy, flexible exchange rates closely correspond with monetary autonomy and the feasibility of monetary discretion, whereas an exchange rate peg indicates the adoption of a monetary rule. Monetary commitment does not necessarily imply a fixed exchange rate, however. Instead, a central bank may pursue inflation or monetary targeting. As discussed above, our exchange rate indicator accounts for the realization of the de facto exchange rate regime and might therefore provide additional information to the MC indicator,

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[25] The effect is limited however. Given the estimates in Table 3, a one percentage-point inflation increase leads to 0.06 additional points on the reform index during the subsequent decade.

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which focuses on de jure aspects of monetary commitment. Hence, we check the robustness of our results by using exchange rate flexibility to account for another important aspect of monetary autonomy.

Belke, Herz and Vogel (2006) contains the detailed results of this check. We focus on the estimates for exchange-rate commitment. The control estimates are to a large degree qualitatively similar to the results in Table 3. We find a negative impact of exchange-rate flexibility on monetary and banking sector reform and on trade liberalization and a positive estimate for government size. The positive correlation between exchange rate commitment and trade liberalization coincides with the view of the exchange rate peg as an instrument to facilitate international exchanges and to fully reap the benefits of economic integration. Indeed, the complementarity between trade and exchange rate commitment was a prominent argument in favor of EMU (Emerson et al. 1992).

The negative correlation between exchange rate flexibility and *money and banking sector* reform directly points to the commitment effect of an external anchor. Pegging the exchange rate increases the credibility of the monetary authority and allows importing stability. Lower inflation expectations and inflation rates translate into a positive indicator change. A credible exchange rate commitment might also have reduced exchange rate risks leading to deeper domestic financial markets, increased competition and improved financing conditions. The positive correlation between exchange rate flexibility and government sector reform could finally result from governments being less reform-minded under flexible rates and an independent monetary policy, or from the lower costs of structural reforms under monetary accommodation that is not possible in monetary union. From the Calmfors perspective, it is important to note that the exchange rate indicator is not significant for overall regulation or labor-market reform.

Again, there is no support for a complementarity between monetary discretion and structural reform. Neither does the insignificance of the exchange rate indicator support the TINA perspective from Table 3. The exchange rate measure only captures part of the monetary commitment, and potentially not its decisive elements and its impact on structural reforms in our sample of OECD economies.

Both the sub-indicator for *money and banking sector* reform and, consequently, also the aggregate index of economic freedom contain information about lagged inflation rates. Therefore, the inclusion of lagged inflation as an explanatory variable is potentially problematic. In order to check the robustness of the estimates, we have rerun the regressions in Tables 2 and 3 (and also Table 4 in Belke, Herz and Vogel, 2006) for overall and monetary and banking reform and excluded lagged inflation as a regressor. However, this modification has no quali-

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tative impact on the estimates for monetary and exchange rate commitment. The lagged dependent variable becomes insignificant for monetary reform in Table 2, and the lagged levels of overall economic freedom and sound money are significantly negative in Table 3 and Table 4 in Belke, Herz and Vogel (2006). Political constraints are now significantly positive for overall economic freedom, and higher per-capita income seems to improve the prospect for reform. None of these changes does affect our conclusions on the complementarity or substitutability of monetary commitment and economic reforms and on the Calmfors hypothesis in particular, however.

This chapter has investigated the link between monetary policy of open economies and structural reforms. We have confronted our data set with three hypotheses: i) the (extended) Calmfors hypothesis, according to which the degree of reforms is higher in the case of autonomous policy and lower in the case of commitment, ii) the TINA hypothesis which implies a positive impact of a monetary policy rule on the extent of reforms, and iii) a third factors hypothesis: if third factors dominate the relationship, monetary commitment should turn out insignificant. Empirical estimations were performed with panel data on 23 OECD countries from 1970-2000. The structural reforms are measured by the Economic Freedom of the World index, whereas the monetary policy constraint was measured by a monetary commitment index and the exchange rate regime. Our results provide little evidence to the hypothesis that monetary autonomy promotes structural reforms and economic freedom. Instead, our estimates for regulatory and labor-market reform are strongly in favor of the TINA argument. Neither overall monetary nor exchange rate commitment affects the overall index of structural reforms, however. Exchange rate commitment and *money and banking sector* reform and exchange rate commitment and trade liberalization both appear to be complements.

Seen on the whole, we would like to stress that the ECB should not give in and enact a discretionary policy with an eye on dismal labor market performance. This would best serve to foster and to support structural reform efforts - not at least by the German Grand Coalition - in the euro area. The results also strongly argue against those maintaining that a discretionary and lax monetary policy stance has never and nowhere been detrimental for employment. Our empirical results reveal that discretionary monetary policy tends to lead to a lower degree of structural reforms and, hence, to lower employment.

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Table 2. Reforms and monetary commitment - GLS estimates with commitment indicator

	EFW	Money	Government size	Trade	Regulation	Labor market
Monetary commitment	-0.24	**-0.90***	-0.04	-0.40	0.53	**2.17****
	(-0.77)	(-1.79)	(-0.05)	(-0.62)	(1.48)	(2.41)
EFW, M, G, T, R, LM (t-1)	**-0.17***	**-0.48*****	**-0.36*****	**-0.56*****	-0.03	**-0.23****
	(-1.67)	(-5.54)	(-3.98)	(-5.19)	(-0.34)	(-2.24)
Inflation (t-1)	**2.41*****	-3.20	**4.60****	**-3.29***	**1.70****	-0.30
	(2.79)	(-1.65)	(2.37)	(-1.80)	(2.23)	(-0.08)
Growth (t-1)	0.32	**11.0****	-9.09	-6.78	-3.00	-0.47
	(0.12)	(2.17)	(-1.33)	(-1.18)	(-0.94)	(-0.06)
Openness (t-1)	-0.16	0.28	-0.65	0.32	-0.08	-0.65
	(-1.02)	(1.25)	(-1.18)	(0.89)	(-0.43)	(-0.97)
LnRGDPpc (t-1)	0.28	**1.79*****	-0.07	-0.48	-0.13	-0.18
	(1.12)	(4.37)	(-0.10)	(-0.92)	(-0.44)	(-0.18)
POLCON5	0.04	-1.42	**2.99***	2.19	0.77	1.00
	(0.06)	(-1.42)	(1.80)	(1.46)	(1.03)	(0.53)
GOVCHANGES	-0.02	-0.04	-0.06	-0.12	0.02	0.09
	(-0.29)	(-0.32)	(-0.39)	(-0.93)	(0.24)	(0.54)
Constant	-1.88	-12.5***	-0.33	7.46	0.82	1.60
	(-0.90)	(-3.69)	(-0.05)	(1.63)	(0.33)	(1.17)
D1980s	0.63***	1.35***	0.91***	0.48	-0.24	-0.10
D1990s	1.04***	1.03***	1.16***	0.95**	0.91***	-0.67
AR (1) (p-value)	0.96	0.43	0.81	0.42	0.10*	0.79
R^2	0.77	0.72	0.77	0.45	0.73	0.32
Observations	58	58	58	58	57	51

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Table 3. Reforms and monetary commitment – 1-step GMM system estimates with commitment indicator

	EFW	Money	Govern-ment size	Trade	Regula-tion	Labor market
Monetary commitment	-0.38	0.39	0.12	0.01	**0.77****	**1.59****
	(-0.73)	(0.25)	(0.13)	(0.02)	(2.29)	(2.20)
EFW, M, G, T, R, LM (t-1)	0.34	0.21	-0.18	**-0.57*****	-0.23	**-0.43****
	(0.72)	(0.26)	(-0.94)	(-4.02)	(-1.54)	(-2.38)
Inflation (t-1)	**6.00*****	16.6	**4.62*****	**-1.80***	1.20	-1.17
	(3.17)	(1.31)	(3.56)	(-1.74)	(1.44)	(-0.35)
Growth (t-1)	5.15	**23.4****	**-13.7***	-3.85	-2.30	0.10
	(1.23)	(2.28)	(-1.77)	(-0.70)	(-0.82)	(0.01)
Openness (t-1)	-0.20	-0.12	-0.61	0.17	-0.13	-1.33
	(-1.02)	(-0.21)	(-1.09)	(0.52)	(-0.51)	(-1.30)
LnRGDPpc (t-1)	-0.04	0.53	0.13	-0.38	0.02	0.37
	(-0.09)	(0.25)	(0.20)	(-0.96)	(0.06)	(0.51)
POLCON5	-1.04	0.44	**2.93*****	**2.76****	0.68	1.89
	(-0.73)	(0.18)	(2.85)	(2.55)	(1.10)	(1.13)
GOVCHANGES	0.08	**0.41***	-0.05	-0.03	0.06	-0.02
	(0.86)	(1.73)	(-0.25)	(-0.25)	(0.87)	(-0.19)
Constant	-1.97	-9.67	-3.20	5.72	0.46	-1.64
	(-0.83)	(-0.72)	(-0.46)	(1.61)	(0.13)	(-0.42)
D1980s	0.68*	0.89**	1.06***	0.40	-0.18	-0.07
D1990s	1.09***	0.83	1.14**	0.80**	0.89***	-0.67
AR (1) (p-value)	0.01***	0.01***	0.05**	0.07*	0.02**	0.49
Sargan test (p-value)	0.90	0.15	0.35	0.24	0.30	0.09*
Observations	58	58	58	58	57	51

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PART 3

A critical review of the real interest rate concept

CONTENT: *3.1 Calculating the neutral real interest rate. – 3.2 Monetary policy transmission and the interest rate. – 3.3 Consequences for monetary policy.*

SUMMARY: *The concept of the neutral (real) interest rate (NRIR) – as implied by the Taylor rule – recommends monetary policy to set the real interest rate at a level which closes, or at least smoothes, the output gap. We argue that such a policy, if put into practice, would entail substantial pitfalls. First, monetary policy is hardly in a position to influence real GDP; a systematic impact of monetary policy on long-term interest rates and GDP is hardly detectable. To make things worse, a cyclically oriented policy might provoke the well-known time-lag problem. Second, and perhaps most importantly, the NRIR concept may not be compatible with price stability, as it ignores the impact of credit and money growth on inflation. – As a result, we favour a long-term oriented monetary policy that has a strong focus on credit and money growth and asset prices. Such a monetary policy would not only be compatible with the objective of price stability. It would also reduce the risk of the economy falling into (a monetary induced) financial crisis which, in turn, could have a highly negative impact on output and employment.*

3.1 Calculating the neutral real interest rate

OVERVIEW

The *neutral real interest rate* (NRIR) is defined as the level of the *real interest rate* that is consistent with low and stable inflation and real production corresponding to potential production. To put it differently: the NRIR is the rate consistent with the output gap $(y - y^*)$ and inflation gap $(\pi - \pi^*)$ being zero, where y (y^*) represents (potential) output and π (π^*) is actual (target) inflation.

The concept of the NRIR stems from the work of the Swedish economist Knut Wicksell[26]: "*There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tend neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods.*"

If, according to the so-called Wicksell process, the *market interest rate* falls below the *neutral interest rate* $(i < i^n)$, investment will exceed saving $(I > S)$, implying that aggregate demand will be greater than aggregate supply $(AD > AS)$. This, in turn, is supposed to fuel demand for

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[26] Knut Wicksell (2002, p. 102).

bank loans and push up the general level of prices. Alternatively, if the market rate rises above the neutral rate ($i > i^n$), savings will exceed investment ($I < S$), aggregate supply will exceed aggregate demand ($AD < AS$), bank loans and the stock of money will contract, translating into a decline of the price level. That said, whenever the market interest rate equals the neutral level, the economy is said to be in equilibrium.

Economic theory has it that the (long-term) real interest rate corresponds, in equilibrium, to the economy's potential output growth. In fact, in equilibrium an economy's potential growth matches the marginal return on capital (adjusted for risk). According to the *Golden Rule*, the risk-adjusted marginal return on capital should, in equilibrium, equal the long-term real interest rate.[27]

Let us assume monetary policy would follow the NRIR concept. Here, the central bank reaction function might be formulated as follows:
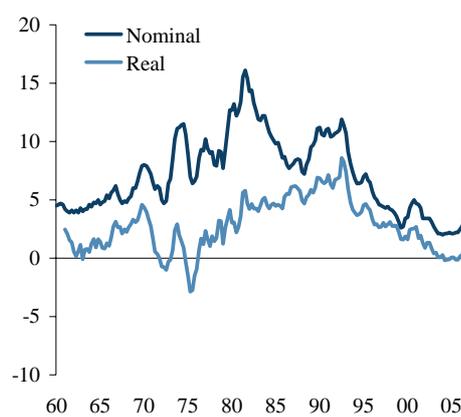
$$(1) \quad \Delta r = \lambda \, (i_t - i^n) \,,$$

where $\lambda < 0$ shows the intensity with which the official interest rate, r, is changed in response to the *interest rate gap*, that is the difference between the actual real money market rate (i_t) and the NRIR (i^n). As the NRIR is unobservable and unknown, economists have put forward a variety of estimation/calculating methods.[28]

3-months interest rate, nominal and real (%)
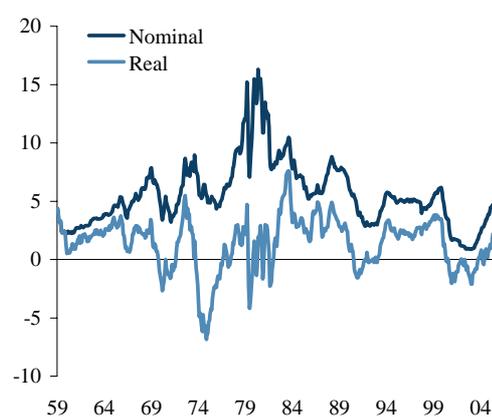
Source: ECB, Federal Reserve Bank of St. Louis, Thomson Financials; own calculations. - Real yields were calculated by substracting annual consumer price inflation from nominal yields. - Monthly data for the US, quarterly data for the euro area.

ESTIMATING THE NRIR

A rather simple approach is to assume that the NRIR corresponds to the *real interest rate trend* as observed in the past. A popular method is

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[27] See Bernhardsen (2005); Björksten and Karagedikli (2003).
[28] See Wu (2005).

smoothing the ex post real interest rate series by using the Hodrick-Prescott (HP) filter. Such an approach might be a reasonable approximation for periods in which output and inflation gaps were zero. In periods of (large) output and inflation swings, however, such an estimation method might be associated with substantial errors.

A more sophisticated approach is combining econometric tools and structural macroeconomic modeling techniques. For instance, Laubach and Williams (2003) make use of a structural model, which consists of three equations. The authors use an *IS-function* that (i) relates the output gap to the NRIR, (ii) includes a *Phillips curve* (relating inflation to the output gap) and (iii) specifies the positive correlations between the NRIR and the trend growth of output.

Once the macroeconomic model is specified, the researcher can estimate the NRIR through exploring the correlations between the interest rate, inflation, and output. If actual output exceeds trend (as predicted by the model), part of the unexpected strength in output will be attributable to a more accommodative monetary policy, which, in turn, implies that the NRIR was higher than projected.

Based on the paper of Laubach and Williams, the Kalman-Filter method has become a rather popular methodology for calculating the NRIR. Applying the Kalman-Filter to a small-scale macroeconomic model, one can de-trend the data to estimate unobservable variables such as the NRIR and potential output simultaneously.

NRIR are also estimated by using so-called stochastic dynamic general equilibrium models (SDGEM). These models define the NRIR as the interest rate that would prevail if all prices and wages were flexible. The concept allows for a time-varying NRIR, depending on structural factors. To estimate the NRIR, the parameters of the model must either be estimated or calibrated. While theoretically appealing, in practice the estimates turn out to be rather sensitive to choices regarding model specifications and parameter values.[29]

NRIR AND THE TAYLOR RULE

At this juncture it is of interest to highlight the relation between the NRIR and the well-known Taylor rule (Taylor 1993). The Taylor rule can be written as:

$$(2)\quad i = i^* + \pi^* + \alpha\,(\pi - \pi^*) + \beta\,(y - y^*)\ \text{with}\ \alpha, \beta > 0.$$

This is equivalent to:

$$(3a)\quad i - \pi + \pi - \pi^* - i^* = \alpha\,(\pi - \pi^*) + \beta\,(y - y^*),\ \text{and}$$

$$(3b)\quad (i_r - i^*) + (\pi - \pi^*) = \alpha\,(\pi - \pi^*) + \beta\,(y - y^*).$$

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[29] Details on the issue can be found in Gali (2002) and Giammarioli and Valla (2004).

So the neutral rate i* is:

(4) $i^* = i_r + (1 - \alpha)(\pi - \pi^*) - \beta(y - y^*)$.

So, if α and β are known, the NRIR can be easily calculated. However, to estimate α and β, i* must be known; in fact, it has to be calculated first.

PROBLEMS WITH ESTIMATING THE NRIR

Independent of the method used for calculating the NRIR, a number of problems arise (Wu, 2005):

(1)   The first difficulty has to do with the so-called *one-sided filtering problem*. Statistical theory tells us that, in estimating unobservable variables, the more observations are used in the estimation, the more accurate is the estimates. In reality, however, we can observe macroeconomic data only up to today. Therefore, the estimate of today's NRIR based on data which is available today will be quite different from the estimate when we have data beyond today – which are called *two-sided* or *smoothed* estimates.

(2)   In addition, estimating the NRIR tends to suffer from the fact that macroeconomic data (especially GDP) are often revised. In many cases such revisions can be quite substantial. This, of course, might weaken the reliability of NRIR estimates.

(3)   Our discussion so far has assumed that the macroeconomic model underlying the estimates of the NRIR is correct. However, there might be alternative models of the economy, and usually there is no consensus about which model is actually the correct one/most reliable.

NRIR AND MONETARY POLICY

The monetary policy recommendation that follows from the NRIR concept is that whenever there is a positive output gap, monetary policy-makers should set the interest rate at a level which puts downward pressure on demand, thereby dampening inflationary pressure. Alternatively, whenever actual output is lower than potential, the central bank should set the real interest rate at a level which stimulates spending, inducing investment and consumption, thereby increasing demand and avoiding the emergence of downward price pressure.

However, is it really advisable for a central bank, which aims at maintaining price stability like the ECB, to base its policy decision on the output gap as required by the NRIR concept? As can be argued, a number of serious difficulties would arise which run counter the objective of keeping inflation at a low and stable level.

To start with, monetary policy works with long (and often uncertain) time-lags. If the central bank lowers interest rates today (as a di-

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rect response to below-potential growth), the actual policy impact on output will be felt at a (much) later point in time. An output oriented monetary policy could therefore easily become pro-cyclical, leading to unwanted swings in output, employment and inflation.

What is more, an output oriented monetary policy might actually undermine the central bank's political independence.[30] Take, for instance, the case in which there are disappointing output and employment gains as a direct result of unfavourable macro-economic policies (such as, for instance, high taxation, tight regulation, protectionism, etc.). Under a NRIR concept, the central bank would actually be required to *bail out* the government's policy by cheap money. This, in turn, might (with a time delay) result in inflation (and, in addition, reduce economic incentives for bringing about structural reform).[31]

Finally, and perhaps most importantly, empirical evidence suggests that there are variables which appear to be much more important for inflation than the output gap. Indisputably, the output gap as a *demand pull factor* may have an impact on consumer prices in the short-run. However, as experience in many countries suggests, it is credit and money expansion that determines inflation in the medium- to long-run. However, as the NRIR concept ignores credit and money growth altogether, it is questionable whether it is actually compatible with price stability (that is preventing deflation and inflation).

3.2 Monetary policy transmission and the interest rate

What role does the (real) interest rate play in the monetary policy transmission mechanism? To answer this question, it might be worthwhile to take a brief look at two basic (and actually interrelated) transmission cannels: the *money channel* and the *credit channel*.[32]

According to the *money channel*, a reduction in base money supply would limit the banking system's ability to create additional credit and money. However, if loan demand remains strong, banks would offer their clients higher deposit rates – to make them move part of their funds from sight and time deposits (which are subject to minimum reserves) into bank liabilities which are not subject to reserve holdings. By doing so, minimum reserves are transformed into free reserves. As bonds are substitutes for time and savings deposits, yields on coupon bearing financial instruments can be expected to rise. This makes investments in stocks and real investments less attractive. As a result, the

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[30] In this context see ECB-Observer (2001) and (2002, p. 17).
[31] See in this context part 2 „Monetary policy and structural reforms" in this report.
[32] See Bernanke and Gertler (1995).

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reduction in base money would eventually, by affecting the yield environment, reduce output and inflation.

The *credit channel* model holds that a restrictive monetary can be delivered by raising central bank rates. This, in turn, leads to an immediate rise in borrowing costs. This is because rising rates on central bank reserves force banks to raise their lending rates. This, in turn, reduces the demand for loans and/or results in *credit rationing.* As a result, fewer investments would be realised, with output gains and inflation expected to slow down.

It is important to note here that both the *money channel* and the *credit channel* assume that the central bank can control, at least in the medium- to long-run, the long-term interest rate: Either by setting money supply or by changing official short-term interest rates, monetary policy is supposed to influence long-term borrowing rates which, in turn, affect investment, output, employment and inflation.

Against this background it should be of particular interest to form a view about the impact the ECB main refinancing rate exerts on long-term borrowing rates. Such a relation might be tested by using a simple *Granger causality test* (see box below).

In the period January 1999 to November 2006, we find that the null hypothesis – namely that changes in nominal ECB refinancing rates do not *Granger-cause* changes in nominal long-term rates – cannot be rejected in virtually all tests under review. For real (that is inflation adjusted) rates, the null cannot be rejected in all cases under review. Variations of the lag-structure do not change the results; tests in a vector error correction framework do not change these findings either.

Does the short-rate affect the long-rate area?

Figure 3.2.1. – ECB and money market rates and 10-year Bund yield (%)

Source: Thomson Financials.

Figure 3.2.1 shows short-term (official) interest rates and the 10-year Bund yield for the period January 1999 to November 2006. As noted above, both the money and credit view assume a (strong) impact of central bank rates on long-term interest rates. However, is there empirical support for these theories in the euro area?

One test of causality is whether the lags of one variable enter into the equation of another variable. The Granger (1969) approach to the question of whether X causes Y is to see how much of the current Y can be explained by past values of Y and then to see whether adding lagged values of X can improve the explanation. Y is said to be Granger-caused by X if X helps in the prediction of Y, or equivalently if the coefficients on the lagged X's are statistically significant. Note that two-way causation is frequently the case; X Granger causes Y and Y Granger causes X.

(a) Euro area nominal rates

(b) Euro area real rates (%)
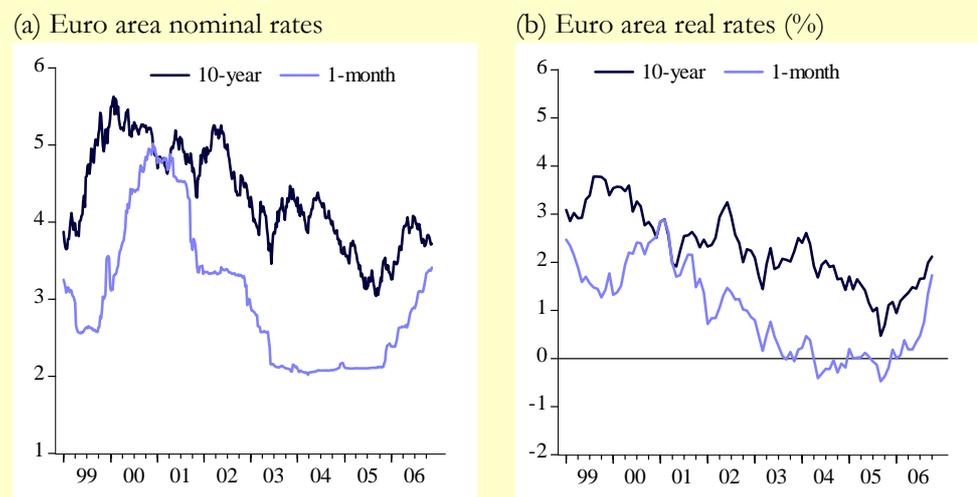
Source: Thomson Financials, own calculations.

It is important to note that the statement "X Granger causes Y" does not imply that Y is the effect or the result of X. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

The Granger causality approach runs bi-variate regressions in the following form:

$$Y_t = a_0 + a_1 Y_{t-1} + ... a_n Y_{t-n} + \beta_1 X_{t-1} + ... + \beta_n X_{t-1} + \varepsilon_t \text{ and}$$

$$X_t = a_0 + a_1 X_{t-1} + ... a_n X_{t-n} + \beta_1 Y_{t-1} + ... + \beta_n Y_{t-1} + \varepsilon_t,$$

for all possible pairs of (X,Y) series in the group. The reported F-statistics are the Wald statistics for the joint hypothesis:

$$\beta_1 = \beta_2 = ... = \beta_n = 0$$

for each equation. The null hypothesis is that X does *not* Granger-cause Y in the first regression and that Y does not Granger-cause X in the second regression.

Running Granger causality tests, we made use of weekly 10-year Bund yields and the 1- and 3-months money market rate for the period January 1999 to November 2006. Running a VAR model on the basis of changes in nominal rates, the Schwarz criterion suggests a lag length of zero, the Akaike criterion of 2 weeks. However, we also tested for higher lag lengths (see Figure 3.2.2).

Figure 3.2.2. – Results of the Granger causality tests, nominal rates

Null Hypothesis:	Obs	F-Statistic	Prob.	Null Hypothesis:	Obs	F-Statistic	Prob.
Lag 1				*Lag 1*			
D(I1M) does not Granger Cause D(I10Y)	410	0.713	0.399	D(I3M) does not Granger Cause D(I10Y)	410	0.240	0.624
D(I10Y) does not Granger Cause D(I1M)		0.126	0.722	D(I10Y) does not Granger Cause D(I3M)		0.249	0.618
Lag 2				*Lag 2*			
D(I1M) does not Granger Cause D(I10Y)	409	0.862	0.423	D(I3M) does not Granger Cause D(I10Y)	409	0.448	0.639
D(I10Y) does not Granger Cause D(I1M)		0.264	0.768	D(I10Y) does not Granger Cause D(I3M)		0.192	0.825
Lag 4				*Lag 4*			
D(I1M) does not Granger Cause D(I10Y)	407	1.209	0.306	D(I3M) does not Granger Cause D(I10Y)	407	3.545	0.007
D(I10Y) does not Granger Cause D(I1M)		1.079	0.366	D(I10Y) does not Granger Cause D(I3M)		1.179	0.319
Lag 6				*Lag 6*			
D(I1M) does not Granger Cause D(I10Y)	405	1.354	0.232	D(I3M) does not Granger Cause D(I10Y)	405	2.451	0.024
D(I10Y) does not Granger Cause D(I1M)		0.872	0.515	D(I10Y) does not Granger Cause D(I3M)		1.368	0.226
Lag 8				*Lag 8*			
D(I1M) does not Granger Cause D(I10Y)	403	1.209	0.292	D(I3M) does not Granger Cause D(I10Y)	403	1.842	0.068
D(I10Y) does not Granger Cause D(I1M)		1.099	0.363	D(I10Y) does not Granger Cause D(I3M)		1.792	0.077
Lag 10				*Lag 10*			
D(I1M) does not Granger Cause D(I10Y)	401	1.209	0.284	D(I1M) does not Granger Cause D(I10Y)	401	1.209	0.284
D(I10Y) does not Granger Cause D(I1M)		1.265	0.249	D(I10Y) does not Granger Cause D(I1M)		1.265	0.249
Lag 15				*Lag 15*			
D(I1M) does not Granger Cause D(I10Y)	396	1.279	0.212	D(I3M) does not Granger Cause D(I10Y)	396	1.385	0.151
D(I10Y) does not Granger Cause D(I1M)		1.700	0.049	D(I10Y) does not Granger Cause D(I3M)		2.008	0.014
Lag 20				*Lag 20*			
D(I1M) does not Granger Cause D(I10Y)	391	1.320	0.163	D(I3M) does not Granger Cause D(I10Y)	391	1.437	0.102
D(I10Y) does not Granger Cause D(I1M)		1.745	0.025	D(I10Y) does not Granger Cause D(I3M)		1.923	0.010

Source: Thomson Financials, own calculations. – D = difference. I1M = 1-months money market rate, I3M = 3-months money market rate, I10Y = 10-year Bund yield. – Period: January 1999 to November 2006. – Weekly data.

For virtually all lags under review, the null hypothesis – namely that changes in short-term interest rates do not Granger-cause changes in long-term yields – cannot be rejected; only for a lag of 4 and 6 weeks, changes in the 3-month rate tend to lead changes in the long rate. However, at longer lags, there seems to be evidence that changes in long-term rates Granger-cause changes in short-term rates. This finding might suggest that long-term yields adjust (driven by expectations) well before official interest rates are changed. Turning to real rates, the results of the Granger tests cannot reject the null hypothesis that short-term rates do not Granger-cause long rates (see Figure 3.2.3).

Figure 3.2.3. – Results of the Granger causality tests, real rates

Null Hypothesis:	Obs	F-Statistic	Prob.	Null Hypothesis:	Obs	F-Statistic	Prob.
Lag 1				*Lag 1*			
D(I1M) does not Granger Cause D(I10Y)	92	0.662	0.418	D(I3M) does not Granger Cause D(I10Y)	92	1.650	0.202
D(I10Y) does not Granger Cause D(I1M)		1.072	0.303	D(I10Y) does not Granger Cause D(I3M)		0.313	0.577
Lag 2				*Lag 2*			
D(I1M) does not Granger Cause D(I10Y)	409	0.862	0.423	D(I3M) does not Granger Cause D(I10Y)	91	1.917	0.153
D(I10Y) does not Granger Cause D(I1M)		0.264	0.768	D(I10Y) does not Granger Cause D(I3M)		0.276	0.760
Lag 4				*Lag 4*			
D(I1M) does not Granger Cause D(I10Y)	89	2.396	0.057	D(I3M) does not Granger Cause D(I10Y)	89	1.792	0.139
D(I10Y) does not Granger Cause D(I1M)		0.526	0.717	D(I10Y) does not Granger Cause D(I3M)		0.271	0.896
Lag 6				*Lag 6*			
D(I1M) does not Granger Cause D(I10Y)	87	2.164	0.056	D(I3M) does not Granger Cause D(I10Y)	87	1.803	0.110
D(I10Y) does not Granger Cause D(I1M)		0.436	0.853	D(I10Y) does not Granger Cause D(I3M)		0.296	0.937
Lag 8				*Lag 8*			
D(I1M) does not Granger Cause D(I10Y)	85	1.648	0.128	D(I3M) does not Granger Cause D(I10Y)	85	1.210	0.307
D(I10Y) does not Granger Cause D(I1M)		0.464	0.877	D(I10Y) does not Granger Cause D(I3M)		0.363	0.937
Lag 10				*Lag 10*			
D(I1M) does not Granger Cause D(I10Y)	83	1.570	0.137	D(I3M) does not Granger Cause D(I10Y)	83	1.338	0.231
D(I10Y) does not Granger Cause D(I1M)		0.847	0.586	D(I10Y) does not Granger Cause D(I3M)		0.738	0.687
Lag 15				*Lag 15*			
D(I1M) does not Granger Cause D(I10Y)	78	1.235	0.281	D(I3M) does not Granger Cause D(I10Y)	78	0.980	0.490
D(I10Y) does not Granger Cause D(I1M)		1.152	0.341	D(I10Y) does not Granger Cause D(I3M)		0.933	0.536
Lag 20				*Lag 20*			
D(I1M) does not Granger Cause D(I10Y)	73	1.505	0.147	D(I3M) does not Granger Cause D(I10Y)	73	1.066	0.425
D(I10Y) does not Granger Cause D(I1M)		1.321	0.235	D(I10Y) does not Granger Cause D(I3M)		0.875	0.616

Source: Thomson Financials, own calculations. – D = first difference, I1M = 1-months money market rate, I3M = 3-months money market rate, I10Y = 10-year Bund yield. – Period: January 1999 to November 2006. – Real rates were calculated by substracting annual HICP inflation from nominal rates. – Monthly data.

Against the backdrop of these findings, there should at least be some hesitation when it comes to accepting the notion that monetary policy would be in a position to systematically influence medium- to long-term borrowing rates – as is required under the NRIR concept. So what would be the lesson to be learned from the discussion above?

3.3 Consequences for monetary policy

According to the consensus view in economics, a monetary policy approach is favoured which is (i) concerned about inflation as well as output fluctuations, (ii) forward looking, and (iii) prevents serious economic downturns related to financial instabilities (bursting of bubbles, banking crises, etc.).

HEDGING AGAINST FINANCIAL CRISES

In periods of favourable economic expansion, with relatively little uncertainty about the correct model of the economy, the NRIR concept might indeed appear to be an attractive policy approach. However, the assessment might change drastically if the potential consequences of ignoring credit and money expansion are taken into account.

A great number of studies seem to support the hypothesis that growth rates of credit and money play an important role not only for

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consumer price inflation[33] but also for the development of asset prices. In theory, the potential role of credit and money supply growth for asset price developments is actually straightforward.[34]

In fact, *asset price inflation* is much more likely to appear if investors can leverage their positions, that is finance purchases of existing assets by (additionally created) credit. Furthermore, a strongly rising money stock might signal the build up of ample liquidity, waiting to be invested in potentially higher-yielding opportunities. As a result, ample liquidity qualifies, at least theoretically speaking, as a source for asset price inflation.

In many cases, asset price inflation, which tended to be accompanied by economic boom periods, ended in a sharp correction, or even a collapse, of asset prices, turning boom into bust. In fact, many of the *boom-and-bust cycles* seen in the past have been accompanied, or preceded, by overly expansionary monetary policies – as evidenced by strong growth rates in credit and money supply (see, for instance, Detken and Smets (2004)).

Money and asset prices in Japan

Figure 3.3.1. – Japanese income velocity, trend deviations and the stock market

(a) Japanese income velocity of "broad money"

(b) Deviation of income velocity from trend
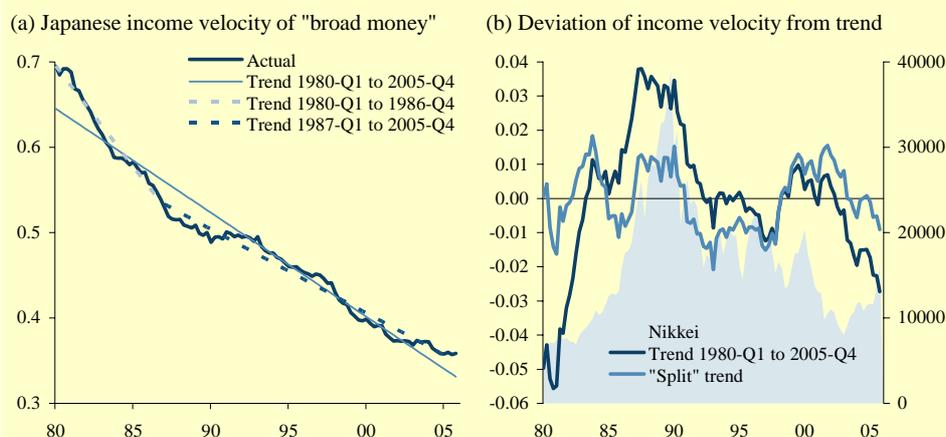
Source: Thomson Financia; own estimation. - Income velocity is defined as nominal GDP minus stock of broad money (all variables in logarithms). - Period: 1980-Q1 to 2005-Q4.

A visual inspection suggests that the strong rise in the Japanese Nikkei stock market index around the second half of the 1980s was accompanied by overly generous money supply growth relative to income gains (see Figure 3.3.1). This is illustrated by actual income velocity falling below its long-run trend.

[33] See, for instance, Altimari (2001); Neumann and Greiber (2004).

[34] See Friedman (1988); Borio and Lowe (2002); Bean (2003); Detken and Smets (2004); Srejber (2004); ECB (2005); Knight (2006).

What is more, the decline in stock prices, starting around the end of 1989, appears to have been accompanied by income velocity moving back towards (or even above) the long-run trend, a sign that money supply growth became subdued relative to income expansion (a direct consequence of banks reigning in credit and money expansion).

That said, in Japan prolonged deviations of the actual income velocity of money from its long-term trend seem to contain valuable information for the role credit and money have played for the build up and later collapse of the *stock market bubble.*

Figure 3.3.2 shows the annual growth rates of bank loans extended to the private sector by euro area MFIs in percent and development of the Euro Stoxx 50. The simple correlation coefficient between the two time series is high (with an R-squared of 0.86). What is more, a simple cross-correlation analysis suggests that credit expansion has, in the sample period, led stock market prices.

Figure 3.3.2. – Credit, money and stock prices

(a) Bank loan growth (% y/y) and stock markets   (b) M3 growth (% y/y) and stock markets
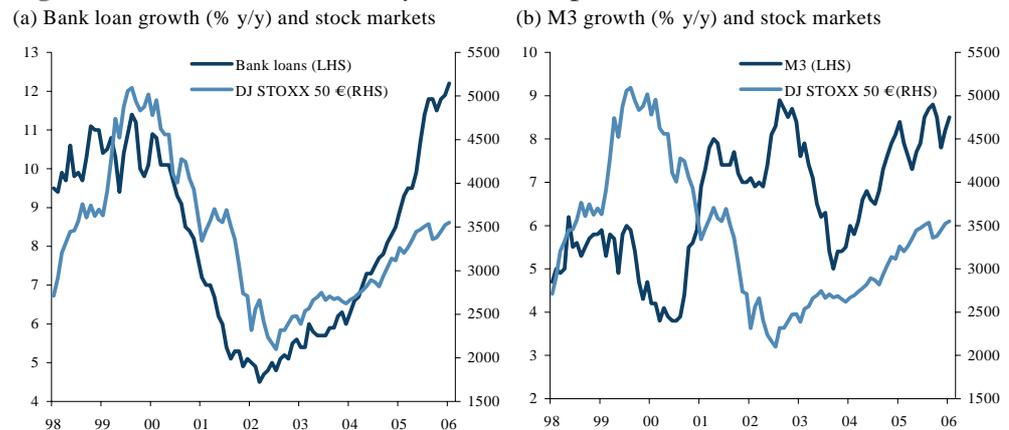
Source: Bloomberg, own calculations.

That said, a monetary policy that takes into account credit and money supply expansion when setting interest rates should not only be compatible with price stability – given that ultimately inflation is always and everywhere a monetary phenomenon. It would also help reducing the risk of the economy falling into a (monetary induced) financial crisis which, in turn, could have negative and costly consequences for output and employment.

THE LESSON TO BE LEARNED

It is hard to see that the NRIR concept, including the Taylor rule, could qualify as a reliable blueprint for a monetary policy aiming at price stability in the euro area. First, monetary policy cannot systematically influence real output according to a pre-set design; at least in the

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short-run, a systematic impact of changes in central bank short-term interest rates on long-term borrowing costs is hardly detectable.

Second, monetary policy works with (unknown) time-lags on output and prices. As a result, a central bank that lowers rates in response to a cyclical weakening of the economy might de facto set into motion a pro-cyclical policy which, in turn, leads to unwanted cyclical swings and potential violations of price stability.

Given the uncertainties related to the calculations of the NRIR and the concept's systematic ignorance of credit and money, we are strongly in favour of a monetary policy that has a medium- to long-term orientation, assigning a prominent role to credit and money when setting interest rates. Such a policy should not only be conducive to price stability, it would also reduce the risk of the economy falling into a (monetary induced) financial crisis that would entail a negative impact on growth and employment.

A final word might be in order. It would actually amount to a *fatal conceit* should central banker give the impression that monetary policy has the power to influence the real economy in a systematic fashion. It needs to be stressed that, in view of currently available knowledge, investment and economic growth depend largely on human capital and the prevailing institutions (such as, for instance, property rights, the economy's degree of economic freedom, etc.) rather than on monetary policy.

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PART 4
ECB policy – review and outlook

CONTENT: *4.1 Monetary developments in the euro area. – 4.2 Reviewing ECB rates against the Taylor concept. – 4.3 Euro area inflation outlook.*

SUMMARY: *Monetary policy in the euro area has been, and still is, very expansionary according to a number of measures such as credit and money growth and the level of (nominal and real) short-term interest rates. We forecast annual consumer price inflation to be 2.3% on average in 2007 (largely a result of lower oil prices; and including the German 3pp VAT hike), to be followed by 2.3% in 2008. For reducing upward pressure on future inflation, we recommend to raise the ECB main refinancing rate to around 4.0%. – The results of our money demand analyses suggest that excess liquidity has increasingly affected asset prices – such as bonds, stocks and possibly housing – rather than consumer prices. Against the background of our findings it seems to be even more important for the ECB to set interest rates in accordance with the signals provided by M3 growth if consumer and/or asset price inflation shall be avoided.*

4.1 Monetary developments in the euro area

OVERVIEW

With a growth rate of 8.1% y/y on average in the period October 2005 to October 2006, M3 expansion has remained exceptionally strong (Figure 4.1.1 (a)). As a result of money supply growing persistently above the ECB's 4½% reference value, *excess liquidity*, as defined by, for instance, the *real money gap* on the basis of M3 (and M3 corrected for portfolio shifts), has been drifting upwards (see Figure 4.1.1 (b)). In fact, measures of excess liquidity suggest substantial inflationary potential coming from monetary expansion.

Figure 4.1.1. – Euro area money growth and "excess liquidity"

(a) M3 growth (% y/y)   (b) Measures of "excess liqudity" (%)
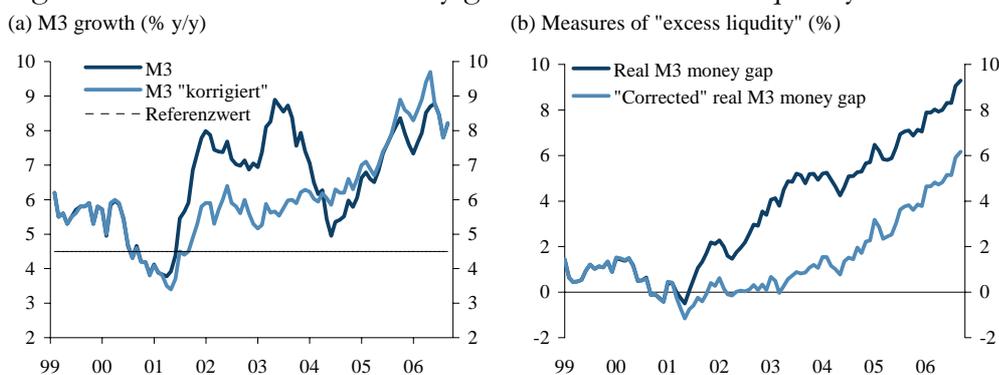
Source: ECB, Thomson Financial; own calcuations.

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Figure 4.1.2 (a) shows the income velocity of M3 (that is nominal GDP divided by M3) for the period 1980-Q1 to 2006-Q2. In addition, a linear trend line (calculated for the period 1980-Q1 to 2001-Q4, and extrapolated thereafter) is shown. The deviation of the actual income velocity from its long-run trend is depicted in Figure 4.1.2 (b). The deviation – which can be interpreted as a measure of *excess money holdings* – has reached the highest level in the sample period under review.

Figure 4.1.2. – M3 income velocity

(a) Income velocity of M3, actual and trend   (b) "Excess liquidity"
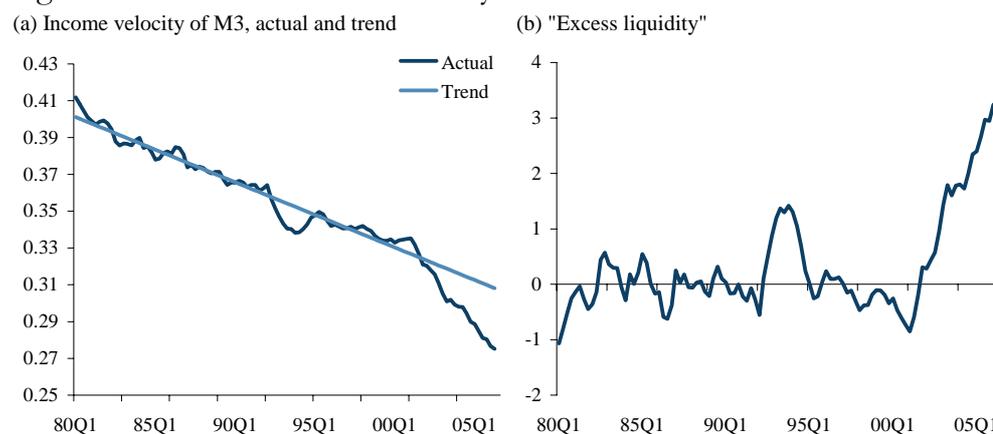
*Source:* ECB, Thomson Financials; own calculations.

So far, the impact of excess liquidity on consumer prices has been relatively modest. As Figure 4.1.3 (a) shows, money supply growth has remained high by historical standards, while consumer price inflation has been running close to the ECB's 2% upper ceiling. However, such a finding is by no means a reason for complacency as far as monetary developments are concerned. In particular, it might be premature to call into question the role of money for inflation in the euro area.[35]

A brief look at price developments in the euro area
Since October 2005 to October 2006, HICP inflation was 2.3% on average, thus exceeding the ECB's upper ceiling of price stability definition (see charts (a) to (d)); only in September 2005 dropped inflation to below 2.0%, driven by the sharp decline in oil prices. Core inflation has remained well contained, with a 1.4% y/y rise on average in the last 12 months. However, since the beginning of 2006, the decline of core inflation – which set in around the beginning of 2002 – seems to have come to a halt.

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[35] In this context see, for instance, the Portugese central bank, which, after reviewing the stability of the money demand model suggested by Calza, Gerdesmeier and Levy (2001) and Carstensen (2004 a, b), concluded: "(…) the recent evidence raises serious doubts regarding the use of M3 as an indicator for evaluating the risks to price stability." Banco de Portugal, Economic Bulletin, Summer 2006, p. 51.

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SELECTED PRICE MEASURES IN THE EURO AREA

(b) Producer price inflation* (%)

(d) Euro area labour cost index (% y/y)
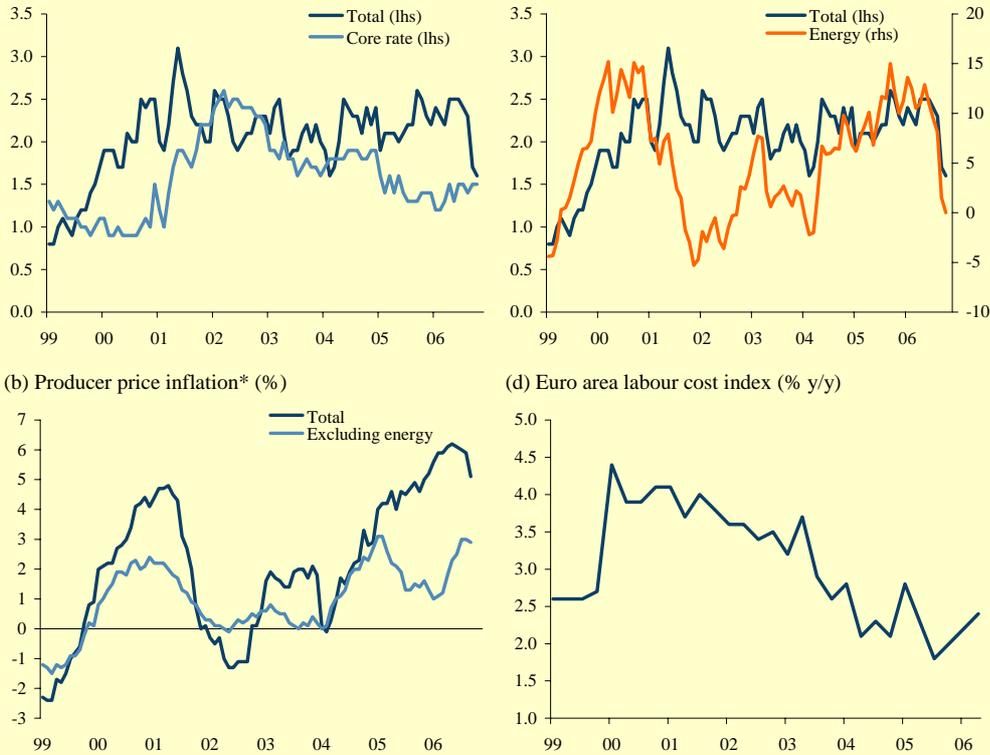
Source: Bloomberg, own estimates. *Producer prices excluding construction

Price developments at the producer level suggest that some *pipeline pressure* has been building up lately. So far, however, the annual changes in nominal labour costs seem to have remained on a downward trend, which set in around 2000. It should also be noted here that firms' and consumers' price expectations (regarding price moves in the coming 12 months) have started to drift upwards (in particular in Germany, presumably related to the VAT hike as from 1 January 2007).

FIRMS' AND CONSUMERS' PRICE EXPECTATIONS

(a) Firms' selling price expecations, coming 12-mths

(b) Consumers' expected price trends, coming 12-mths
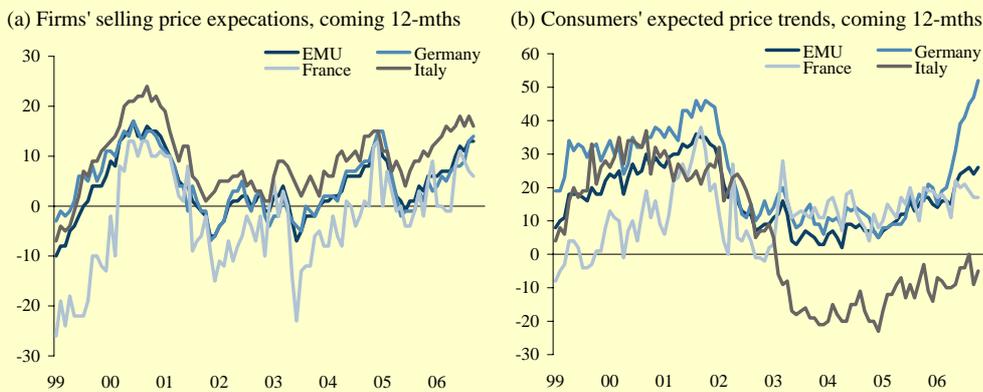
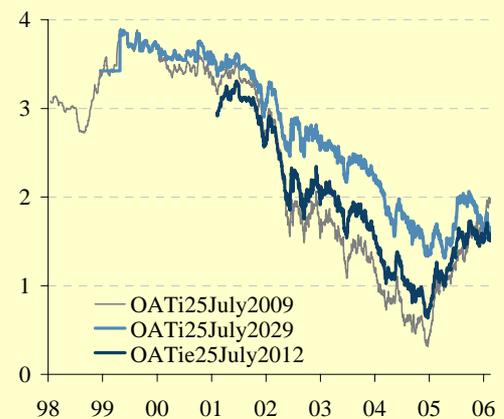

Source: Bloomberg, own estimates.

Finally, the charts below show the break even inflation rates (derived from French government inflation linked bonds) and the bonds' real yield component. Break even inflation rates for longer maturities have remained above the ECB's upper 2% ceiling. Inflation expectations for the more medium-term, however, seem to have improved lately, as evidenced by break even inflation rates for the linker maturing in July 2029.

EURO AREA BREAK EVEN INFLATION AND REAL YIELDS (%)
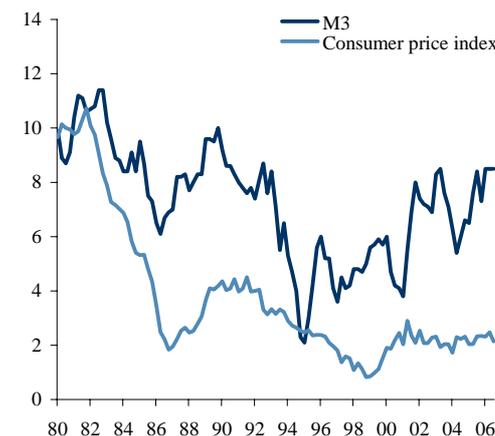

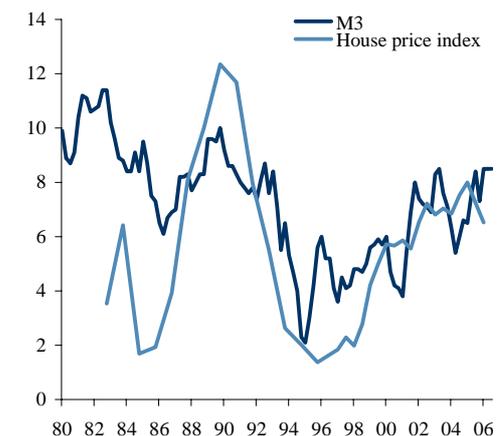(a) Break-even inflation of OATs in percent
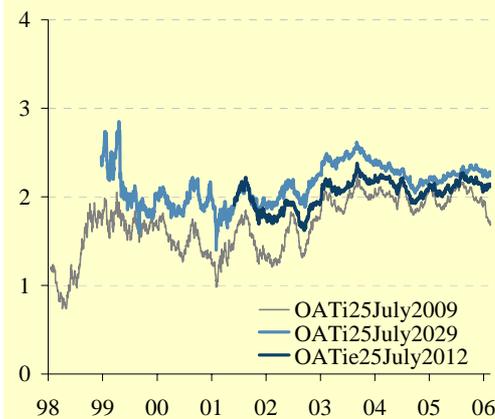
(b) Real yields of OATs in percent

— OATi25July2009
— OATi25July2029
— OATie25July2012

Source: Bloomberg; own calculations.

Figure 4.1.3. – M3 and price indices

(a) M3 and consumer prices (% y/y)

(b) M3 and house prices (% y/y)

— M3
— Consumer price index

— M3
— House price index

Source: ECB, Thomson Financials; own calculations. Quarterly data for M3. Annual data for property prices, starting 1981, interpolated; as from 1996: semi-annual data, interpolated.

The key issue is this: Excess liquidity, which has been building up in the last years, might have increasingly affected asset prices – such as bonds, stocks and real estate prices (which are not, or not fully, accounted for in measures of price inflation of products and services produced in the current period) – rather than consumer prices. *Asset*

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price inflation might thus have the potential to (*temporarily*) cloud, e.g. distort, the traditional link between money and consumer prices.

Figure 4.1.3 (b) plots money supply growth rates together with annual changes in the euro area residential property price index. Since the second half of the 1990s, property price inflation has been, on average, closely related to money expansion. This finding could indeed indicate that excess money growth has been accompanied by property price inflation rather consumer price inflation.

As noted above, the information content of money for inflation in the euro area has been put into question – and thus the rationale for assigning a prominent role to money in the ECB monetary policy strategy.[36] In view of the historic long-run relation between money growth and consumer price inflation, however, such a conclusion might indeed be premature and even preposterous (see box below).

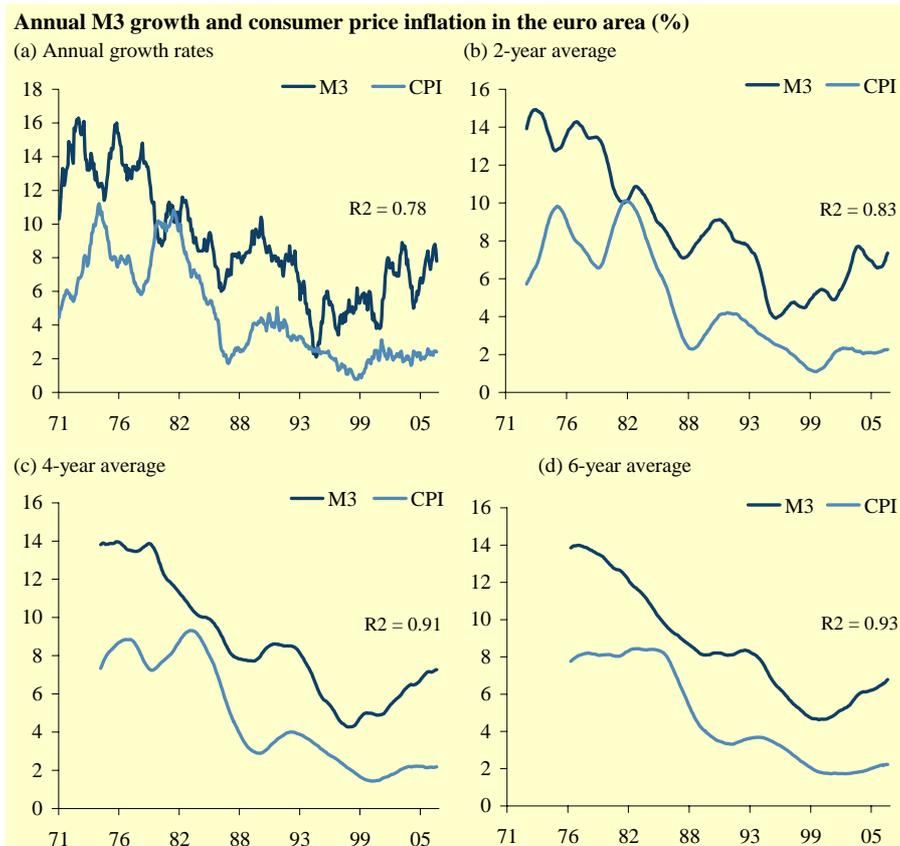### The long-run link between money growth and inflation

In their efforts to maintain low inflation, today's central banks tend to pay relatively little attention to the growth rate of money supply. This may come as a surprise, given that many studies suggest a close relationship between money growth and inflation, at least in the long run. But how long must money growth be "strong" before it should be of concern to policymakers?[37]

Chart (a) below depicts annual M3 growth in the euro area and the annual change in the consumer price index for the period January 1971 to September 2006. The simple correlation coefficient of the contemporaneous series is 0.78. Chart (b) plots two year averages, for which the correlation coefficient rises to 0.83. Lengthening the averaging to four and six years (charts (c) and (d), respectively), the link between money growth and inflation becomes even closer, as indicated by correlation coefficients of 0.91 and 0.93, respectively.

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[36] In this context see, for instance, ECB (2003), Background Studies for the ECB's Evaluation of its Monetary Policy Strategy, November, Frankfurt, pp. 187 and, in particular pp. 245 for an overview on money demand stability: "First and foremost, there is strong evidence favouring the hypothesis that there is a stable long-run relationship between real money and real GDP." (p. 293)

[37] This box draws heavily on Fitzgerald, T. (1999), Money Growth and Inflation: How Long is the Long-Run? In: Federal Reserve Bank of Cleveland.

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Annual M3 growth and consumer price inflation in the euro area (%)

(a) Annual growth rates

(b) 2-year average

(c) 4-year average

(d) 6-year average

Source: Thomson Financials; own calculations.

Of course, on a month-to-month and quarter-to-quarter basis, the relation between money and inflation might not be well understood. But the simple illustration above should serve as a reminder that ignoring money supply changes (for too long a period of time) might be unwise, as it runs the risk of translating into inflation later on.
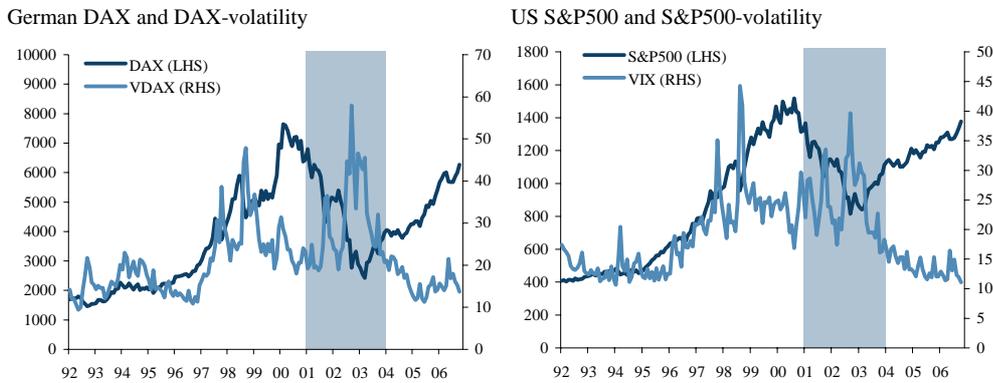
The long-run relationship between money and inflation suggests a straightforward strategy for maintaining low inflation: choose the growth rate of money that corresponds to the desired long-run rate of inflation. In fact, some economists have concluded from this evidence that the problem of controlling inflation has been successfully solved.[38]

FINANCIAL MARKET TURMOIL AND MONEY HOLDINGS

In the period 2001 to 2003, international stock market gyrations increased considerably, accompanied by an exceptionally strong increase in the stock of M3 (see Figure 4.1.4). So it might be that the recent turmoil in global financial markets might have led to a (*temporary*, if not *persistent*) rise in (cautionary) money holdings in the euro area.

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[38] See, for instance, Lucas, R. E. (1986), Adaptive Behavior and Economic Theory, Journal of Business, vol. 59, No. 4, October 1986, p. 402. He makes it clear that this assertion applies to long-run averages of money growth and inflation.

Figure 4.1.4. – International stock market developments

German DAX and DAX-volatility

US S&P500 and S&P500-volatility

Source: Bloomberg; own calculations. – Shaded areas represent periods of „elevated" stock market volatility.

When it comes to analysing the long-run relation between money, output interest rates and inflation, it might thus be insightful to explicitly take into account the latest period of financial market crisis. By doing so, we will contrast official M3 developments with two additional money supply series, namely (i) "M3 adjusted for portfolio shifts" (as published by the ECB) and – as a kind of control variable – (ii) "M3 adjusted for higher money holdings" (as calculated by ECB Observer).

Figure 4.1.5. – Money growth and demand deviation from mean

(a) Annual growth rates of M3 aggregates[a]
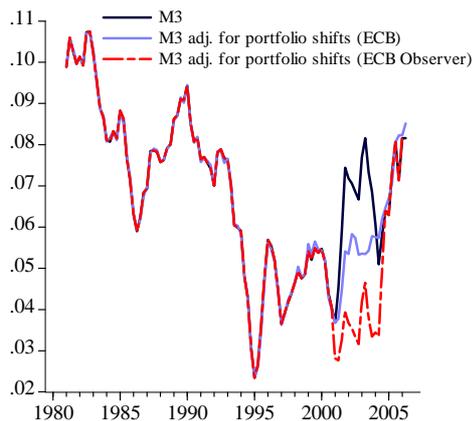
(b) Deviations of money holdings from long-run equilibrium[b]
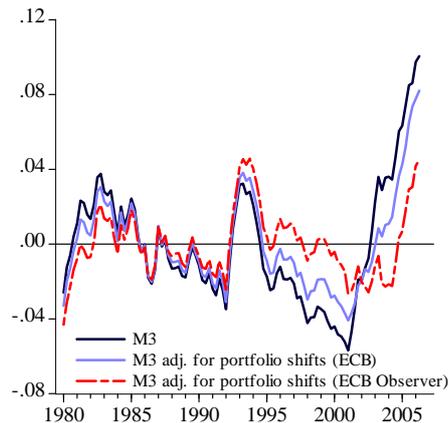
Source: ECB, Thomson Financials; own estimates. – [a]Fourth differences of log values. – [b]Estimated using a simple OLS regression. Note that the null hypothesis of a unit root can only be rejected for the aggregate M3 adjusted for portfolio shifts (ECB Observer) according to ADF-tests.

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The latter was estimated using a simple money demand function (specified for 1980-Q1 to 2001-Q4)[39], based on real GDP, the long-term interest rate and a shift dummy, the latter taking the value of 0 from 1980-Q1 to 2000-Q4, thereafter rising linearly from 1 in 2001-Q1 to 12 in 2003-Q4, and remaining at that level for the rest of the sample period.

Figure 4.1.5 (a) shows the annual growth rates of the three M3 aggregates under review. Most notably, all three aggregates have shown very strong growth since around the end of 2004. Just for the sake of illustration, Figure 4.1.5 (b) shows the residuals of OLS estimates of real money demand (specified as outlined above) for the three money stocks under review. As can be seen, all residuals suggest a rather large level of excess liquidity.

Figure 4.1.6. (a) shows the level of official stock of M3 and the levels of money stocks adjusted for portfolio effects (that is the ECB's and ECB Observer's aggregate). The latter are – due to taking account of portfolio shifts – lower than the former. Figure 4.1.6 (b) shows the respective income velocities of money. As can be seen, the income velocities of the ECB's adjusted stock of M3 and ECB Observer's M3 show a (much) less pronounced decline compared to the velocity calculated on the basis of the official stock of M3.

Figure 4.1.6. – Stock of M3 and income velocities

(a) Stock of M3 (€bn, logs)   (b) Income velocities
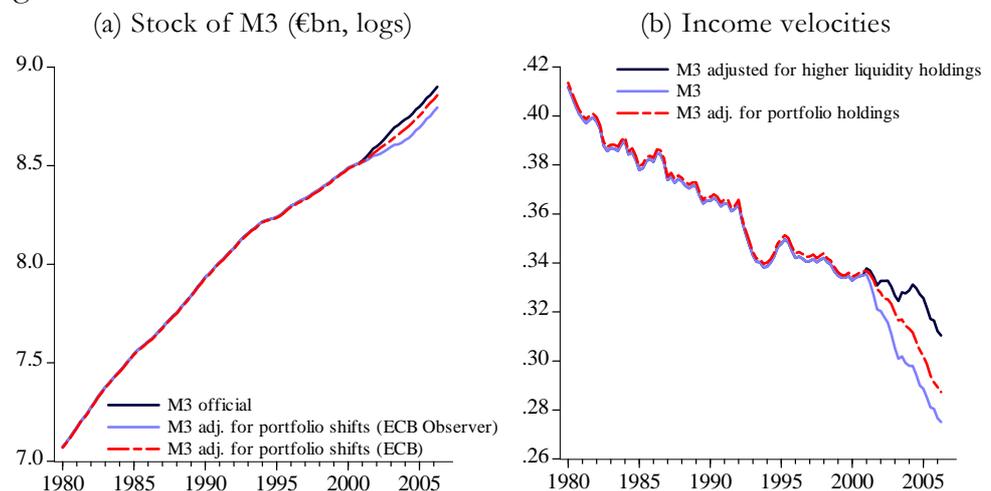
Source: ECB, Thomson Financials; own calculations. – The income velocity is defined as nominal GDP divided by stock of M3.

A DEMAND FOR MONEY

Turning to some further empirical estimates, we tested a demand function for real M3 holdings, which was specified as follows:

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[39] In the literature, this period is actually unanimously considered to be a period of a stable long-run demand function in the euro area.

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$$m_t - p_t = \beta_0 + \beta_1 y_t + \beta_2 i_t^s + \beta_3 \pi_t + \beta_4 sv_t + \varepsilon_{t,1},$$

where $m_t - p_t$ is the real money holding (in logs), y_t is real income, i_t^s is the short-term yield (which implies a semi-log interest rate elasticity), π_t is inflation (first differences of log consumer prices, annualized), sv_t market volatility (as specified in Figure 4.1.7 (b)), and ε the i.i.d. error term.

Figure 4.1.7. – Stock market and stock market volatility

(a) Stock market, real (logs)[a]   (b) Stock market volatility[b]
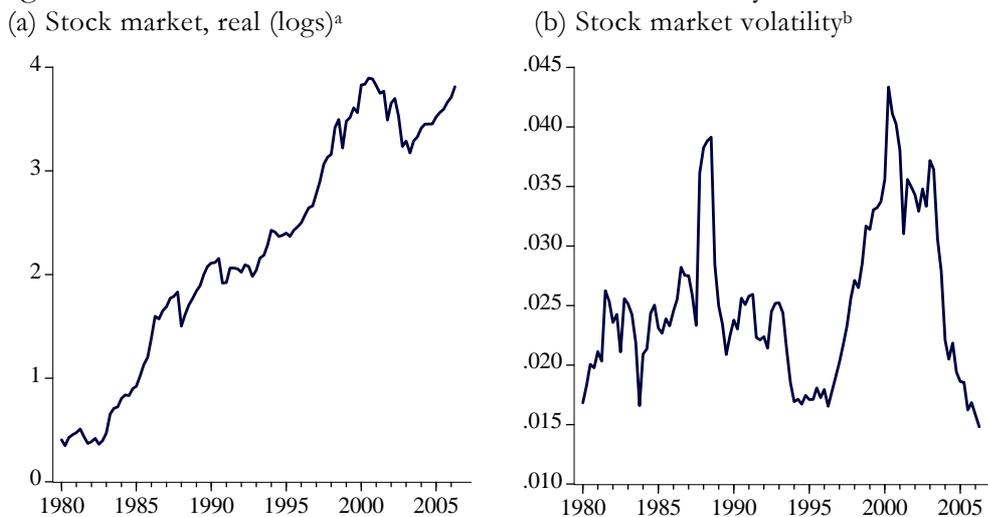
Source: ECB, Thomson Financials; own calculations. – [a]Deflated with GDP deflator. – [b]Standard deviation of weekly changes of stock prices (first differences in log values) over a gliding 52 week window.

Figure 4.1.8. – Trace and max-eigenvalue tests, estimated cointegration parameters, forward recursive estimates, official M3

Sample period	Trace statistic	Max-eigen statistic	Parameter estimates			
			$\beta_1(y)$	$\beta_2(i^l)$	$\beta_3(\pi)$	$\beta_4(sv)$
1981Q1	72.83*	29.62	1.08	-0.24	0.03	0.001
2002Q4			(0.81)	(0.06)	(0.01)	(0.00)
1981Q1	74.55*	30.33	1.25	-0.08	0.09	0.005
2003Q4			(0.25)	(0.02)	(0.02)	(0.001)
1981Q1	71.29*	29.12	1.24	-0.04	0.04	0.001
2004Q4			(0.11)	(0.01)	(0.01)	(0.00)
1981Q1	69.61*	29.51	1.21	-0.03	0.02	0.002
2005Q4			(0.09)	(0.01)	(0.01)	(0.00)
1981Q1	70.77*	29.82	1.22	-0.03	0.02	0.002
2006Q2			(0.09)	(0.01)	(0.01)	(0.00)

Legend: * (**) denotes significance at the 0.05 (0.01) level. – Standard errors in (.) brackets. – Using MacKinnon-Haug-Michelis (1999) p-values.

Analysing the long-run relation between the variables under review, we applied the Johansen technique (1991, 1995). The cointegration system uses an unrestricted constant, allowing for a linear trend in

the variables but not in the cointegration relationships. The lag length of the VAR was determined by the Schwarz criterion, which suggested one quarter. Due to high autocorrelation in the residuals, however, we decided for a lag length of 2 quarters.

Estimating a demand for money function

Let's assume you would want to explore the relation between real money (M/P) and output (Y). The regression equation would be:

(1) $(M/P)_t = \beta_o + \beta_1 Y_t + \varepsilon_t$,

where M = money supply, P = price level and ε is the i.i.d. (white noise) error term; t denotes time.

If M/P and Y are *cointegrated*, there is a long-run equilibrium between the two series. Of course, in the short-run, the relation between M/P and Y might be in disequilibrium. However, over time, the disequilibrium should disappear if M/P and Y are cointegrated.

The so-called error correction mechanism (ECM), popularised by Engle and Granger (1987), corrects for any such disequilibria over time. Consider the following first difference model:

(2) $\Delta(M/P)_t = \beta_0 + \beta_1 \Delta Y_t + \beta_2 \Delta Y_{t-1} + \beta_3 \Delta(M/P)_{t-1} + \beta_4 \varepsilon_{t-1} + u_t$,

where Δ denotes the change (or first difference) of the variables; ε_{t-1} is the error correction term, that is the one-period lagged value of the residuals of equation (1); u is the i.i.d. error term.

That said, equation (2) includes the equilibrium error in the previous period. If the coefficient β_4 is statistically significant, it tells us that part of the disequilibrium in M/P in the previous period is corrected in the next period.

However, the Engle-Granger approach has several defects. First, it does not tell us whether variables under review are *exogenous* or *endogenous*. Second, any error introduced in the first step of the Engle-Granger procedure (estimating the long-run relation (1)) is carried into step two (estimating the first difference equation (2)).

This is why empirical research has turned towards using the Johansen (1988) and Sock and Watson (1988) procedures, which rely heavily on the relationship between the rank of the matrix and its characteristic roots, thereby trying to solve the problems related to the Engle-Granger approach.

We applied the Johansen procedure to the long-run relation between real money and various explanatory variables for various sample periods (see Figure 4.1.8). For all periods under review we find at least one cointegration vector according to the Trace statistic. In all sample periods, the income elasticity of money demand exceeds unity and remains fairly stable from sample period to sample period.

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Whether or not the cointegration relationship can be interpreted as a demand for money function, however, must be inferred from the error correction model. For the full sample period (and in contrast to analyses made for the period 1980-Q1 to 2001-Q4), we find that *monetary overhangs* are either no longer statistically significant in the equation for changes in real money demand or are statistically significant for changes in real money demand *and also* for changes in consumer price inflation, stock market volatility and the long-term bond yield.

That said, *excess liquidity* appears to have increasingly affected bond and stock prices lately, potentially causing *asset price inflation*.[40] Such a hypothesis, if proved to be true, would support the conclusion that consumer price inflation and/or the GDP deflator (which include the prices of goods and services produced in the current period) might no longer appropriate to measure the loss of purchasing power induced by excess money growth.

A DEMAND FOR MONEY AND ASSET PRICES

To find out a bit more about where excess liquidity might be going, we formulated an alternative long-run function for real money demand:

$$m_t - p_t = \beta_{0,1} + \beta_{1,1} y_t + \beta_{2,1} i_t^l + \beta_{3,1} i_t^s + \beta_{4,1} \pi_t + \beta_{5,1} s_t + \beta_{6,1} sv_t + \varepsilon_{t,1},$$

where i_t^s is the short-term rates and s_t is the real stock market performance.[41]

Using real money, real output, short- and long-term interest rates, inflation, real stock market and its volatility, Johansen's trace and max-eigenvalue statistics suggest the existence of one cointegration vector. However, we identify long-run relations between short- and long-term interest rates and inflation, and real GDP and real stock markets and its volatility. As a result, we decided to work with the following system:

(i) $m_t - p_t = \beta_{0,1} + \beta_{1,1} y_t + \beta_{2,1} i_t^l + \beta_{4,1} \pi_t + \beta_{6,1} sv_t + \varepsilon_{t,1}$

(ii) $i_t^l = \beta_{0,2} + \beta_{3,2} i_t^s + \beta_{4,2} \pi_t + \beta_{5,2} s_t + \beta_{6,2} sv_t + \varepsilon_{t,2}$

(iii) $s_t = \beta_{0,3} + \beta_{1,3} y_t + \beta_{6,3} sv_t + \varepsilon_{t,3}$.

The first equation represents the long-run demand function for real balances.[42] The second function captures the combined Fisher

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[40] In this context see Gerdesmeier, D., Polleit, T. (2005), Measures of excess liquidity, HfB Working Paper No. 65 (www.hfb.de).

[41] All variables included are non-stationary according to ADF-test results (even though inflation could be trend-stationary in the sample period under review).

[42] Note that one could argue that neither interest rates nor inflation nor stock market volatility should enter the long-run demand for money function: given that such variables should be I(0) in the long-run, they should influence short-term, but not long-term real balance holdings.

equation (relating long-term rates to inflation), the term structure of interest (relating long- to short-rates) and the substitution effect between bond and stock market investments The third equation relates real output to the real stock market performance and its volatility.

Again, the cointegration system uses an unrestricted constant, allowing for a linear trend in the variables but not in the cointegration relationships. The length of the VAR was determined by the Schwarz criterion, which suggests lag of 1, rejecting the null hypothesis of at most one vector at the 0.05 level (Trace statistic). However, in view of the economic relations outlined above, we decided to opt for 3 vectors and a lag of 3 quarters.

In the following, we will present and briefly comment the estimation results for the demand function of (i) official M3, (ii) M3 adjusted for portfolio shifts as calculated by the ECB and, as a kind of control variable, (iii) M3 adjusted for changes in liquidity preferences (as calculated by ECB Observer). Finally, we will (iv) put the results into perspective.

RE (I): DEMAND FOR OFFICIAL M3

The matrix below shows the results of the cointegration analysis for euro area money demand for the period 1980-Q1 to 2006-Q2. The first row looks like a long-run money demand relationship. Income elasticity of money demand is 1.33 (in line with the findings of various other pre-crisis studies). Also, the (constant) interest elasticity of money demand is negative and has a plausible magnitude.

$$
\begin{bmatrix}
1 & \underset{(0.07)}{-1.329} & 0 & \underset{(0.31)}{1.617} & \underset{(0.01)}{-0.014} & 0 & \underset{(0.64)}{5.057} \\
0 & 0 & 1 & \underset{(0.07)}{-0.434} & \underset{(0.001)}{-0.0043} & \underset{(0.003)}{0.0005} & 0 \\
0 & 1 & 0 & 0 & 0 & \underset{(0.003)}{-0.154} & \underset{(0.60)}{4.501}
\end{bmatrix}
\begin{bmatrix}
m_t - p_t \\
y_t \\
i_t^{long} \\
i_t^{short} \\
\pi_t \\
stock_t \\
stockvol_t
\end{bmatrix}
$$

Chi-square (4) = 2.16 [0.54], standard errors in brackets.

Figure 4.1.9 (a) shows the residuals of the long-run demand for real money function. Figure (b) depicts the equivalent for the asset markets (combining the Fisher equation, the term-structure of interest and the substitution effect of stock market versus bond market), and Figure (c) plots the relation between real GDP, real stock markets, and its volatility.

Figure 4.1.9. – Cointegration results, deviations from equilibrium

(a) Money demand   (b) Asset markets   (c) Stock-GDP relation
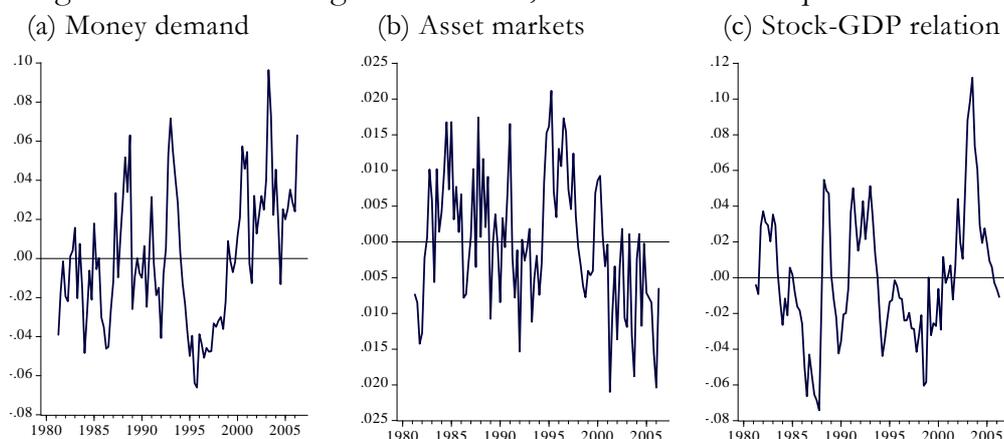
Source: ECB, Thomson Financials; own estimates.

Augmented-Dickey-Fuller (ADF) tests for stationarity suggest that, for the period under review, the null hypothesis of a unit root in the residuals of the long-run relations can be rejected at the 5% level. Whether or not the first cointegration relation can be interpreted as a demand for money function, however, must be inferred from error correction models.

Turning to first difference equations, we find that the lagged error correction term of the long-run real money demand function does not prove to be statistically significant for explaining changes in real money demand (see Figure 4.1.10). That said, the monetary overhang is not corrected via higher consumer price inflation/GDP deflator.

Figure 4.1.10. – Results of the first difference equation (official M3)

	$\Delta(m_t - p_t)$	$\Delta(y_t)$	$\Delta(i_t^l)$	$\Delta(i_t^s)$	$\Delta(\pi_t)$	$\Delta(s_t)$	$\Delta(sv_t)$
Lags	3	3	3	3	3	3	3
ECT_1	-0.031	0.0100	-0.037	-0.061	11.909	-1.270	-0.023
	-0.024	-0.023	-0.017	-0.021	-5.233	-0.550	-0.014
	[-1.293]	[0.4366]	[-2.076]	[-2.832]	[2.275]	[-2.306]	[-1.985]
ECT_2	-0.281	0.1373	-0.294	-0.219	64.093	-0.131	-0.002
	-0.092	-0.086	-0.067	-0.081	-19.71	-2.075	-0.055
	[-3.049]	[1.582]	[-4.362]	[-2.685]	[3.250]	[-0.063]	[-0.034]
ECT_3	-0.020	-0.058	-0.018	0.052	-6.110	0.759	-0.026
	-0.026	-0.024	-0.019	-0.023	-5.627	-0.592	-0.015
	[-0.788]	[-2.378]	[-0.982]	[2.253]	[-1.085]	[1.281]	[-1.665]
R2	0.49	0.47	0.52	0.54	0.58	0.36	0.40

Legend: Standard errors below, *t*-values in [.]. – *ECT* represent the error correction terms as calculated from the long-run estimates. – Period: 1980-Q1 to 2006-Q2.

However, excess money seems to affect long bond yields, the short-term rate, the change in inflation, and changes in stock market

valuations and its volatility, as expressed by the statistical significance of the error correction term of the long-run money demand function in the respective first difference equations.

Figure 4.1.11. – Estimated cointegration parameters and trace tests, forward recursive estimates, official M3

Sample pe- riod	Income elas- ticity	Interest rate elasticity	Stock market volatility	Trace statis- tic	Max-eigen statistic
1981-Q1 2002-Q4	1.23 (0.03)	-0.80 (0.17)	2.48 (0.54)	153.67*	50.02*
1981-Q1 – 2003-Q4	1.18 (0.04)	-0.97 (0.18)	3.28 (0.67)	155.72*	54.78*
1981-Q1 – 2004-Q4	1.22 (0.05)	-1.16 (0.20)	4.67 (0.76)	156.46*	60.06*
1981-Q1 – 2005-Q4	1.26 (0.06)	-1.60 (0.28)	4.68 (0.63)	145.53*	46.23*
1981-Q1 – 2006-Q2	1.32 (0.07)	-1.62 (0.31)	5.05 (0.63)	144.05*	58.69*

Legend: * (**) denotes significance at the 0.05 (0.01) level. – Using McKinnon-Haug-Michelis (1999) p-values.

Figure 4.1.12. – Recursive coefficient estimates for the long-run demand for official M3
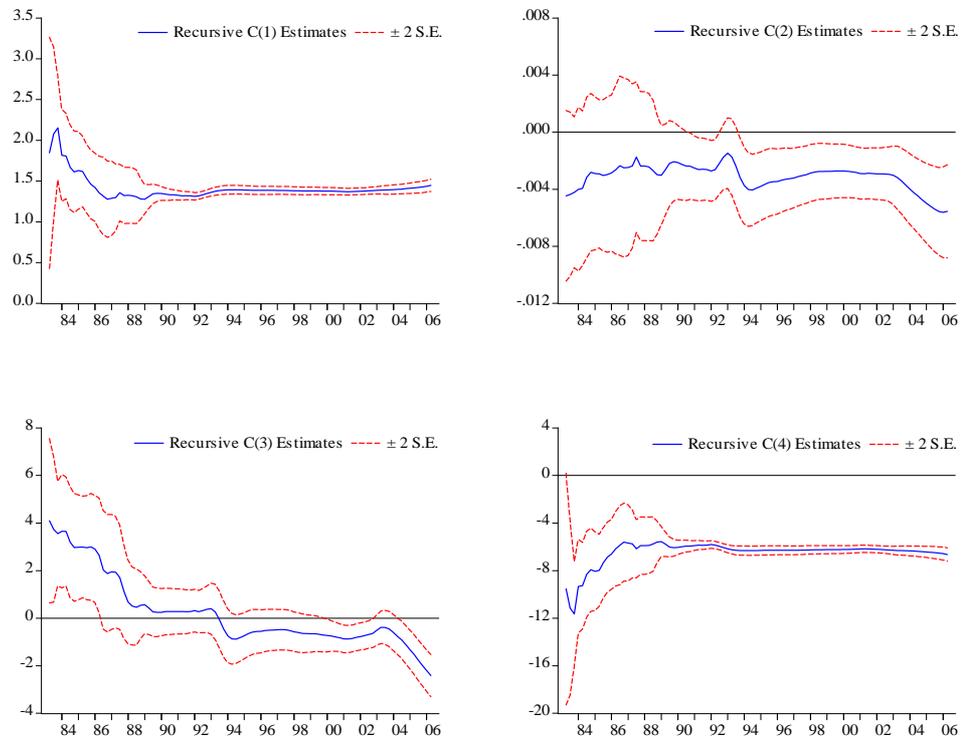
Source: ECB, Thomson Financials; own calculations. – The recursive coefficients show the evolution of estimates for the coefficients under review as sample data is added to the estimate. If the coefficient exhibits significant variations as the number of data added to the estimate is increased, it might be interpreted as a sign if instability. – The dotted lines represent two standard error bands. – Legend: C(1) = income elasticity, C(2) = interest rate elasticity (short rate), C(3) = stock market volatility and C(4) = constant.

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Looking into parameter stability of the (assumed) long-run money demand function, recursive estimation techniques were applied (Dreger, Wolters (2006)). Table 4.1.11 shows the results from this exercise.[43] Overall, the relationships appear to be stable, also after the turbulent period in 2001. In any case, the cointegration finding can be confirmed for all sample periods under review.

Just for illustrative purposes, Figure 4.1.12 shows the recursive estimates of the coefficients of the long-run demand function according to a simple OLS estimate of the money demand function as specified above. Here, income elasticity of money demand has remained fairly stable in the sample period. Recently, however, interest rate and stock market volatility elasticity of money demand has increased (somewhat).

RE (II): DEMAND FOR M3 ADJUSTED FOR PORTFOLIO SHIFTS (ECB)
Using M3 adjusted for portfolio shifts (ECB), income and interest rate elasticity of money are now slightly lower than those estimated for the official M3 demand function (see matrix below).

$$\begin{bmatrix} 1 & \underset{(0.06)}{-1.265} & 0 & \underset{(0.29)}{1.399} & \underset{(0.29)}{-0.006} & 0 & \underset{(0.53)}{3.954} \\ 0 & 0 & 1 & \underset{(0.08)}{-0.497} & \underset{(0.001)}{-0.0047} & \underset{(0.003)}{0.0003} & 0 \\ 0 & 1 & 0 & 0 & 0 & \underset{(0.003)}{-0.154} & \underset{(0.68)}{4.330} \end{bmatrix} \begin{bmatrix} m_t - p_t \\ y_t \\ i_t^{long} \\ i_t^{short} \\ \pi_t \\ stock_t \\ stockvol_t \end{bmatrix}$$

Chi-square (4) = 1.667 [0.79], standard errors in brackets.

Figure 4.1.13. – Cointegration results, deviations from equilibrium

| (a) Money demand | (b) Asset markets | (c) Stock-GDP relation |
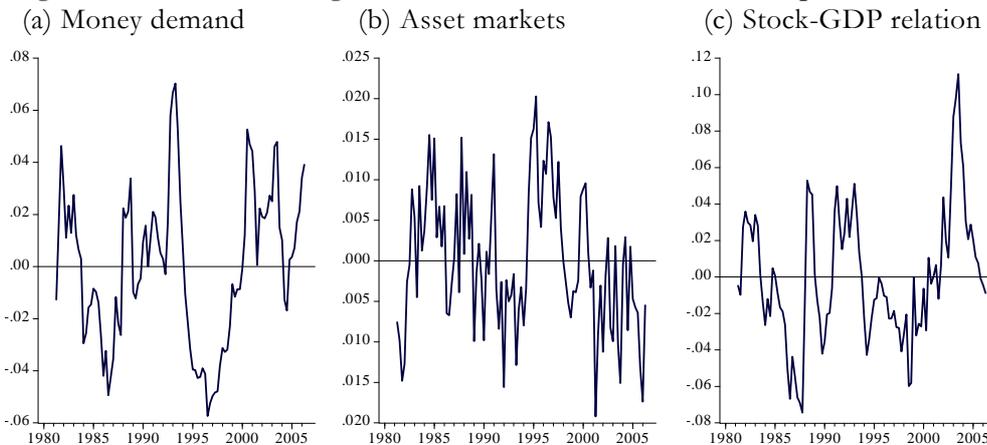
Source: ECB, Thomson Financials; own estimates.

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[43] We started with 2002, given that the periods before have been associated with a stable demand for money function in the euro area.

Figure 4.1.13 (a) to (c) show the residuals of the long-run equations. According to ADF-tests the null hypothesis of a unit root can be rejected for all series at the 0.05 level. Figure 4.1.14 shows the results of the first difference equations. Here, the error correction term of the long-run real money demand function proves to be statistically significant in the first difference equation for real money demand. The monetary overhang is thus corrected via affecting the price level. At the same time, however, the monetary overhang seems also to affect long- and short-term interest rates.

Figure 4.1.14. – Results of the first difference equation (M3 adjusted for portfolio shifts (ECB))

	$\Delta(m_t - p_t)$	$\Delta(y_t)$	$\Delta(i_t^l)$	$\Delta(i_t^s)$	$\Delta(\pi_t)$	$\Delta(s_t)$	$\Delta(sv_t)$
Lags	3	3	3	3	3	3	3
ECT_1	-0.081	0.005	-0.041	-0.067	11.577	-1.115	-0.022
	-0.024	-0.026	-0.020	-0.0246	-5.982	-0.629	-0.017
	[-3.335]	[0.195]	[-2.009]	[-2.727]	[1.935]	[-1.771]	[-1.333]
ECT_2	-0.287	0.127	-0.292	-0.194	57.460	1.1911	0.0024
	-0.081	-0.086	-0.068	-0.0821	-19.933	-2.097	-0.056
	[-3.540]	[1.468]	[-4.264]	[-2.364]	[2.882]	[0.567]	[0.042]
ECT_3	0.0126	-0.053	-0.022	0.039	-3.438	0.400	-0.034
	-0.020	-0.021	-0.017	-0.020	-4.985	-0.524	-0.014
	[0.623]	[-2.440]	[-1.305]	[1.923]	[-0.689]	[0.764]	[-2.44]
R2	0.52	0.47	0.511	0.532	0.576	0.352	0.379

Legend: Standard errors below, *t*-values in [.]. – *ECT* represent the error correction terms as calculated from the long-run estimates. – Period: 1980-Q1 to 2006-Q2.

Figure 4.1.15. – Estimated cointegration parameters and trace tests, forward recursive estimates, M3 adjusted for portfolio shifts
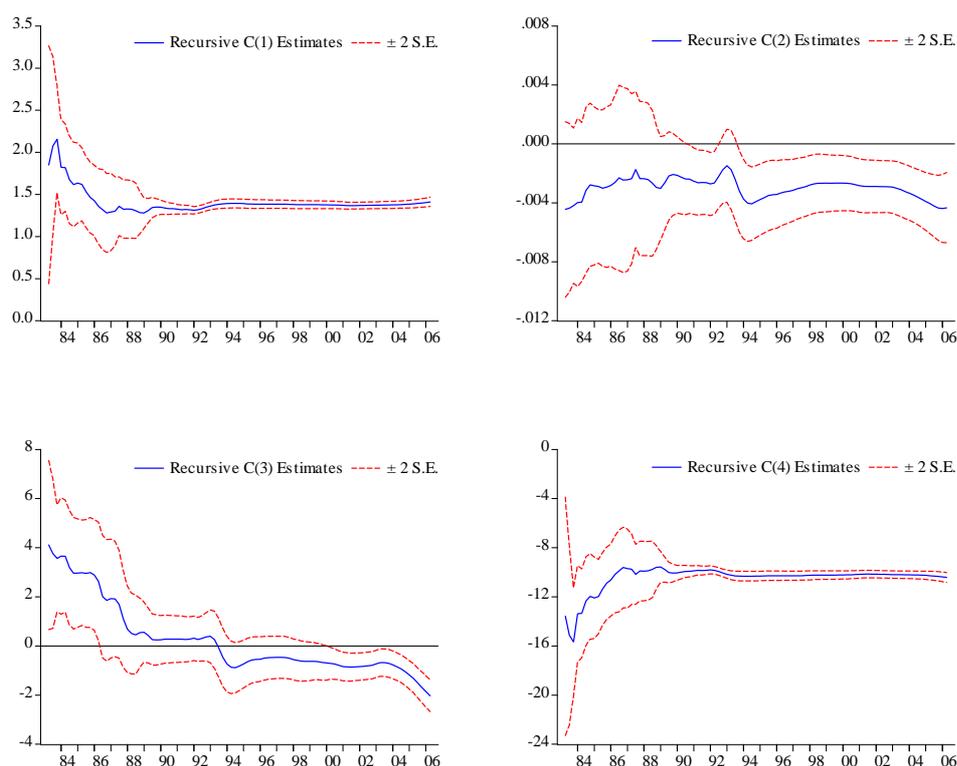
Sample period	Income elasticity	Interest rate elasticity	Stock market volatility	Trace statistic	Max-eigen statistic
1981-Q1 – 2002-Q4	1.24 (0.02)	0.37 (0.13)	1.49 (0.41)	164.72*	63.00*
1981-Q1 – 2003-Q4	1.25 (0.03)	0.33 (0.12)	2.23 (0.51)	165.69*	66.95*
1981-Q1 – 2004-Q4	1.25 (0.03)	0.55 (0.13)	2.70 (0.51)	158.87*	61.08*
1981-Q1 – 2005-Q4	1.29 (0.05)	1.08 (0.23)	3.34 (0.49)	139.29*	54.52*
1981-Q1 – 2006-Q2	1.27 (0.06)	1.39 (0.29)	3.95 (0.53)	134.79*	54.69*

Legend: * (**) denotes significance at the 0.05 (0.01) level. – Using MacKinnon-Haug-Michelis (1999) p-values.

Figure 4.1.15 shows the forward recursive estimated cointegration parameters. Overall, the relationships seem to be relatively stable, and in all sample periods the cointegation relation prevails. Again for illustrative purposes, Figure 4.1.16 shows the OLS recursive coefficient es-

timates for the real money demand function. Income elasticity has remained fairly stable throughout the period under review. What is more, the recent increases in the coefficients for interest rates and stock market volatility are now considerably smaller when compared with the estimates for official M3.

Figure 4.1.16. – Recursive coefficient estimates for the long-run demand for M3 corrected for portfolio shifts (ECB)

Source: ECB, Thomson Financials; own calculations. – The recursive coefficients show the evolution of estimates for the coefficients under review as sample data is added to the estimate. If the coefficient exhibits significant variations as the number of data added to the estimate is increased, it might be interpreted as a sign of instability. – The dotted lines represent two standard error bands. – Legend: C(1) = income elasticity, C(2) = interest rate elasticity (short rate), C(3) = stock market volatility and C(4) = constant.

### RE (III): DEMAND FOR M3 ADJUSTED FOR CHANGES IN LIQUIDITY PREFERENCE (ECB OBSERVER)

Using the stock of M3 adjusted for portfolio shifts (as calculated by ECB Observer), the cointegration analysis yields the following results:

$$
\begin{bmatrix}
1 & \underset{(0.04)}{-1.341} & 0 & \underset{(0.17)}{0.359} & \underset{(0.003)}{0.001} & 0 & \underset{(0.37)}{1.657} \\
0 & 0 & 1 & \underset{(0.07)}{-0.434} & \underset{(0.001)}{-0.004} & \underset{(0.003)}{0.006} & 0 \\
0 & 1 & 0 & 0 & 0 & \underset{(0.004)}{-0.156} & \underset{(0.72)}{5.147}
\end{bmatrix}
\begin{bmatrix}
m_t - p_t \\
y_t \\
i_t^{long} \\
i_t^{short} \\
\pi_t \\
stock_t \\
stockvol_t
\end{bmatrix}
$$

Chi-square (4) = 4.644 [0.33], standard errors in brackets.

Income elasticity is now slightly higher than in the previous two estimates, whereas interest elasticity is considerably lower. Figure 4.1.17 (a) to (c) shows the deviations of actual values from their long-run equilibrium estimates. The null hypothesis of a unit root can be rejected for all series at the 0.05 level according to ADF-tests.

Figure 4.1.17. – Cointegration results, deviations from equilibrium

(a) Money demand   (b) Asset markets   (c) Stock-GDP relation
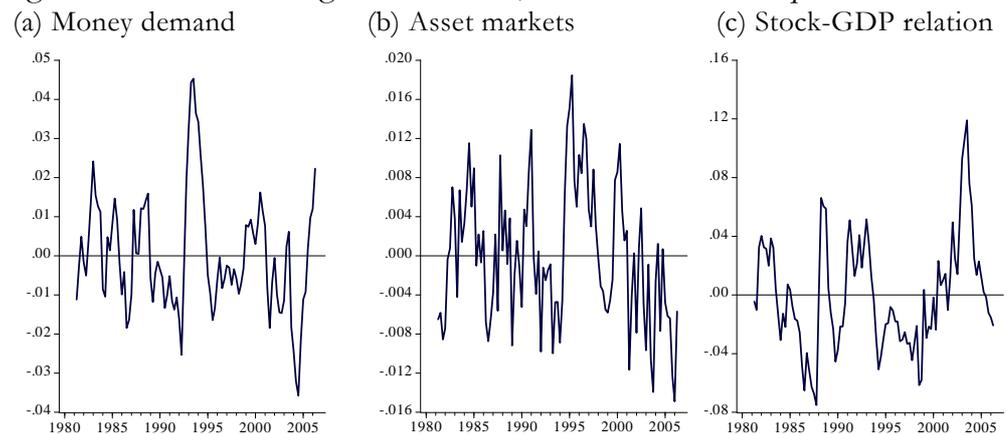
Source: ECB, Thomson Financials; own estimates.

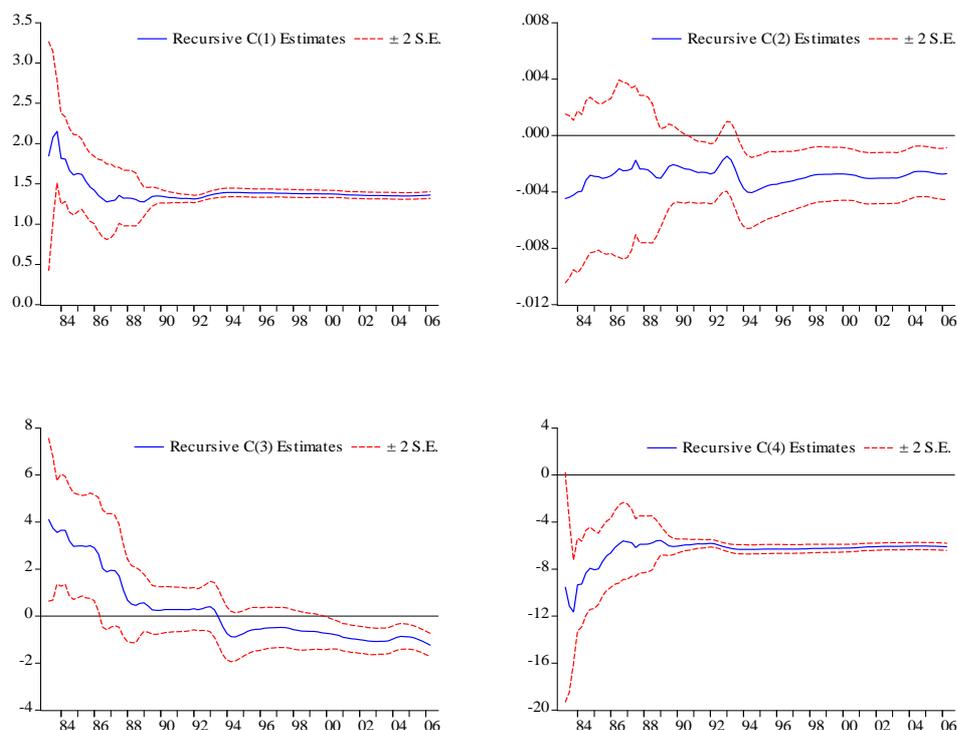Figure 4.1.18. – Results of the first difference equation (M3 adjusted for portfolio shifts (ECB Observer))

	$\Delta(m_t - p_t)$	$\Delta(y_t)$	$\Delta(i_t^l)$	$\Delta(i_t^s)$	$\Delta(\pi_t)$	$\Delta(s_t)$	$\Delta(sv_t)$
Lags	3	3	3	3	3	3	3
ECT_1	-0.129	0.0215	0.001	-0.096	15.189	0.291	-0.038
	0.038	0.037	0.0287	0.0348	8.559	0.901	0.023
	[-3.342]	[0.574]	[0.003]	[-2.771]	[1.774]	[0.323]	[-1.633]
ECT_2	-0.222	0.044	-0.301	-0.116	36.588	1.746	0.055
	0.093	0.090	0.069	0.084	20.689	2.179	0.056
	[-2.374]	[0.489]	[-4.340]	[-1.378]	[1.768]	[0.801]	[0.971]
ECT_3	-0.025	-0.037	-0.035	0.010	2.366	-0.155	-0.040
	0.018	0.0183	0.013	0.0170	4.171	0.439	0.011
	[-1.369]	[-2.061]	[-2.557]	[0.636]	[0.567]	[-0.353]	[-3.521]
R2	0.53	0.45	0.52	0.53	0.53	0.33	0.41

Legend: Standard errors below, *t*-values in [.]. – *ECT* represent the error correction terms as calculated from the long-run estimates. – Period: 1980-Q1 to 2006-Q2.

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The monetary overhang proves to be statistically significant in the first difference equation for long-run real money holdings, indicating that monetary overhangs are corrected over time by changes in real money holdings (see Figure 4.1.18). The monetary overhang, however, proves also to be statistically significant for the changes in short-term rates; this finding might merely reflect the ECB's reaction function.

Again, for illustrative purposes, Figure 4.1.19 depicts the recursive estimates of the long-run money demand function using M3 adjusted for portfolio effects as calculated by ECB Observer. Eyeballing the co-efficients suggests that the parameters under review have remained fairly stable in the period under review.

Figure 4.1.19. – Recursive coefficient estimates for the long-run de-mand for M3 corrected for portfolio shifts (ECB)

Source: ECB, Thomson Financials; own calculations. – The recursive coeffi-cients show the evolution of estimates for the coefficients under review as sample data is added to the estimate. If the coefficient exhibits significant variations as the number of data added to the estimate is increased, it might be interpreted as a sign of instability. – The dotted lines represent two standard error bands. – Legend: C(1) = income elasticity, C(2) = interest rate elasticity (short rate), C(3) = stock market volatility and C(4) = constant.

RE (IV): SUMMARY

Figure 4.1.20 (a) shows three measures of excess liquidity, namely (i) the long-run deviation of official M3 demand from its equilibrium according to the cointegration models, and (ii) residuals of two OLS

regressions using money demand specifications on the basis of M3 adjusted for portfolio shifts and M3 adjusted for changes in liquidity preference. As can be seen, all measures indicate a considerable build up of excess liquidity in the euro area in recent years.

Figure 4.1.20 (b) plots excess liquidity (calculated on the basis of official M3) with annual house price inflation. The fit between the two series is rather striking: it suggests that strong money expansion has been associated with inflating house prices in the euro area. This indeed could indicate that *there is actually more in official M3 than meets the eye* when it comes to inflationary pressures in the euro area. To put it more succinctly: *If there is a monetary policy problem, it might not be related to M3, it might be related to measuring inflation.*

Figure 4.1.20. – Measures of excess liquidity and house price inflation

(a) Measures of "excess liquidity"

(b) "Excess liquidity"[a] and house price inflation
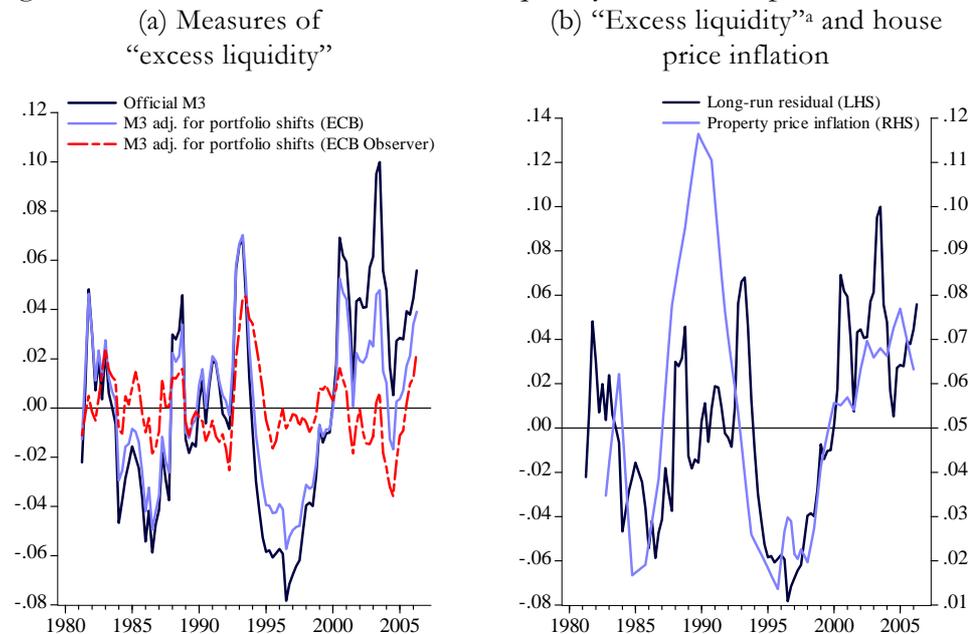
Source: ECB, Thomson Financials; own estimates. –[a]Residual of the long-run money demand functions on the basis of official M3.

As is commonly known, money supply changes work with long and usually uncertain time-lags on the economy and its price level. That said, it cannot be excluded that the money supply increases seen in recent years might hold in store a considerable potential for consumer price inflation going forward.

Alternatively, excess liquidity might also trigger unfavourable developments in financial asset markets. In view of strong increases in asset prices, in particular housing, stocks and bonds, an exogenous shock could actually trigger a sharp downward correction of elevated prices which, in turn, could exacerbate the costs of a financial and economic crisis.

In sum, we conclude that it appears to be increasingly important for the ECB, which has the mandate of preserving the purchasing power of the euro, to set interest rates in accordance with the signals provided by (trend) money supply growth, that is (trend) excess liquidity. This is, because at the end of the day, the consequences of asset price inflation should be equal to those of traditional consumer price inflation – a debasement of the value of money.

## 4.2 Reviewing ECB rates against the Taylor concept

According to the Taylor (1993) concept, the central bank should set its nominal interest in response to the level of growth and inflation. In such a *normative interpretation*, a comparison between the actual central bank rate with the Taylor rate should allow an assessment of the monetary policy stance: if the actual rate is higher (lower) than the Taylor rate, monetary policy would be restrictive (expansionary) by this measure.

Using Taylor's equation, the nominal Taylor rate can be calculated as follows:

$$f_t^* = r + \pi_{t-1} + (\pi_{t-1} - \pi^*)/2 + 100 \cdot (y_{t-1} - y_{t-1}^p)/2,$$

where f_t^* is the implied ECB refinancing rate, r is the *long-run equilibrium real short-term interest rate*, π_{t-1} is the previous period's annual inflation (measured on the basis of the consumer price index), y_{t-1} is the log of the previous period's level of real gross domestic product (GDP), and y_{t-1}^p is the log of an estimate of the previous period's level of potential output (which is approximated by using the HP-Filter). We calculate the Taylor rate for five alternative target inflation rates: $\pi^* = 0, 1, 2, 3, 4$ percent.

Figure 4.2.1. – ECB refinancing rate and Taylor rates

(a) ECB rate and inflation targets (%)   (b) ECB rate, output gap and inflation gap (%)*
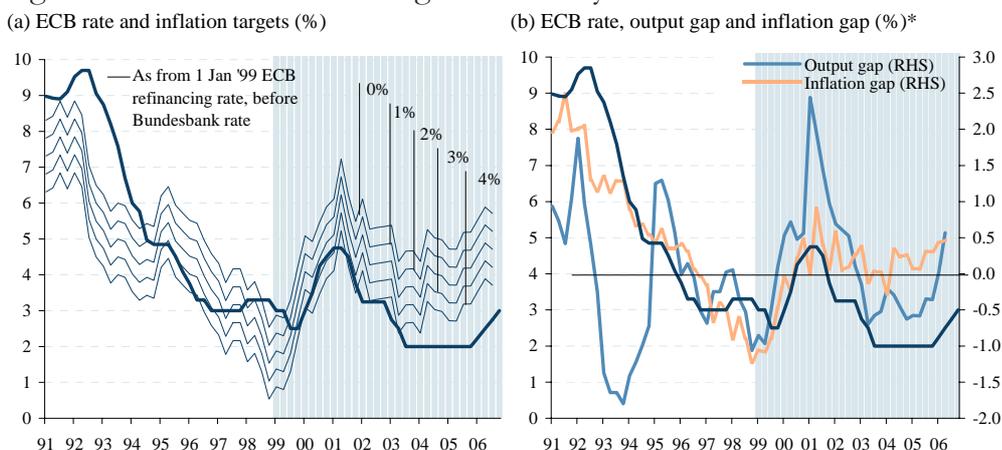
Source: Thomson Financials, Bloomberg; own calculations. * Inflation gap calculated on the basis of a 2% inflation target.

Figure 4.2.1 (a) shows, for the period Q1 91 to Q3 06, the ECB refinancing rate (before 1999-Q1: Bundesbank rate) together with various

Taylor interest rates calculated on the basis of alternative levels of envisaged (target) inflation. Assuming a real equilibrium interest rate of 1.9% p.a. (corresponding to the estimated long-term growth rate of the euro area economy), actual ECB rates have remained below the level as recommended by the Taylor rule since the end of 2001.

For instance, the Taylor rate on the basis of envisaged inflation of, say, 2.0% would have been 4.3% in Q3 06, contrasting with an actual rate of just 3.0% in September.[44]

Figure 4.2.1 (b) shows the output and inflation gap in the euro area. The inflation gap has been positive most of the time since the beginning of the single currency union. Lately, the output gap has also turned into positive territory. That said, both components of the Taylor interest rate are recommending higher ECB rates.

Figure 4.2.2. – ECB real rates and economic growth

(a) ECB real rates (%) and real GDP growth (% y/y)
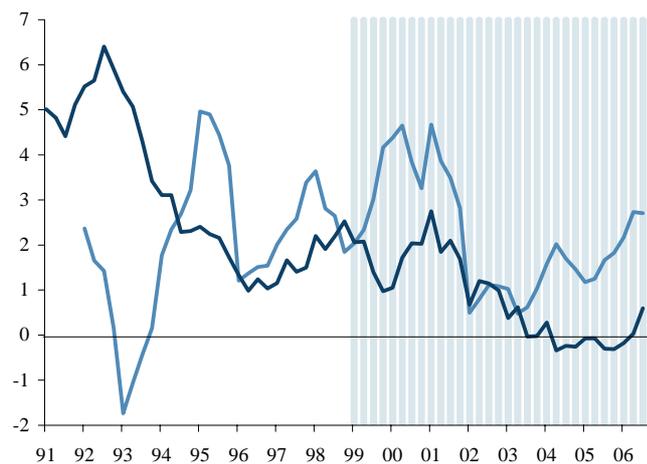
Source: Thomson Financials, Bloomberg; own calculations.

The same point can be made by simply contrasting real ECB rates with real economic expansion rates (Figure 4.2.2). Real short-term rates have remained well below actual GDP expansion since the middle of 2003. Overall, the review of a simple normative Taylor rule would suggest that real (and nominal) short-term ECB interest rates have remained at very low levels in recent years. In view of a positive output and inflation gap, the Taylor rule would actually support an increase in ECB short-term interest rates.

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[44] This can be explained as follows: real rate of 1.9% plus envisaged inflation of 2.0% plus output gap of .7% times .5 plus inflation gap of .1% (that is the average of monthly HICP inflation in Q3 06 of 2.1% minus 2.0%) times .5.

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4.3 Euro area inflation outlook

Back in September 2005, ECB Observer forecast annual euro area
HICP inflation to be 2.5% on average in 2006, indicating that there
would be little hope for inflation to fall below the ECB's upper 2.0%
ceiling anytime soon. At that point in time, ECB staff inflation projec-
tions gave a mid-point inflation outlook of 1.9% for 2006.[45]

4.3.1. – Forecast assumptions

		GDP[1)]growth	GDP[2)] trend growth	M3[3)] growth	Oil pri-ce[4)] (US-$)	EURO-USD[5)]
2006	Q2	2.7	2.2	8.5	58.0	1.28
	Q3	2.6	2.1	9.0	57.0	1.27
	Q4	2.4	2.1	8.5	55.0	1.29
2007	Q1	2.2	2.0	8.0	55.0	1.25
	Q2	2.0	2.0	7.5	55.0	1.25
	Q3	2.0	2.0	7.0	55.0	1.25
	Q4	2.0	2.0	7.0	55.0	1.25
2008	Q1–Q4	2.0	2.0	7.0	55.0	1.25

Legend: 1) real gross domestic product (GDP), annual change (%), sea-
sonally adjusted. – 2) Potential GDP, annual change (%), past values cal-
culated on the basis of level applying the Hodrick-Prescott-Filter; as
from Q2 2005, estimate ECB Observer. – 3) Stock of money M3, annual
change in %, seasonally adjusted. – 4) Oil price in US$ (Brent). – 5)
EURO-USD is the euro-US-dollar exchange rate.
Source: ECB Observer.

4.3.2. – Inflation forecast, 2006-Q4 to 2008-Q4
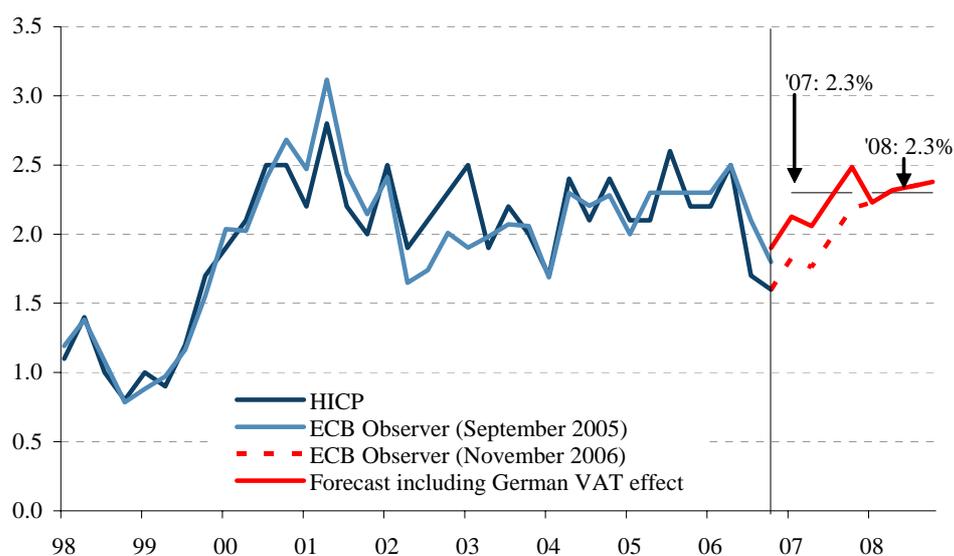
Source: ECB Observer.

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[45] According to current information, inflation is most likely to average out at 2.2%
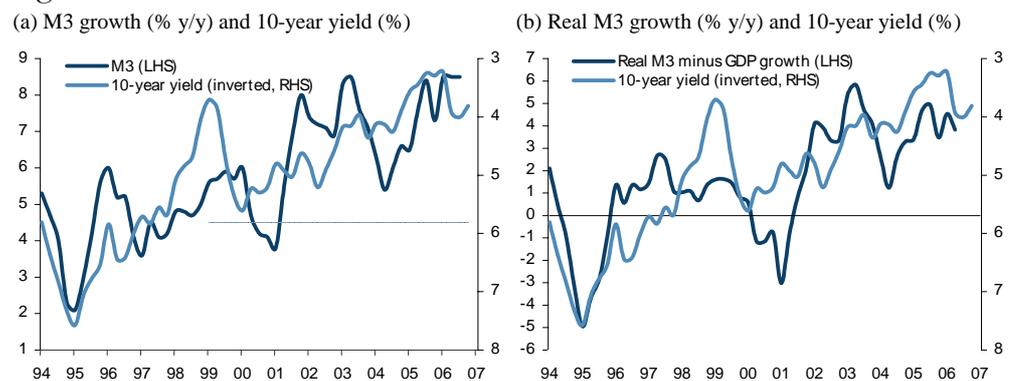this year, largely driven by the sharp drop in oil prices.

Looking ahead, our inflation forecast model suggests an annual average rise of the HICP of 2.3% (including the effect from the German 3pp VAT hike as from 1 January 2007). Of course, the latest pronounced decline in crude oil prices exerts a particularly favourable effect on the short-term dynamics of inflation. For 2008, however, average annual HICP inflation should remain at 2.3%, as excessively high money growth can be expected to prevent inflation from remaining below 2.0% (see Figure 4.3.2).

Figure 4.3.3. – Credit, money and stock prices

(a) Bank loan growth (% y/y) and stock markets   (b) M3 growth (% y/y) and stock markets
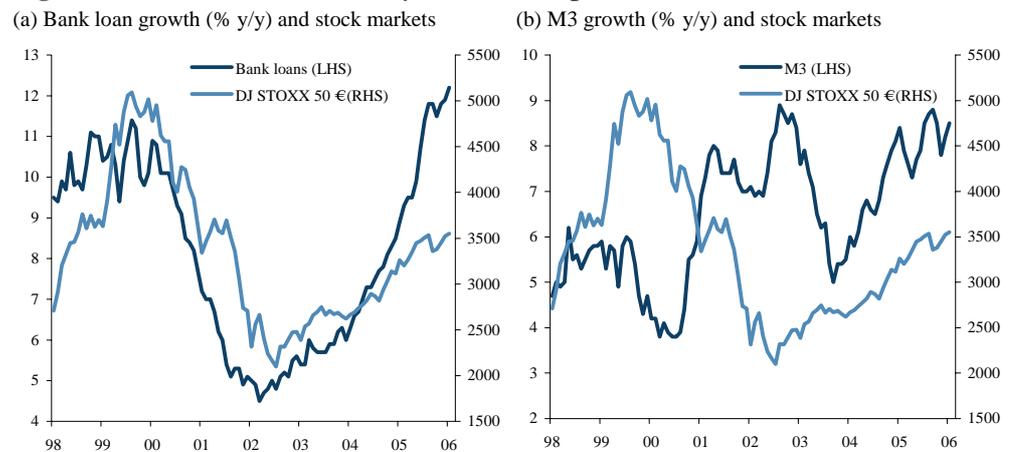
Source: Bloomberg, own calculations.

Figure 4.3.4. – M3 and bond market valuation

(a) M3 growth (% y/y) and 10-year yield (%)   (b) Real M3 growth (% y/y) and 10-year yield (%)

Source: Bloomberg, Thomson Financials; own calculations.

As highlighted in the chapter 4.1 of this report, strong credit and money growth has not only been accompanied by rising stock prices (see Figure 4.3.3) but also by declining bond yields (see Figure 4.3.4). In this context one should bear in mind: inflating asset prices might just be a temporary development – to be followed by a pick-up in consumer price inflation and/or emerging problems in the financial sector, once a sharp correction in elevated asset price increases sets in.

It is against this background that we are in strong support for raising the ECB main refinancing rates further, bringing the ECB refinancing rate to around 4.0%. Under the current official rate level, credit and money supply growth, the drivers of (long-run) inflation, can be expected to continue to grow at too rapid a pace: that is too rapid for either allowing inflation to slow down to an acceptable level or soothing concerns about a forthcoming financial crisis.

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APPENDIX

A.1. – ECB's assessment according to Monthly Bulletin editorial

Date	Actual inflation	Inflation projections	Output growth	M3[1] and	Credit expansion	Final assessment	ECB rate[2]
December 2000	"… slightly below 2.5% in 2000."	2.3% in 2001 1.9% in 2002	"… the short-term outlook points to some moderation in growth …" However, the underlying dynamism of growth continues to prevail."	5.5%	"… a continued high rate of growth in credit to the private sector …"	"… the Governing Council judges the risks to price stability in the medium term under both pillars of the strategy still to be on the upside."	4.75%
June 2001	"… inflation remains above 2.0% in 2001 …" "In 2002, inflation is likely to fall back below 2% …"	2.5% in 2001 1.8% in 2002	Real GDP growth in the euro area in 2001 is expected to come down from the high level reached in 2000 to levels more in line with trend potential growth …"	4.6% "…the indications from the first pillar are consistent with price stability over the medium term."	"… the annual rate of growth of credit to the private sector has continued to moderate over recent months …"	"There is a need to remain vigilant as regards developments affecting the balance of risks to price stability."	4.50%
December 2001	"… annual inflation rates have remained above 2% during most of 2002 …"	1.8% in 2003 1.6% in 2004	"It is expected, therefore, that economic growth will remain subdued in the coming months."	7.1% "There is ample liquidity in the euro area." "… it is unlikely at this juncture that this will translate into inflationary pressures."	"The recent moderation of the growth in loans to the private sector (…) supports this assessment."	"… the reduction in the key ECB interest rates on 5 December 2002 was guided by the assessment that prospects have strengthened for inflation to fall below 2% in the course of 2003."	3.25%
June 2002	"… inflation fell from 2.4% in April to 2.0% in May 2002. However, this decline is mainly due to a base effect …"	2.3% in 2002 1.9% in 2003	"Overall, they suggest that real GDP growth in the euro area should again be in line with potential growth later this year."	7.4% "M3 growth still partly reflects the portfolio shifts to M3 …"	"… annual growth rates of loans to the private sector have stabilised over recent months."	"To avoid inflationary pressure, (…) high wage increases must not spread across sectors and countries in the euro area."	3.25%
December 2002	"2002 inflation has been rather persistent despite the economic slowdown."	1.8% in 2003 1.6% in 2004	"The most likely scenario is that economic growth will gradually recover in the course of 2003 towards rates more in line with potential."	7.1% "There is ample liquidity in the euro area. However, particularly in the light of sluggish economic growth, it is unlikely at this juncture that this will translate into inflationary pressures."	"The recent moderation of the growth in loans to the private sector (…) supports this assessment."	"The key ECB interest rates have now reached a very low level by historical standards. The Governing Council will continue to monitor closely all factors that may affect the prospects for inflation in the euro area."	2.75%
June 2003	1.9% in May, "annual inflation rates are expected to hover broadly around this level for the remainder of 2003 and to fall significantly in 2004."	2.0% in 2003 1.3% in 2004	"… the latest data releases on real GDP growth have confirmed that economic activity in the euro area remained subdued …"	8.7% "… growth in the broad monetary aggregate M3 remained strong. Consequently, the euro area economy has continued to accumulate liquidity significantly above the amount needed to sustain non-inflationary growth."	"… loans to the private sector increased at a much more moderate pace than M3."	"… the economic analysis indicates that inflation rates should decline to below 2% over the medium term (…). The monetary analysis indicates that the strong expansion of M3 should not, for the time being, adversely affect this outlook."	2.0%

APPENDIX

A.1. – ECB's assessment according to Monthly Bulletin editorial (cont'd)

Date	Actual inflation	Inflation projections	Output growth	M3[1] and	Credit expansion	Final assessment	Rate[2]
December 2003	2.2% in November, "… inflation rates are likely to fluctuate around 2% over the coming months, a gradual and limited decline in inflation should take place later on."	1.8% in 2004 1.6% in 2005	"… euro area economic growth is likely to gradually recover over the next quarters, leading to a broader and stronger upswing in the course of next year and the year after."	7.5% "… should high excess liquidity continue to prevail once there is a significant strengthening of economic activity, it could lead to inflationary pressures in the medium term."	"The low level of interest rates has also supported the growth of credit demand."	"… the economic analysis indicates that the main scenario for price developments (…) continues to be in line with the definition of price stability. This picture is confirmed by cross-checking with the monetary analysis."	2.0%
June 2004	2.5% in May; "… these factors (…) should bring annual rates of consumer price inflation back to below 2% in 2005." "… there has been an increase in measures of long-term inflation expectations (…). … the recent upward trend calls for particular vigilance."	2.1% in 2004 1.7% in 2005	"… the recovery in euro area economic growth is expected to continue over the coming quarters, leading to a broader and stronger upswing in the course of next year."	5.2% "…the low level of interest rates continues to fuel monetary growth and the amount of excess liquidity remains high in the euro area."	*No mentioning*	"… the economic analysis indicates that the main scenario for the outlook for price developments (…) remains in line with price stability. Cross-checking with the monetary analysis also supports the case for vigilance with regard to the materialisation of risks to price stability."	2.0%
September 2004	Looking ahead, however, there are no indications at present of stronger underlying inflationary pressures building up domestically."	2.2% in 2004 1.8% in 2005	"Looking ahead, the conditions for a continuation of the recovery remain in place."	5.7% "M3 growth remains resilient." "There remains substantially more liquidity in the euro area than is needed to finance non-inflationary growth."	"The low level of interest rates also seems to be fuelling the growth of loans to the private sector …"	"… while the economic analysis indicates that prospects are consistent with price stability (…), a number of upside risks need to be carefully monitored. Cross-checking with the monetary analysis also supports the case for strong vigilance with regard to the materialisation of risks to price stability."	2.0%
December 2004	"The short-term outlook for inflation remains worrisome."	2.2% in 2004 2.0% in 2005 1.6% in 2005	"The available survey information for October and November points to ongoing growth in the fourth quarter, albeit at a more moderate pace than in the first half of this year."	6.1% "As a result of the persistently high growth in M3 over the past few years, there remains substantially more liquidity in the euro area than is needed to finance non-inflationary economic growth. This could pose risks to price stability over the medium term."	"Growth in loans to nonfinancial corporations has picked up further in recent months."	"… the economic analysis suggests that underlying domestic inflationary pressures are contained, but a number of medium-term upside risks to price stability need to be monitored closely. Cross-checking with the monetary analysis supports the case for continued vigilance with regard to the materialisation of risks to price stability (…)."	2.0%

APPENDIX

A.1. – ECB's assessment according to Monthly Bulletin editorial (cont'd)

Date	Actual inflation	Inflation projections[1]	Output growth	M3[2]	Credit expansion	Final assessment	Rate[3]
March 2005	"In the coming months, annual inflation rates are likely to fluctuate around 2%."	1.9% in 2005 1.6% in 2006	"There are a number of reasons why the weaker real GDP growth in the second half of 2004 could be a transitory phenomenon."	6.6% "The latest monetary data confirm the strengthening of M3 growth observed since mid-2004." There is "substantially more liquidity in the euro area exists than is needed to finance non-inflationary economic growth."	"The exceptionally low level of real interest rates is also further stimulating private sector demand for credit."	"… the economic analysis confirms that underlying domestic inflationary pressures remain contained, while medium-term upside risks to price stability exist and will be monitored closely. Cross-checking with the monetary analysis supports the case for continued vigilance with regard to the materialisation of risks to price stability … ."	2.0%
June 2005	"Over the coming months, annual HICP inflation rates are expected to remain broadly around current levels."	2.0% for 2005, 1.5% for 2006	"Most recent indicators for economic activity remain, on balance, on the downside."	7.2% "… the increasingly liquid nature of monetary expansion, the accumulated stock of the broad monetary aggregate M3 may entail upside risks to price stability over the medium to longer term."	"… the euro area private sector's demand for MFI loans, in particular for house purchase, has remained strong."	"… the economic analysis suggests that underlying domestic inflationary pressures remain contained in the medium term. At the same time, it is necessary to underline the conditionality of this assessment and the related upside risks to price stability. Cross-checking with the monetary analysis supports the case for ongoing vigilance."	2.0%
September 2005	"Over the next few months, annual HICP inflation rates are expected to fluctuate around current levels, mainly due to recent developments in oil prices."	2.2% for 2005 1.9% for 2006	"The most recent survey indicators have, on balance, been supportive to the view that economic growth could improve in the second half of 2005, while higher oil prices continue to weigh on demand and confidence."	n/a "The liquidity situation in the euro area remains ample by all plausible measures, indicating risks to price stability over medium to longer horizons."	"Low interest rates are also fuelling credit expansion, with the strengthening of the demand for loans broadly based across the private sector. The growth of mortgage borrowing remains very strong. In this context, price dynamics in the housing markets need to be monitored closely."	"…the balance of risks to the baseline inflation scenario is tilted to the upside. Cross-checking the economic analysis with the monetary analysis confirms the need for particular vigilance in order to keep medium-term inflation expectations firmly anchored at levels consistent with price stability."	2.0%
December 2005	"It is likely that annual HICP inflation rates will remain elevated in the short term."	2.2% for 2005 2.1% for 2006 2.0% for 2007	"… the outlook for economic activity remains subject to downward risks, relating mainly to higher than expected oil prices, concerns about global imbalances and weak consumer confidence."	7.3% "Liquidity in the euro area is ample by all plausible measures. The strengthening of monetary growth observed since mid-2004 has gained further momentum over the past months."	"Furthermore, the growth of borrowing – especially mortgage loans – remains very robust. In this context, price dynamics in a number of housing markets need to be monitored closely."	"… increased risks to price stability identified by the economic analysis have been confirmed by cross-checking with the monetary analysis. An adjustment of the ECB's monetary policy stance was therefore warranted."	2.25%

APPENDIX

A.1. – ECB's assessment according to Monthly Bulletin editorial (cont'd)

Date	Actual inflation	Inflation projections[1]	Output growth	M3[2]	Credit expansion	Final assessment	Rate[3]
March 2006	"In the short run, inflation rates are likely to remain at above 2%, with the precise levels depending strongly on future energy price developments,	2.2% for 2006 2.2% for 2007	"…the conditions remain in place for ongoing economic expansion ….	8.5% "Looking through the short-term effects generated by such portfolio behaviour, the trend rate of monetary expansion remains strong, reflecting the stimulative impact of the low level of interest rates."	"… growth rate of credit to the private sector has strengthened further over recent months, with borrowing by households – especially loans for house purchase – and non-financial corporations rising at a marked pace."	"… inflation rates are projected to remain elevated in 2006 and 2007, and the economic analysis indicates that risks to price stability over the medium term remain on the upside."	2.50%
June 2006	"… In the months to come and in 2007, inflation rates are likely to remain above 2%, the precise levels depending on future energy price developments."	2.3% for 2006 2.2% for 2007	"… the conditions remain in place for the euro area economy to continue growing at around the potential rate."	8.5% "… the latest developments confirm that the stimulative impact of the low level of interest rates remains the dominant factor behind the current high trend rate of monetary expansion."	"… The further acceleration of monetary and credit growth in this environment of already ample liquidity points to increased upside risks to price stability at longer horizons."	"… inflation rates are projected to remain elevated in 2006 and 2007, with risks to this outlook on the upside. Given the strength of monetary and credit growth and the ample liquidity situation, a cross-check of the outcome of the economic analysis with that of the monetary analysis confirms that upside risks to price stability over the medium term prevail."	2.75%
September 2006	"… inflation rates are likely to remain above 2%, the precise levels depending on future energy price developments. "	2.4% for 2006 2.4% for 2007	"… the conditions remain in place for the euro area economy to continue growing at around the potential rate."	8.5% "… liquidity in the euro area remains ample by all reasonable measures."	"Continued strong monetary and credit growth in the context of already ample liquidity points to upside risks to price stability over the medium to longer term."	"… inflation rates are projected to remain elevated in 2006 and 2007, with risks to this outlook continuing to be clearly on the upside. Given the ongoing dynamism of monetary and credit growth in an environment of already ample liquidity, … upside risks to price stability prevail over the medium term."	2.75%

Source: European Central Bank, Monthly Bulletins. – 1) Mid points. – 2) Numbers refer to the average growth rate of the last three months. – 3) Up to 21 June 2000, rate of the fixed rate tender; from 28 June 2000, rate of the variable rate tender at minimum bid rate.

APPENDIX

A2. Schedules for the meetings of the Governing Council and General Council of the ECB and related press conferences, 2006 and part of 2007

Governing Council		General Council	Press Conferences
2006			
12	January		12 January
2	February		2 February
16	February		
2	March		2 March
16	March	16 March	
6	April		6 April
20	April		
4	May		4 May
18	May		
8	June (Madrid)		8 June
22	June	22 June	
6	July		6 July
20	July		
3	August		
31	August		31 August
14	September	14 September	
5	October (Paris)		5 October
19	October		
2	November		2 November
16	November		
7	December		7 December
21	December	21 December	
2007			
11	January		11 January
8	February		8 February
22	February		
8	March		8 March
22	March		
12	April		12 April
26	April		
10	May (Dublin)		10 May
24	May		
6	June (Madrid)		6 June
21	June		
5	July		5 July
19	July		
2	August		
6	September		6 September
20	September		

Source: ECB.

APPENDIX

A.3 – ECB Observer – recent publications

Number	Title and content	Date of publication
No. 9	Money matters for inflation in the euro area Content: *1. Challenges to ECB independence. – 2. A critical review of the "neutral interest rate" concept. – 3. Monetary policy and its impact on structural economic developments. – 4. ECB policy – review and outlook.*	29 November 2006
No. 8	Back to the rules Content: *1. Rules for sound money. – 2. How the ECB and the US Fed set interest rates. – 3. A call for ECB Governing Council minutes. – 4. Euro area monetary policy and inflation outlook.*	27 September 2005
No. 7	Towards a "more neutral" monetary policy Content*: 1. A critical look at ECB staff inflation projections. – 2. Asset price inflation – a cause of concern for monetary policy. – 3. Impact of short-term rates on stock market returns. – 4. ECB rate and euro inflation outlook.*	16 September 2004
No. 6	Liquidity on the rise Content: *1. A case against ECB FX market interventions. – 2. "Price gaps" and US inflation. – 3. "Price gaps" and euro area inflation. – 4. ECB rate and euro inflation outlook.*	2 February 2004
No. 5	Challenges to ECB credibility Content*: 1. Fundamentals of ECB credibility. – 2. ECB strategy review – increasing the bank's open flank. – 3. Uncertainty – pressure for easier monetary policy. – 4. ECB policy review and outlook.*	8 July 2003
No. 4	International coordination of monetary policies – challenges, concepts and consequences *Content: 1. International coordination of monetary policies. – 2. Does the ECB follow the Fed? – 3. Stock prices – a special challenge for monetary policy. – 4. ECB monetary policy review and outlook.*	19 December 2002
No. 3	The Fed and the ECB – why and how policies differ Content*: 1. The US Federal Reserve System and the European System of Central Banks – selected issues under review. – 2. The reaction functions of the US Fed and ECB. – 3. The influence of monetary policy on consumer prices. – 4. ECB rate policy and euro area inflation perspectives.*	24 June 2002
No. 2	Can the ECB do more for growth? Content: *1. Should the ECB assign a greater role to growth? – 2. Government finances and ECB policy – a discussion of the European Stability and Growth Pact. – 3. "Price gap" versus reference value concept. – 4. Assessment of current ECB policy and outlook.*	19 November 2001
No. 1	Inflationsperspektiven im Euro-Raum Content: *1. Warum die EZB-Geldpolitik glaubwürdig ist. – 2. EZB-Strategie – Stabilitätsgarant oder überkommenes Regelwerk? – 3. Stabilitätsrisiken der Osterweiterung. – 4. Zinspolitik der EZB in 2001 und 2002.*	17 April 2001

APPENDIX
A.4. – ECB Observer – objectives and approach

The objective of ECB Observer is to analyse and comment on the conceptual and operational monetary policy of the European System of Central Banks (ESCB). ECB Observer analyses focus on the potential consequences of past and current monetary policy actions for the future real and monetary environment in the euro area. The analyses aim to take into account insights from monetary policy theory, institutional economics and capital market theory and are supplemented by quantitative methods. The results of the analyses are made public to a broad audience with the aim of strengthening and improving interest in and understanding of ECB monetary policy. ECB publishes its analyses in written form on a semi-annual basis.

APPENDIX
A.5. – ECB Observer *team members*

Professor Dr. *Ansgar Belke*, born 28 March 1965. 1991 Diploma in Economics, University of Münster; 1995 Ph.D. in Economics, University of Bochum; 1997 Research Fellow at the Center for Economic Research, Tilburg/Netherlands, Visitor at the Centre for European Policy Studies, Brussels; 2000 Habilitation in Economics and Econometrics, University of Bochum; 2000 Visiting professor (C4) at the University of Essen, 2000 Full Professor of Economics, University of Vienna (C4); since 2001: Full Professor of Economics (C4), Head of 'Research Center for European Integration', and board member 'Eastern Europe Center', University of Hohenheim; since 2004: Research Fellow at the Institute for the Study of Labour (IZA), Bonn. Fields of interest: International Macroeconomics, Monetary Economics, European Integration, Venture Capital Finance. Publications in journals such as North American Journal of Economics and Finance, Open Economies Review, Public Choice, Scottish Journal of Political Economy, World Economy. Referee for journals like European Economic Review, Open Economies Review, Public Choice, and for the German Science Foundation, Volkswagen Foundation, German Economic Association, FEMISE Network (Forum Euro-Mediterranéen des Instituts Economiques). Presentations at international conferences such as 'Annual Econometric Society European Meeting', 'European Economic Association Congress', 'International Seminar on Macroeconomics (EEA and NBER)'. E-mail: belke@uni-hohenheim.de.

Professor Dr. *Martin Leschke*, born on 2 March 1962 in Oberhausen, Germany. From 1983 to 1989 studied economics at the Westfälische Wilhelms-University. From 1989 to 1993 assistant to professorship for economics, specialising in monetary economics (professor Dr. Manfred Borchert). Dissertation in 1993 at the University of Münster. 1994 research fellowship at the Center for Study of Public Choice, George Mason University, Fairfax, VA, USA (sponsored by DFG). Habilitation in 1998. From 1999 to February 2002 assistant professor at the University of Münster. Since March 2002, professorship of economics at the University of Bayreuth. Research focus: money theory and monetary policy, European integration, institutional economics, macro-economic issues.
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Professor Dr. *Wim Kösters*, born on 26 November 1942 in Greven, Germany. From 1963 to 1968 studied economics at the Westfälische Wilhelms-Universität Münster. From 1968 to 1969 stipendium at the Florida State University and Harvard University. From 1969 to 1982 assistant to Prof. Dr. Hans K. Schneider in Münster and Cologne. Dissertation in 1972 at the University in Münster. Habilitation in 1982 at the Universität in Cologne. From 1982 to 1991 Professor of macroeconomics at the University of Münster. Since 1991 professorship in theoretical economics I (Jean Monnet professorship) at the Ruhr-University Bochum. Memberships: Council for Economic and Social Policy – Verein für Socialpolitik, Working Group International Economic Relations and Working Council German Domestic Market of the List Association, Working Group Economic Policy and Development, Working Group Europe Policy and Science of the Konrad Adenauer-Stiftung, Brussels Initiative, Latin America Centre of the University of Münster (corresponding), Presidium of the Working Group European Integration, European Community Studies Association/USA. Research focus: monetary theory and monetary policy, macro-economics and stabilisation policy, labour market theory and policy, integration theory and policy with a special emphasis on monetary integration, international trade policy.
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Dr. *Thorsten Polleit*, born 4 December 1967 in Münster, Germany. From 1988 to 1993 studied economics at the Westfälische Wilhelms-Universität Münster. 1995 dissertation with Professor Dr. Manfred Borchert, professorship for monetary economics, specialising in monetary theory and policy. From 1997 to March 1998 ABN AMRO (Deutschland) AG, Frankfurt, Institutional Investor Equity Advisory. From April 1998 to September 2000 Chief Economist (Germany) at ABN AMRO (Deutschland) AG and ABN AMRO Asset Management GmbH. Since October 2000 at Barclays Capital in the Economics and Strategy Division. Since the end of 2002, he is a member of the Handelsblatt / Wall Street Journal Europe sponsored ECB Shadow Council. Thorsten is active in the fields of financial market and monetary policy theory research. In March 2003, he was appointed Honorary Professor at the HfB – Business School for Finance and Management, Frankfurt, lecturing Monetary and Financial Market Economics. Research focus: monetary theory and policy, and capital market theory.
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