BANCA D'ITALIA

EUROSISTEMA

Temi di discussione

(Working papers)

Excess money growth and inflation dynamics

by Barbara Roffia and Andrea Zaghini

January 2008

Number 657

The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

EXCESS MONEY GROWTH AND INFLATION DYNAMICS

by Barbara Roffia[*] and Andrea Zaghini[**]

Abstract

The paper analyzes the short-run impact of periods of strong monetary growth on inflation dynamics for 15 industrialized economies. We find that when robust money growth is accompanied by large increases in stock and house prices and loose credit conditions, the probability of recording an inflationary outburst over a three-year horizon is significantly increased. In contrast, significant money stock expansions which are not associated with sustained credit increases and strong dynamics in other asset prices seem to be less likely to have inflationary consequences and thus, less worrying from a policy perspective.

JEL Classification: E31, E40
Keywords: Inflation, money growth, quantity theory of money

Contents

[*] European Central Bank, Directorate General Economics. barbara.roffia@ecb.int.
[**] Bank of Italy, Economic and International Relations. andrea.zaghini@bancaditalia.it

1.Introduction[1]

The existence of a positive relationship between money and prices in the long run is well acknowledged in economic literature. A large consensus can be found on both the direction and the dimension of the effect of an increase in the monetary aggregate (regardless of the definition adopted) on price developments. The statement that, in equilibrium, monetary policy is neutral (i.e. it does not affect real economic variables such as consumption and output but it has only a nominal impact) hinges on the quantity equation, which in turn defines a positive "one-to-one" relationship between monetary and price growth: after an increase in money stock prices will rise eventually in the same proportion. The theoretical consensus on money neutrality is also supported by well-documented empirical evidence, in both time-series and cross-countries analyses.[2]

The economic profession, however, highlights that, since money is not the sole cause of price developments in the short run, a certain period of time must elapse before the "one-to-one" relationship emerges. In fact, there are other factors that may temporarily affect price dynamics and hide the longer-term money neutrality. This implies that, in order to forecast inflation, monetary aggregates may not show good leading properties in the short-to-medium run. Indeed, the role of money as an informational variable for monetary policy decisions is an open issue. Empirical works provide mixed results and the findings seem mainly to depend on the selected countries and the historical periods considered.[3]

The aim of the paper is to shed some light on the reasons why some robust money growth episodes lead to inflation even in the short-run while others do not. In particular, we check whether the development in asset prices and credit dynamics might

[1] The authors would like to thank Ben Steil, Alessandro Calza, Sergio Nicoletti Altimari, Huw Pill, Lars Risbjerg, Frank Smets, Andrea Tiseno and Thomas Westermann for helpful discussions and useful suggestions together with two anonymous referees and participants at the XIV Tor Vergata Conference on Banking and Finance, the LXI European Meeting of the Econometric Society and the ECB Workshop "The role of monetary analysis in monetary policy". The views expressed in the paper do not necessarily reflect those of the European Central Bank or the Bank of Italy.

[2] See for instance Lucas (1980), Lothian (1985), McCandless and Weber (1995), Jaeger (2003), Gerlach and Svensson (2003) and Benati (2006) among many others.

[3] A non-exhaustive list includes Stock and Watson (1999), Dwyer and Hafer (1999), Trecroci and Vega (2000), Nicoletti Altimari (2001), Leeper and Roush (2002).

contribute positively to the triggering of an inflationary outburst. The analysis of the inter-relationship between money, credit and asset prices, which can be dated at least as far back as Kindleberger (1978), has recently regained relevance in the current context of low and stable inflation in almost all industrialized economies. In such an environment, inflationary pressures normally associated with unsustainable developments in real and financial variables may take longer to emerge and symptoms may show up in advance in excessive credit and asset price growth (Bordo and Jeanne, 2002; Borio and Lowe, 2002; Machado and Sousa, 2006).

In addressing our goal we rely on a technique employed by a recent strand of the empirical literature on credit and asset prices developments (Borio and Lowe, 2004; Detken and Smets, 2004; Van den Noord, 2006). Instead of focusing on the joint statistical properties of the two time series of money and inflation over time – as traditionally done when assessing the quantity theory (Bachmeier and Swanson, 2005; De Grauwe and Polan, 2005; Bruggeman et al., 2005; Assenmacher-Wesche and Gerlach, 2006a) – we focus only on carefully chosen episodes of sustained money growth which ex-ante are supposed to have a high probability of leading to an inflationary outburst.

We first identify 71 periods of robust monetary growth over the last three decades in 15 industrial economies and we find that only in around 50 per cent of the cases did inflation actually follow over a three-year horizon. We then check via probit regressions whether the probability of inflation occurring after those episodes is influenced by the behavior of a set of macroeconomic and financial variables. The empirical evidence gathered supports the view that when robust money growth is accompanied by large increases in stock prices, house prices and loose credit conditions an inflationary outburst is likely to follow in the short run.

A direct policy implication stemming from our findings is that money growth must be seen as more dangerous for price stability when accompanied by strong credit and asset price growth. In contrast, robust money growth which is not associated with sustained credit expansion and strong dynamics in asset prices seems to be less likely to have inflationary consequences and thus, less worrying determinants are to be investigated regarding its evolution.

The paper is structured as follows. Section 2 illustrates the dataset and proposes a brief cross-section and pooled panel analysis of money and price developments; Section 3 deals with the selection criteria of money growth episodes; in Section 4 we present an econometric investigation of the circumstances that may lead to an inflationary outcome and in Section 5 we discuss the results from several robustness checks. Finally, Section 6 draws some conclusions by relating our results to the current empirical literature.

2. A preliminary look at the data

The study analyzes the development of financial, real and monetary indicators around periods of strong monetary growth. In particular, we made use of historical series of a broad monetary aggregate, roughly equivalent to M2 or M3 (depending on the country considered) and year-on-year changes in the consumer price index. As for asset prices, we considered stock market developments (represented by the share price index available for each country) and house price dynamics. Macroeconomic variables include nominal and real GDP, output gap and nominal investment (gross fixed capital formation), while financial variables are represented by the short-term (three-month money market) and long-term (ten-year government bond yield) interest rates and the nominal and real effective exchange rates. With regard to credit, we use credit to the private sector (or loans to the private sector when available). We also considered several indices of oil and commodity prices and indicators of fiscal sustainability.[4]

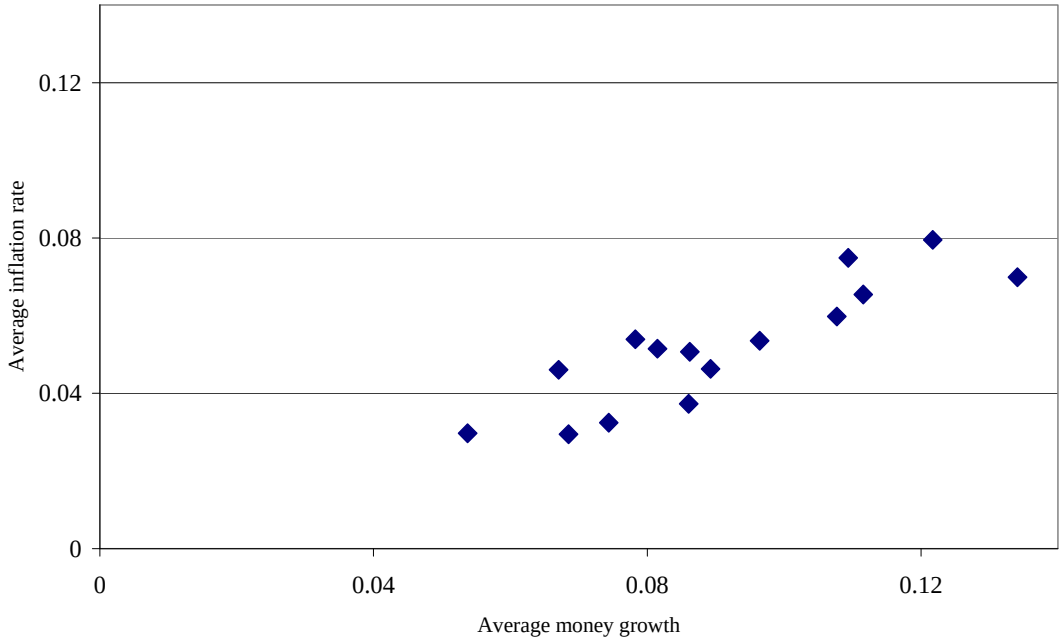
The dataset used for the analysis consists of quarterly data collected for 15 main industrial economies and spans more than three decades. Whenever available, data start in 1970 Q1 and end in 2006 Q1. The countries considered are: Australia, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. The average growth rate of the monetary aggregate over the whole sample ranges from five per cent in Switzerland to 13 per

[4] All series are seasonally adjusted. Whenever available, quarterly series are calculated as averages of monthly series. For a detailed description of the series used and their sources see the Appendix.

cent in New Zealand, while average inflation is at the lowest rate in Germany (three per cent) and at the highest rate in Spain (eight per cent).

Before starting our analysis of the short-run linkage between money and prices, we check the quantity theory tenet for the long run.[5] We run this preliminary assessment because the long-run relation between money and prices has recently been questioned by De Grauwe and Polan (2005) for countries displaying a low level of inflation. Since the countries in our sample are all included in their group of low level inflation economies (and low level of money growth), we briefly replicate their main analyses simply to shed some light on the statistical properties of our data set. It would be indeed questionable to investigate a "milder" short-run relation if the "stronger" long-run relation were not to hold in our sample.

Figure 1 Average inflation and money growth across countries



[5] Note that in the paper we use the wording "short run" to refer to a period different from the "long run", which in the money-inflation literature is often much longer than our horizon of three years. For instance, Fitzgerald (1999) suggests for the US a period of eight years, while Smets (2003) hints at a medium-term of four years for the euro area. In addition, there is ample evidence in the VAR literature for the main industrialized economies that after three to four years monetary policy shocks still have significant real effects on the economy (usually GDP's response peaks at eight to 12 quarters and then slowly declines) and thus that the long run has not yet started after that amount of time. Our "short-run" definition might thus be interpreted as a short-to-medium run.

With respect to the study of De Grauwe and Polan (henceforth DeGP) we have fewer countries (15 in our sample *versus* 32 in their cross-section analysis), but longer time series (37 years *versus* 30). Figure 1 depicts the scatter plot for the 15 countries of the averages of their money and price growth rates over the whole time span (1970-2006). Even though the points are clearly below the 45 degree line, the two variables exhibit a strong positive correlation and they are far from depicting a "shapeless and almost horizontal cloud" as instead is the case for the DeGP set of countries. A simple regression of the growth rate of prices on money and real GDP confirms the visual intuition. Table 1 reports the estimates on our sample (Panel A) and the values in DeGP (Panel B).[6] Although the coefficient on money growth (0.703) is below unity, it is much larger than the one reported in DeGP (0.250) and significantly different from zero.

Table 1 Results of OLS estimations

	(Panel A)			**(Panel B)**		
Variable	Coefficient	*Std Error*	*p* -Value	Coefficient	*Std Error*	*p* -Value
Constant	0.004	0.008	0.653	4.750	2.145	0.035
Broad Money	0.703	0.142	0.000	0.250	0.187	0.200
GDP	-0.601	0.487	0.242	-0.280	0.219	0.209

Note: White HCSE & Covariance.

In addition, the panel regressions run following DeGP's analysis, which take advantage of both cross-section and time-series dimensions of the data set, seem to support the idea that our sample is well suited to investigate the relation between money and prices in the short run. Table 2 shows the results of a pooled (homogeneous) OLS regression and a fixed-effect regression. The coefficient on money growth suggests an impact adjustment of prices to changes in the broad monetary aggregate of around 0.3. Given that this is a contemporaneous relation, whereas the quantity theory postulates a long-run unitary relation between the two variables, the results can be considered fairly satisfactory. In comparison, DeGP report a

[6] The data are taken from Table 6 on p. 250 of De Grauwe and Polan (2005).

lower fixed-effect estimate of 0.2005 for the whole sample and 0.1663 for the low inflation countries.

Summing up, the evidence in favor of a positive long-run relation between money growth and inflation is strong, even though the brief analysis proposed cannot be considered exhaustive. The fact that we are using a much more homogeneous sample of advanced economies and with a more reliable data releasing process may explain the large differences with the DeGrauwe and Polan's results. In the following section we propose a way in which phases of robust money growth might be selected to investigate from a favorable perspective the short-run relation between money development and inflation dynamics.

Table 2 Results of panel estimations

	(Pooled OLS)			(Fixed effects)		
Variable	**Coefficient**	**Std Error**	***p*- Value**	**Coefficient**	**Std Error**	***p*- Value**
Constant	0.022	0.003	0.000	0.026	0.003	0.000
Broad money	0.329	0.025	0.000	0.289	0.026	0.000

3. Episode selection

The main aim of the paper is to analyze the relation between money and prices in order to check whether the positive causality implied in the quantity equation holds also over a relatively limited time span. Thus, by carefully selecting periods of robust monetary increase, we try to place us in the most favorable condition to assess the one-to-one quantity theory prediction. In particular, to select phases of "excessive" money growth we make use of a measure proposed by Borio and Lowe (2004), who focus their attention on the cumulative building of imbalances. The idea is that vulnerabilities are generally built up over an extended time, rather than in a single period such as a month or a quarter.

Borio and Lowe suggest looking at the "money gap" measure, which is defined as the deviation of the ratio of money to GDP from its trend. The trend is here calculated using a

Hodrick-Prescott filter (with a smoothing parameter of 1600) over the whole sample.[7] Starting from this principle, we sorted out only periods of continuous imbalances, namely our episodes are selected according to their length. In particular, we selected an episode only when the deviation of the ratio of money to GDP from trend persisted for at least one year (four consecutive quarters). The only exception was that, when we found a single negative quarter within an already established episode, we considered it part of the excessive money growth period. As an example, during the eight quarters from 1984 Q4 to 1986 Q3, Australia witnessed only one quarter (1985 Q2) in which the ratio of money to GDP was (slightly) negative. We thus considered the full eight-quarter length instead of starting the episode from 1985 Q3.[8]

In order to have three years of data after the end of each episode, we considered only episodes ending before 2003 Q1, so that the available number of cases turned out to be 71 (see Table 3). Although for each country at least two episodes can be recorded, episodes are not evenly distributed among countries, partly due to different data availability. More precisely, Australia witnessed nine episodes, followed by Norway, Sweden and the United States which experienced six episodes. France and Switzerland, at the opposite, underwent only two and three episodes, respectively. Fifteen episodes occurred in the 1970s, 23 in the 1980s, 27 in the 1990s and six ended after 2000. The length of the episodes ranges from four to 20 quarters. In particular, there are 32 cases which lasted less than two years (four to eight quarters) and 39 with a length between two and five years (nine to 20 quarters). Finally, it is worth noting that the list of the selected episodes is consistent with the periods of financial distress identified by the empirical literature (Bordo et al., 2001; Borio and Lowe, 2002; Detken and Smets, 2004; Van den Noord, 2006).

[7] In the same vein we constructed the gap measures for credit to the private sector, stock prices, house prices, output, inflation and investment.

[8] According to this rule, we adjusted the length of six episodes, which would have been selected anyway, and added one episode of seven quarters, which instead would not have been selected according to the four consecutive quarter rule. However, the results of the paper are not affected by this marginal adjustment. See Section 5 for robustness checks about both the selection criterion and the inflation assessment.

Table 3 Episodes of "excessive" monetary growth

Country	Money growth gap>0%	No. of quar-ters	No. of epis.	Inflat. epis.
Australia	1972 Q4 - 1974 Q2	7	9	**yes**
	1975 Q2 - 1976 Q1	4		**no**
	1977 Q4 - 1978 Q4	5		**yes**
	1980 Q1 - 1981 Q2	6		**no**
	1983 Q1 - 1983 Q4	4		**no**
	1984 Q4 - 1986 Q3	8		**yes**
	1989 Q3 - 1991 Q4	10		**no**
	1996 Q4 - 1997 Q3	4		**no**
	1999 Q1 - 2000 Q1	5		**yes**
Canada	1972 Q1 - 1972 Q4	4	5	**yes**
	1978 Q4 - 1983 Q1	18		**no**
	1986 Q4 - 1987 Q3	4		**no**
	1990 Q3 - 1993 Q4	14		**no**
	1996 Q1 - 1998 Q4	12		**yes**
Denmark	1975 Q4 - 1978 Q1	10	4	**yes**
	1984 Q2 - 1988 Q4	19		**no**
	1992 Q2 - 1994 Q3	10		**yes**
	1996 Q4 - 1999 Q3	12		**yes**
France	1990 Q3 - 1993 Q4	14	2	**no**
	1995 Q3 - 1996 Q3	5		**no**
Germany	1982 Q1 - 1985 Q2	14	4	**no**
	1988 Q1 - 1990 Q2	10		**yes**
	1993 Q2 - 1994 Q4	7		**no**
	1998 Q4 - 2000 Q2	7		**yes**
Italy	1978 Q1 - 1980 Q1	9	4	**yes**
	1984 Q4 - 1987 Q4	13		**yes**
	1992 Q2 - 1994 Q4	11		**no**
	1996 Q2 - 1997 Q1	4		**no**
Japan	1971 Q3 - 1974 Q1	11	5	**yes**
	1978 Q4 - 1980 Q2	7		**yes**
	1981 Q4 - 1984 Q1	10		**no**
	1987 Q2 - 1991 Q3	18		**no**
	1998 Q1 - 1999 Q4	8		**no**
Nether-lands	1982 Q2 - 1983 Q2	5	4	**no**
	1989 Q3 - 1991 Q1	7		**no**
	1992 Q4 - 1994 Q4	9		**no**
	1998 Q4 - 2000 Q2	7		**yes**
New Zealand	1981 Q1 - 1981 Q4	4	4	**no**
	1985 Q2 - 1988 Q2	13		**no**
	1991 Q1 - 1993 Q4	12		**yes**
	1996 Q2 - 1998 Q3	10		**yes**
Norway	1971 Q4 - 1973 Q2	7	6	**yes**
	1976 Q4 - 1978 Q1	6		**yes**
	1979 Q1 - 1979 Q4	4		**yes**
	1988 Q1 - 1989 Q1	5		**no**
	1991 Q4 - 1996 Q3	20		**yes**
	1998 Q1 - 1999 Q3	7		**yes**
Spain	1984 Q1 - 1985 Q4	8	4	**no**
	1989 Q2 - 1991 Q3	10		**no**
	1993 Q4 - 1994 Q4	5		**no**
	1995 Q4 - 1998 Q2	11		**yes**
Sweden	1973 Q1 - 1975 Q4	12	6	**no**
	1981 Q3 - 1983 Q4	10		**no**
	1986 Q4 - 1988 Q3	8		**yes**
	1991 Q3 - 1994 Q3	13		**no**
	1996 Q2 - 1998 Q1	8		**no**
	1999 Q4 - 2001 Q4	9		**no**
Switzer-land	1977 Q1 - 1980 Q1	13	3	**yes**
	1987 Q1 - 1989 Q4	12		**yes**
	1996 Q1 - 1999 Q3	15		**no**
United Kingdom	1972 Q1 - 1975 Q1	13	5	**yes**
	1981 Q4 - 1985 Q1	14		**no**
	1989 Q3 - 1992 Q4	14		**no**
	1996 Q3 - 1999 Q2	12		**no**
	2000 Q3 - 2001 Q4	6		**no**
United States	1971 Q3 - 1973 Q3	9	6	**yes**
	1976 Q2 - 1978 Q2	9		**yes**
	1982 Q3 - 1983 Q4	6		**yes**
	1986 Q2 - 1988 Q3	10		**yes**
	1990 Q4 - 1993 Q4	13		**no**
	2001 Q3 - 2003 Q1	7		**yes**

Note: All samples start in 1970, with the exception of France (1981 Q4), Germany (1975 Q4), Italy (1977 Q1), Netherlands (1978 Q1), New Zealand (1979 Q4) and Spain (1981 Q4).

Once the set of excessive money growth episodes has been determined, "inflationary" and "non-inflationary" episodes are distinguished on the following basis. We looked at the

average increase in both the consumer price index (i.e. inflation) and the inflation gap – defined as the difference between the inflation rate and its trend value – in the three-year period after the end of the monetary episode. Then, we labeled "inflationary" all the excessive money growth episodes that were followed by an increase in these two variables of at least one time the standard deviation. In other words, we compared the average value of each of these two indicators over the 12-quarter period after the end of the episodes with their corresponding average value over the episode length.

When the difference was more than one time the standard deviation, we labeled the money growth episode "inflationary".[9] Note that the time span considered is in line with the idea of short-run horizon and consistent with the time intervals that have been adopted in a number of inflation targeting regimes (Stevens, 2003). In addition, we regarded as inflationary also those episodes in which the consumer price index or the inflation gap peaked at values more than twice the standard deviation in any of the quarters of the three-year period following the episode, although the overall average increase was less than once the standard deviation. According to the latter rule, we could add other six cases for a total of 33 inflationary episodes (see Table 3).

Thus, surprisingly, the inflationary outcome characterizes less than half of all episodes. Even selecting those episodes for which the period of excessive money growth was lengthy and which thus *ex ante* were supposed to have a higher probability of becoming inflationary, only in 46 per cent of the cases did inflation occur within the three-year period following them.[10] It is also worth noting that the relative share of inflationary episodes is significantly different across countries. For instance, in the United States and Norway five out of six of the episodes of strong monetary increase were followed by a significant acceleration

[9] Given the broad time span of our sample, we considered the standard deviation of both inflation and inflation gap in each separate decade. Thus, for instance, in order to be classified inflationary episodes in the 1970s had to breach a much larger threshold than those of the 1990s.

[10] In the same spirit as ours, De Gregorio (2004) finds that episodes of strong money growth in M2 (with an average length of 31 months) are not usually followed by significant increases in inflation within the next 12 months.

of inflation, while in Sweden and Spain only once out of six and five episodes respectively did periods of excess money growth lead to inflation.[11]

In order to control for the macroeconomic and financial context in which the robust money growth phases unfolded, Table 4 shows the average values of a set of variables which may possibly serve as useful indicators of the building up of inflationary pressures. More precisely, the table reports, for each variable, the average value (across countries and periods) during each type of episode.[12]

Table 4 Average levels of macroeconomic variables

	Inflationary episodes	Non-inflationary episodes
Real stock price gap	1.91	-1.61
Real stock price growth	5.32	6.78
Real house price growth	**3.44*** **	**0.54*** **
Real GDP growth	**3.25*** **	**1.92*** **
Investment growth	**8.08*** **	**3.31*** **
Credit gap	0.90	0.78
Nominal short-term interest rates	**7.39*** **	**8.85*** **
Nominal long-term interest rates	**8.03*** **	**9.25*** **
Real short-term interest rates	**2.91*** **	**4.16*** **
Real long-term interest rates	**3.55*** **	**4.57*** **
Nominal effective exchange rate	-1.16	-0.53
Real effective exchange rate	-0.52	-0.60

Note: The values in bold denote statistical significance at 1% ("***") and 5% ("**").

In particular, we checked whether the differences in the means across episodes are statistically significant using the mean test based on a single factor, analysis of variance (ANOVA). The values in bold denote the means that are statistically different across episodes. It should be noted, however, that this simple analysis is bivariate in nature and does

[11] As regards the 38 periods that were not followed by a significant increase in inflation, in 23 cases the inflation gap was almost unchanged, in four cases it increased slightly, and 11 times it actually decreased, but significantly only in four episodes. Also note that in the present analysis we do not control for the effect of interest-rate changes on money velocity, which may have affected the link between money and inflation. Assenmacher-Wesche and Gerlach (2006b) show that, when taking this into account, the quantity theory of money is somewhat strengthened.

[12] A similar analysis based on the median values leads to the same conclusions.

not provide any insight into how developments in a single variable are interrelated with one another around the excess money growth episodes. This type of issue is instead analyzed in the next section. Bearing this caveat in mind, the following observations are worth noting.

First, business cycle fluctuations during inflationary and non-inflationary money growth episodes are different. In fact, the average growth rate of both real GDP and gross fixed capital formation is significantly higher during inflationary phases than in non-inflationary phases. Second, both the money and the credit gaps are higher during the periods leading to an inflationary outburst even though significantly so only for the money gap. Third, interest rates (regardless whether nominal/real or short/long-term) are significantly lower during the inflationary episodes. Fourth, asset price dynamics suggest that, during the inflationary episodes, both house prices and stock prices were growing vigorously, with the average rate of growth in house prices being significantly larger than during the non-inflationary episodes.

The picture that emerges from this preliminary analysis is that inflationary episodes appear to be associated with increased asset prices and credit gaps and they occur at times of relatively high GDP growth. They are accompanied by a fairly loose monetary policy stance, signaled by lower interest rates, while the international value of the currency does not seem to play any role. In contrast, non-inflationary episodes are characterized by relatively subdued growth, are not associated with particular asset price boom and bust cycles and show higher interest rates both in nominal and real terms. In the remainder of the paper we try to shed some light on the relevance of financial and macroeconomic performance for the development of price pressure.

4. An econometric investigation

This section provides an econometric investigation of whether various financial and macroeconomic variables help to distinguish inflationary from non-inflationary periods of excessive money growth. The study rests on probit regressions for the 15 economies under analysis. In particular, from the selection criterion highlighted in Section 3, we can construct the dependent variable. By attaching a “1” to the inflationary episodes and a “0” to the non-inflationary ones, we end up with an array of 38 zeros and 33 ones. For each period of

excessive money growth we consider the average value of the relevant variables during the episode. More specifically, given the episodes of strong monetary growth, we estimate how the probability of incurring a significant increase in inflation can be explained by a set of regressors, denoted as x:

$$(1) \qquad \Pr(InflOut \neq 0 \mid x) = \Phi(\beta' x),$$

where Φ is the standard cumulative Normal distribution and β is the vector of coefficients.

The vector x of explanatory variables can be divided into three groups. The first set is made up of conventional determinants of the current and future inflation rate, the second set relates to financial factors that may have an impact on the development of the consumer price index, while the third set concerns some specific characteristics of the selected episodes. More precisely, as for the variables that most likely influence inflationary dynamics and money demand, we referred to real short-term interest rates, indicators of the business cycle (GDP growth rate), exchange rate measures (nominal and real effective exchange rate), commodity price indices and measures of fiscal sustainability (general government debt and deficit). As for financial factors, we employed, on the one hand, real and nominal stock market values and house prices and, on the other hand, credit to the private sector (loans to the private sector when available). Finally, we checked whether the length, the intensity and the time period in which the episode of strong money growth occurred had also a role in the determination of inflationary outcomes.

Table 5 reports the estimates of the basic model for the 71 episodes previously selected (see column 1). The signs of the coefficients of the real GDP growth and the interest rate are, as expected, positive and negative respectively, and both are significantly different from zero, while nominal and real measures of the exchange rate, current oil and commodity price levels and debt to GDP ratio are not significantly different from zero.[13] The contribution of other asset prices in influencing the probability that a period of strong money growth is followed by an outburst of inflation is also broadly significant. Both the deviations of the stock market and

[13] Nor did measures of inflation turn out to be significant explanatory variables. This is not surprising since the definition of "inflationary episode" does not depend on the level of inflation during the episode.

house prices from the trend turn out to be significantly positive. In addition, the credit gap also contributes positively to the inflationary outcome. As for the specific characteristics of the episode, the average size of the money gap increase during the episode (a measure of the magnitude of the episode) is significant, while the length of the excess money growth period is not.

Table 5 Results from probit regressions

	(1)	(2)	(3)	(4)	(5)
Constant	**-1.1805**	**-1.9419**	**-1.6459**	**-1.6529**	**-2.6590** **
	(1.4791)	(1.5963)	(1.6072)	(1.5342)	(1.2394)
Real GDP growth	**0.8114** ***	**1.0210** ***	**0.8834** ***	**0.8027** ***	**0.8598** ***
	(0.2337)	(0.2735)	(0.3495)	(0.3097)	(0.3316)
Interest rate	**-0.2096** *	**-0.2916** **	**-0.2211** *	**-0.1887** *	**-0.1768** *
	(0.1139)	(0.1469)	(0.1243)	(0.1191)	(0.1100)
Credit gap	**0.2663** **	**0.4004** ***	**0.3667** ***	**0.2994** ***	**0.2026** **
	(0.1061)	(0.1293)	(0.1446)	(0.1042)	(0.0939)
Real stock price gap	**0.4018** ***	**0.6430** ***	**0.7814** ***	**0.6525** ***	
	(0.1253)	(0.1467)	(0.1997)	(0.1412)	
Real house price gap	**0.6435** **	**0.7506** **	**0.6188** **	**0.6460** **	
	(0.2737)	(0.3336)	(0.2951)	(0.2331)	
Delta money gap	**0.0594** *	**0.1036** ***	**0.1019** **	**0.0848** **	**0.0555** *
	(0.0331)	(0.0415)	(0.0443)	(0.0369)	(0.0307)
Dummy 1970s (D70)		**2.9502** ***	**4.9360** ***	**3.4580** ***	**4.3886** ***
		(1.1197)	(1.5958)	(1.0334)	(1.0430)
Dummy 1980s (D80)		**-1.2131**			
		(0.7699)			
Credit gap*D70			**-0.4051**		
			(0.3103)		
Real stock price gap*D70			**0.0367**		
			(0.0401)		
Real house price gap*D70			**0.0442**		
			(0.2108)		
Real asset gap					**0.6789** ***
					(0.2285)
McFadden R^2	0.553	0.643	0.651	0.622	0.627
LR p-value	0.000	0.000	0.000	0.000	0.000
Marginal coeff.	0.383	0.367	0.380	0.376	0.387
Total obs.	71	71	71	71	71
Dep=0	38	38	38	38	38
Dep=1	33	33	33	33	33

Note: Standard errors in parentheses. The symbols *, **, *** denote statistical significance at 10, 5 and 1 per cent.

We then checked whether there are differences between time periods. In particular, we considered three sub-samples (the 1970s, the 1980s and the 1990s, including the few episodes that occurred after 2000). A set of dummy variables suggests that there is indeed a higher probability of inflationary outburst in the 1970s (see column 2).

In order to check whether this higher probability has an impact also on other coefficients of the model, we introduced in the regressions a multiplicative dummy for each of the following variables: real stock price gap, real house price gap and credit gap (see column 3). It turns out that the coefficients are not significantly different from zero. This in turn implies that the model specification is the same across time periods and that stock market, house prices and credit dynamics exerted the same effects on the probability of inflation along the whole time span.

Table 6 Classification table (success cut-off C=0.5)

	Estimated Equation			Constant Probability		
	Dep=0	**Dep=1**	**Total**	**Dep=0**	**Dep=1**	**Total**
P(Dep=1)<=C	32	5	37	38	33	71
P(Dep=1)>C	6	28	34	0	0	0
Total	38	33	71	38	33	71
Correct	32	28	60	38	0	38
%Correct	84.21	84.85	84.51	100	0	53.52
%Incorrect	15.79	15.15	15.49	0	100	46.48
Total Gain*	-15.79	84.85	30.99			
Percent Gain**		84.85	66.67			

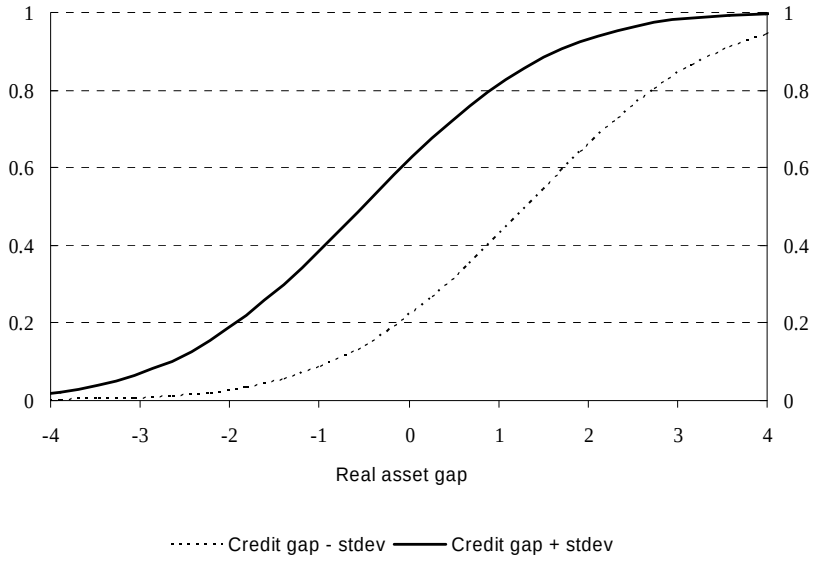
Notes:
* Change in "%Correct" from default (constant probability) specification.
**Percentage of incorrect (default) predictions corrected by equation.

The predictive ability of the model is investigated via the "classification table" (see Table 6), which shows the number of "hits" and "misses" of the prediction rule. In this regard, the performance of the model is assessed on the basis of a bivariate indicator which assigns "1" to the dependent variable ("Dep") if the estimated probability is larger than 0.5 and "0" otherwise. Overall, our model performs fairly well: in the event of an excess money growth episode, it correctly predicts around 85 per cent of both inflationary and non-inflationary outcomes. Only six times out of 34 is an inflationary outcome incorrectly signaled (i.e. it actually did not occur); and only five times out of 37 is a non-inflationary

outcome wrongly classified.[14] Given that in terms of policy Type I errors (i.e. missing an inflationary outburst) are more relevant than Type II errors (i.e. calling a crisis that does not materialize), we can read the data in a different way. Notwithstanding a value as low as 17.6 for the "noise to signal ratio", which is the share of wrong inflationary signals, the model is able to predict a large number of crises (84.8 per cent).

It should be noted, however, that the model is not meant as a predicting tool for inflation in a three-year horizon as we relied on the *ex post* knowledge of variable dynamics over the whole time horizon. A "truly" leading indicator could only be devised if trend measures could be updated in real time every quarter, taking into account only the information available at that point in time. In this respect, our method departs from the one used by Borio and Lowe (2004), who a) compute recursive type trends and gap measures up to each episode using, however, *ex post* (revised) data; and b) look at a list of financial distress dates which could not be, obviously, available *a priori*.

Figure 2 Probability of inflationary outcome



[14] The right-hand side of Table 6 reports the relative performance of our model with respect to the naive rule which assigns "1" to the dependent variable if the proportion of 1 in the sample is larger than 0.5 and "0" otherwise. Overall, the total gain in using our model (measured by the difference between the percentage of corrected predictions from the model and those from the constant probability specification) is 31 percentage points (from 53.5% to 84.5%), which represents a relative improvement of 67%.

In order to investigate the joint effect of asset prices and credit dynamics, we constructed an aggregate gap measure just averaging the real stock and house price gaps. We then estimated the probit regression with this new variable (see column 5 of Table 5). Figure 2 depicts the evolution of the probability of an inflationary outburst with respect to the aggregated asset prices gap when the other explanatory variables are at their average levels and the dummy is set to zero.[15]

The dotted line is computed for a low level of the credit gap (the average value less the standard deviation), while the continuous line is associated to a higher level of the same variable (the average value plus the standard deviation). It is immediately clear that the effect of an increase in the asset gap is non-linear, but it is also evident that its relative contribution to the probability of an inflationary outburst depends on the level of the credit gap. In fact, when both variables are at low levels, an increase in the asset gap determines a relatively mild increase in the probability, while the same increase is significant when the credit gap is at a higher level. For instance, when the latter is one time the standard deviation below its long-term trend, a position of 1.5 per cent of the asset gap determines a probability of inflation still around 0.5, while the same position leads to a much larger probability (0.9) when the credit gap is above the trend.

This empirical evidence is in line with the reasoning put forward in Borio and Lowe (2002 and 2004), who suggest that the simultaneous violation of a given threshold in both variables represents the best proxy of the notion of financial imbalance. A rapid and sizeable increase in credit growth may not necessarily be a problem if the price of the assets backing that expansion grows at a sustainable rate. Similarly, booms and busts in asset prices do not necessarily cause great disruption if agents are not burdened by large debts and rigid liability commitments. Thus, in their opinion, the likelihood of financial disruption increases greatly only when the two developments occur at the same time. Figure 2 seems to fully support this view.

[15] The real asset price gap ranges from -13 to 15; however, almost 2/3 of the observations occur between the values from -4 to 4 displayed in Figure 2.

However, we depart from Borio and Lowe (2004) in an important aspect. The two authors report three main findings: 1) an indicator made by a combination of credit and equity excessive growth is able to anticipate financial imbalances (i.e. banking distress) fairly well; 2) the same indicator shows some leading properties for a reduction in the inflation rate; 3) a positive money gap in excess of two per cent does lead to some upward pressure on inflation over a two-year horizon. Our results instead highlight that periods of significant imbalances in money growth shortly precede an inflationary increase when they are associated with a contemporaneous expansion of credit to the private sector and with asset prices being above their trend developments. In support of our interpretation, Detken and Smets (2004) and Helbling and Terrones (2003) in their analyses of asset price booms and busts find evidence that booms (in particular those followed by sharp reductions in the GDP growth rate) are accompanied by easy monetary and credit conditions and are also characterized by a subsequent large increase in the inflation gap. Similar results are obtained when starting from house market cycles (Catte et al., 2004; Ahearne et al., 2005; Van den Noord, 2006).

A theoretical background for the relationship between monetary aggregates, asset prices and inflation can be dated as back as Brunner and Meltzer (1973). They build on the traditional Keynesian liquidity effect to introduce a broader range of assets in the monetary policy transmission mechanism. Central bank operations that increase liquidity will have the price of assets rise almost step by step. Substitutions from more to less liquid assets take place as the return on more liquid instruments decreases relative to the less liquid and usually riskier assets. Thus, short-term government bonds should be affected relatively early, followed by longer-term securities, by other assets such as stocks and real estate, and finally by the overall price index. In this framework price pressure on stock markets is then seen as a possible warning of future price inflation.

The result that money and credit developments may contain useful information for forecasting price developments is also well established in the literature as well as in central banks' experience. On the one hand, it has been empirically shown that money and credit aggregates are characterized by additional information content for price developments beyond that contained in other macroeconomic indicators (Altissimo et al., 2001; Leeper and Roush, 2002; Nelson, 2003; Gerlach and Svensson, 2003). On the other hand, a large number of theoretical and empirical works emphasized the role of monetary and credit developments in

the transmission of monetary policy shocks and the determination of the price level (Bernanke and Gertler, 1995; Engert and Selody, 1998). For example, when bank credit is rationed via non-price mechanisms, monitoring credit aggregates helps to better understand the economic and financial outlook and the likely impact of monetary policy actions on price developments.[16] Furthermore, a shock to the financial system which increases efficiency in the banking sector may reduce the cost of intermediation, thus making credit more readily available. This in turn leads to increasing demand and building inflationary pressures.

Summing up, we showed that following episodes of significant monetary growth inflation occurred fewer times than expected. In particular, a set of probit regressions suggests that inflationary pressures materialize only when the economy is growing at a fast rate, real rates are low and possible financial imbalances are gathering. This, in turn, leads us to conclude that, together with strong monetary growth, there should also be other "fundamental" factors at work for the occurrence of inflationary outbursts in the short run. This result is fully consistent with the large body of the empirical literature providing evidence that in the short run output gap measures and business cycle indicators are better suited to forecast inflation.[17] The analysis of the joint development of the variables which turned out to be significant for the inflationary outcome is beyond the scope of this work, but it indeed represents a possible avenue for future research.

Our empirical results also suggest that large increases in monetary aggregates are less likely to be inflationary when output growth is subdued, real rates are high, other assets are not experiencing unjustified price rallies, and credit developments are along trend standards. In that case other reasons for the increased money growth have to be investigated, although they are less likely to lead to inflationary consequences. For instance, portfolio shift between assets may be the result of temporary changes in investors' preference for safe and liquid assets included in broad monetary aggregates. This, in turn, may happen in periods of increasing financial market volatility and heightened economic and geopolitical uncertainty.

---

[16] See the large body of the credit rationing literature which followed Stiglitz and Weiss (1981).

[17] See Orphanides and Van Norden (2005), Banerjee et al. (2005) and Stock and Watson (2006) for some recent contributions.

5. Robustness analysis

In order to assess the robustness of our results we conducted several checks on both episode selection criterion and inflationary outcome definition. Concerning the selection technique, first, we adjusted the number of quarters needed to qualify an episode as a robust money growth phase; second, we augmented the average distance of the money-to-GDP ratio from its trend required to be considered in the sample. In particular, on the one hand, we looked at all episodes for which the positive deviation of the money gap lasted for at least three and five quarters, respectively, instead of the four quarters considered in the main analysis of the previous sections. With the looser criterion of three quarters we augmented the sample from 71 to 76 episodes, while the stricter rule of five consecutive quarters led to a reduction of the number of the episodes from 71 to 63.[18] On the other hand, we adopted the much stronger criterion of two per cent for the average money gap trend deviation to qualify the period as an excessive money growth episode. The threshold of two per cent is the one used by Borio and Lowe (2004) in their analysis of the money gap behavior in periods of financial distress. Just 49 episodes of the 71 previously selected were able to pass this more restrictive condition. The share of the inflationary episodes did not change much in the first two new samples. In fact, the share is unchanged at 46 per cent for the three-quarter length rule, while it slightly increases to 49 per cent for the five-quarter rule. Only when using the Borio-Lowe criterion did the share breach the 50 per cent threshold (51 per cent). This latter value is in line with the previous finding that the larger the money gap the higher the probability of an inflationary outcome.

Concerning the criterion used to detect whether excessive money growth episodes were inflationary, we ran two different robustness tests. In particular, we checked whether the time window over which we evaluated inflationary developments did matter in the selection of inflationary periods. Since the aim of the paper is the short-run assessment of the relationship between money and price developments we shorten the reference horizon in two ways. First, we limited to two years (i.e. eight consecutive quarters) the period after the end of the episode

[18] The additional five episodes selected by the three-quarter rule (two of which inflationary) are Canada 2001Q3-2002Q1, France 1984Q4-1985Q2, Japan 1994Q4-1995Q2, Netherlands 1986Q4-1995Q2 (inflationary) and USA 1998Q4-1999Q2 (inflationary). According to the five-quarter rule we instead dropped the eight episodes listed in Table 1 which lasted exactly four quarters.

available to detect the increase in inflation; second, while maintaining a three-year horizon for the *ex post* assessment, we started evaluating the price dynamics one year after the beginning of the episode. In other words, we compared price developments in the first four quarters of each episode with the following 12 quarters regardless of the length of money growth episode. Due to the fact that we have many episodes lasting more than three years, the latter check is meant to assess whether the transmission from money growth to inflation started before the end of the excessive money growth phase.

Table 7 Results from probit regressions

	base	3q	5q	2y	a1y	m>2
Constant	**-1.1805**	**-1.4269**	**-1.1069**	**-1.7682**	**3.3306** **	**-0.5004**
	(1.4791)	(1.3778)	(1.5397)	(1.3764)	(1.7264)	(1.1766)
Real GDP growth	**0.8114** ***	**0.8211** ***	**0.8670** ***	**0.8881** ***	**0.9864** ***	**0.8650** ***
	(0.2337)	(0.2325)	(0.2580)	(0.2511)	(0.2824)	(0.3316)
Interest rate	**-0.2096** *	**-0.1890** *	**-0.1349**	**-0.2431** **	**-0.6326** ***	**-0.1114** *
	(0.1139)	(0.1059)	(0.1041)	(0.0959)	(0.1746)	(0.0611)
Credit gap	**0.2663** **	**0.2964** ***	**0.2467** **	**0.3849** ***	**0.7505** ***	**0.2963** ***
	(0.1061)	(0.1087)	(0.1175)	(0.1222)	(0.2155)	(0.1120)
Real stock price gap	**0.4018** ***	**0.4070** ***	**0.3637** ***	**0.3509** ***	**0.8028** ***	**0.3229** **
	(0.1253)	(0.1211)	(0.1143)	(0.1118)	(0.1883)	(0.1366)
Real house price gap	**0.6435** **	**0.6744** ***	**0.4919** *	**0.4320** **	**0.3595** *	**0.7857** **
	(0.2737)	(0.2644)	(0.2746)	(0.2281)	(0.2371)	(0.408)
Delta money gap	**0.0594** *	**0.0610** *	**0.0672** **	**0.0182**	**0.1699** **	**0.0511** *
	(0.0331)	(0.0337)	(0.0329)	(0.0512)	(0.0712)	(0.0303)
McFadden R^2	0.553	0.535	0.533	0.525	0.685	0.512
Total obs	71	76	63	71	71	49
Dep=0	38	41	32	40	40	24
Dep=1	33	35	31	31	31	25
Inflationary Share	0.465	0.461	0.492	0.437	0.437	0.510
Marginal coeff.	0.383	0.381	0.397	0.370	0.210	0.396

Note: Standard errors in parentheses. The symbols *, **, *** denote statistical significance at 10, 5 and 1 per cent, respectively.

When considering the shorter eight-quarter period after the end of the money growth phase we recoded a switch of three episodes from inflationary to non-inflationary (namely, the first episode for Denmark, the third for Sweden and the sixth for the United States) and only a single one from non-inflationary to inflationary (the third for Italy). Broader changes were instead witnessed when employing a time window of three years starting from the fifth quarter of the money growth period: five episodes switched from inflationary to non-inflationary (the fifth episode for Canada, the third and fourth for Denmark, the second for

Italy and the third for New Zealand) and three episodes from non-inflationary to inflationary (the second episode for Canada, the fourth for Japan and the sixth for Sweden). Again the share of inflationary episodes did not change substantially: in both cases it fell by just two percentage points to 44 per cent.

Table 7 reports the estimates of the probit regressions on the new samples constructed as described above. The first column is the same as the one in Table 5 and it is included for the sake of comparison. In the second column the results of the regression based on the three consecutive quarter selection rule are reported. In the third column, the results related to the five consecutive quarter rule are shown. The fourth and the fifth columns report the results for the two-year window for the inflationary assessment and for the three-year window after the first year of money growth, respectively. Finally, in the sixth column we report the results stemming from the use of the Borio-Lowe money gap rule.

For all samples the coefficients maintained the expected sign and the magnitude changed substantially only for the coefficients of the three-year window after the first year of money growth.[19] In addition, only twice were the coefficients not significantly different from zero. Thus, the overall assessment of Section 4 is entirely confirmed. Both real stock and house prices increase the probability of turning an episode of robust money growth into an inflationary outburst. Similarly, the likelihood is greater when the economy is booming and when credit to the private sector is loose. Also the positive sign of the coefficient on the nominal money gap confirms that the magnitude of the deviation from trend behavior does matter in influencing the transmission to inflation. Finally, the negative sign on short-term real interest rates shows that higher rates are associated with a lower probability of inflation.

[19] However, note that since probit regressions are non-linear in nature, the direct effect of each variable on the probability of an inflationary outcome is to be obtained through the marginal coefficient (last line of Table 7), which is significantly smaller in the case of the regression concerning the three-year window after the first year of money growth than in the other samples. For a discussion on the role of marginal coefficients and their exact computation see, for instance, Greene (2003).

6. Conclusions

We investigated the short-run consequences of periods of strong monetary growth for inflation dynamics in 15 industrial economies. As a first step, we detected 71 episodes of prolonged money growth above trend values over the last three decades. We then checked in how many cases the inflation gap increased significantly over a three-year horizon. We found that in less than 50 per cent of all cases strong monetary dynamics were followed by price developments that can be labeled inflationary. Even if this result is striking considering that we focused only on periods of abnormal money growth for which we expected a much higher correlation with prices, it is consistent with the view that in the short run the quantity theory does not always hold due to the circumstance that other factors might temporarily affect price dynamics.

As a further step we extended the analysis by considering whether the evolution of various macroeconomic and financial variables during the excess money growth episodes can help predict inflation. The results from an econometric investigation based on probit regressions suggest that developments in other asset prices and credit conditions do help identify price dynamics over a three-year horizon. When the excessive money growth is accompanied by large increases in stock prices, house prices and loose credit conditions, the probability of recording an inflationary outcome rises significantly. In addition, it appears that the relationship is non-linear. A rise in one of the two indicators of asset prices and credit conditions is associated with a strong increase in the probability of recording inflation only when the other is already at high levels. Even large increases in one of the two variables do not lead to a worrying increase in the probability when the other is below trend values.

From a policy perspective, our analysis suggests that when money growth is accompanied by loose credit conditions and sustained asset prices growth, it seems to be "more fundamental" in nature and more likely to lead to inflationary pressures. Conversely, when strong monetary dynamics are not accompanied by high credit growth and strong dynamics in asset prices, other determinants seem to affect monetary developments, which are not necessarily linked to inflationary consequences.

A note of caution is needed in interpreting our results. In our analysis the role of monetary policy is not explicitly considered. A central bank may react to an excessive

increase in monetary aggregates, thereby changing the contemporaneous and subsequent behavior of other macroeconomic and financial variables. Such responses might have been different not only across time but also across countries. However, a possible assessment of the monetary policy stance during the selected money growth phases can be extracted from the different magnitude of interest rates. A preliminary analysis based on the ANOVA test has shown that the levels of both real and nominal rates for both short- and long-term maturities were lower during inflationary episodes than in non-inflationary episodes. In addition, the econometric specification has detected a significant negative contribution of real short-term interest rates for the probability of incurring an increase in inflation (i.e. the higher the rates the lower the probability of inflation). Thus, even though we did not test the correctness of the monetary policy stance in each country and period, for instance through a Taylor rule, the evidence gathered suggests that the stance was relatively loose during the episodes of excess money growth that were followed by an outburst of inflation. In contrast, the higher levels of interest rates during the episodes that were not followed by an increase in inflation hints at a tighter policy stance, which may have contributed to maintain price stability.

Appendix

Description of the data and their sources

This appendix contains additional information about the series used in our analysis. In order to save space, we present them in a table format. The main sources for the series were: BIS, Datastream, Euro area wide model (AWM), Eurostat, Global Financial Data, IMF International Financial Statistics (abbreviated as IMF), the respective National Central Banks for each country, OECD Main Economic Indicators (abbreviated as OECD) and Reuters. All data are seasonally adjusted (with the exception of interest rates, exchange rates and the stock market index) either from the original source (whenever available) or via the multiplicative (ratio to moving average) method. Sources are reported in italics below each series to which they refer.

		Australia	Canada	Denmark	Euro area
Inflation rate	*Definition*	year-on-year changes in the CPI - all items (base year = 1990)	year-on-year changes in the CPI - all items (base year = 1992)	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the HICP, before 1992 based on the rates of change of national CPIs (excluding owner occupied housing, except for Spain)
	Source	*Reserve Bank of Australia*	*BIS*	*ECB, Eurostat*	*ECB, Eurostat*
Nominal GDP	*Definition*	gross domestic product at current prices	gross domestic product at market prices (current prices, including 2001 revisions)	gross domestic product at market prices (current prices)	gross domestic product at current prices, based on aggregating national GDP data using the irrevocable fixed exchange rates
	Source	*Reserve Bank of Australia*	*BIS*	*Eurostat. Global Financial Data*	*Area wide model, ECB, Eurostat*
Real GDP	*Definition*	gross domestic product at constant prices, chain volume measure	gross domestic product at market prices - chained 1997	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 1995 prices), based on aggregating national GDP data using the irrevocable fixed exchange rates
	Source	*Reserve Bank of Australia*	*BIS*	*Eurostat, Global Financial data*	*Area wide model, ECB, Eurostat*
Investment	*Definition*	investment, gross fixed capital formation (SNA 93), current prices	investment, gross fixed capital formation, total (including 2001 revisions), current prices	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation, current prices
	Source	*BIS*	*BIS, IMF*	*Eurostat*	*AWM, Eurostat*
Monetary aggregates	*Definition*	M3 stock (adjusted)	M3 (currency plus total privately-held chartered bank deposits)	M3 stock	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations, exchange rate variations and the enlargement in 2001)
	Source	*Reserve Bank of Australia*	*BIS*	*OECD*	*ECB calculations, ECB*
Credit aggregates	*Definition*	credit to the private sector	credit to the private sector	credit to the private sector	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations and the enlargement in 2001)
	Source	*IMF, Reserve Bank of New Zealand*	*OECD*	*BIS, OECD*	*ECB, ECB calculations*
Stock market prices	*Definition*	stock exchange prices, shares, overall index	S&P/TSX composite price index	KAX CSE all shares index	DJ Euto Stoxx 50 price index and, before 1987, share index covering a set of stocks representing 75%-80% of the total market capitalisation
	Source	*BIS, Global Financial Data*	*Datastream*	*Global Financial data, OECD*	*Datastream, Reuters*

		Australia	Canada	Denmark	Euro area
House prices	*Definition*	residential property prices	residential property prices	residential property prices	residential property prices
	Source	*BIS, Reserve Bank of Aistralia*	*BIS*	*BIS, Eurostat*	*ECB, ECB calculations, Eurostat*
Short-term interest rate	*Definition*	3-months bank accepted bills	money market interest rate, 3-months treasury bills	3-months money market interest rate (before 1982 call money rate)	EURIBOR, before 1999 weighted average of national 3-month money market interest rates, based on 2004 GDP weights at PPP exchange rates
	Source	*Reserve Bank of Australia*	*BIS*	*BIS, IMF*	*BIS, Reuters*
Long-term interest rate	*Definition*	10-year treasury bonds yield	10-year government bonds yield (before 1989 yiled on government bonds with maturity more than 10 years)	10-year government bond yield	weighted average of national 10-year government bond yields, based on 2004 GDP weights at PPP exchange rates
	Source	*BIS*	*BIS, IMF*	*BIS, IMF*	
Nominal effective exchange rate	*Definition*	nominal effective exchange rate, Australian dollar, based on currencies covering at least 90% of Australia's trade	nominal effective exchange rate	nominal effective exchange rate	nominal effective exchange rate, euro, broad index (euro area 12)
	Source	*BIS, Reserve Bank of Australia*	*BIS*	*IMF*	*BIS, ECB*
Real effective exchange rate	*Definition*	real effective exchange rate, Australian dollar, 1990=100	real effective exchange rate, Canadian dollar, 1990=100	real effective exchange rate, Danish Kroner, 1990=100	real effective exchange rate, euro, 1990=100
	Source	*BIS*	*BIS*	*BIS*	*BIS*
Debt	*Definition*	government debt (as a percentage of nominal GDP)	gross federal government debt (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)
	Source	*BIS, IMF*	*Bankf of Canada, IMF*	*European Commission*	*European Commission*
Deficit	*Definition*	general government deficit (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)

		France	Germany	Italy	Japan
Inflation rate	*Definition*	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the CPI - all items (whole country)
	Source	*ECB, Eurostat*	*ECB, Eurostat*	*ECB, Eurostat*	*BIS*
Nominal GDP	*Definition*	gross domestic product at market prices (current prices, ESA 95)	gross domestic product at market prices (current prices, ESA 95)	gross domestic product at market prices (current prices, ESA 95)	gross domestic product at market prices (current prices, SNA 93)
	Source	*ECB, Eurostat, IMF*	*ECB, Eurostat, IMF*	*ECB, Eurostat, IMF*	*BIS, IMF*
Real GDP	*Definition*	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 2000 prices, chained, SNA 93)
	Source	*ECB, Eurostat, IMF*	*ECB, Eurostat, IMF*	*ECB, Eurostat, IMF*	*BIS, IMF*
Investment	*Definition*	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation (SNA 93), current prices
	Source	*Eurostat, IMF*	*Eurostat, IMF*	*Eurostat, IMF*	*BIS, IMF*
Monetary aggregates	*Definition*	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	M2 + certificates of deposits (CDs) stock
	Source	*ECB calculations, ECB*	*ECB calculations, ECB*	*ECB calculations, ECB*	*BIS*
Credit aggregates	*Definition*	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	credit to the private sector by domestically licensed banks
	Source	*ECB, ECB calculations*	*ECB, ECB calculations*	*ECB, ECB calculations*	*OECD*
Stock market prices	*Definition*	CAC 40 shares price index and, before 1988, CAC general index	CDAX total share price index	share overall price index (MIB) and, before 1974, BCI general index	Nikkei 225 stock exchange prices index
	Source	*BIS, Global Financial Data*	*BIS, Global Financial Data*	*BIS, Global Financial Data*	*BIS*

		France	Germany	Italy	Japan
House prices	*Definition*	residential property prices	residential property prices	residential property prices	residential property prices
	Source	*ECB, Government Agency*	*ECB*	*ECB*	*BIS, Bank of Japan*
Short-term interest rate	*Definition*	3-month money market interest rates	3-month money market interest rates	3-month money market interest rates (before 1974 3-month treasury bills)	3-month repos on bonds - Gensaki - (before 1979 call money rate)
	Source	*Reuters*	*Reuters*	*Global Financial Data, Reuters*	*BIS, IMF*
Long-term interest rate	*Definition*	10-year government bonds yield	10-year public sector bonds yield	10-year government bonds yield	10-year government bond yield
	Source	*BIS*	*BIS*	*BIS*	*BIS, IMF*
Nominal effective exchange rate	*Definition*	nominal effective exchange rate	nominal effective exchange rate	nominal effective exchange rate	nominal effective exchange rate, yen
	Source	*IMF*	*IMF*	*IMF*	*BIS, Bank of Japan*
Real effective exchange rate	*Definition*	real effective exchange rate	real effective exchange rate	real effective exchange rate	real effective exchange rate, Japanese yen, 1990=100
	Source	*IMF*	*IMF*	*Banca d'Italia, IMF*	*BIS*
Debt	*Definition*	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)
	Source	*European Commission*	*European Commission*	*European Commission*	*European Commission*
Deficit	*Definition*	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)

		Netherlands	New Zealand	Norway	Spain
Inflation rate	*Definition*	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the CPI - all items	year-on-year changes in the CPI - all items	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI
	Source	*ECB, Eurostat*	*Reserve Bank of New Zealand*	*BIS*	*ECB, Eurostat*
Nominal GDP	*Definition*	gross domestic product at market prices (current prices, ESA 95)	gross domestic product at market prices (current prices)	gross domestic product at market prices (current prices)	gross domestic product at market prices (current prices, ESA 95)
	Source	*ECB, Eurostat, IMF*	*Global Financial Data, IMF*	*IMF*	*ECB, Eurostat, IMF*
Real GDP	*Definition*	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 1995/96 prices, chained, SNA 93)	gross domestic product at market prices (constant 2001 prices)	gross domestic product at market prices (constant 1995 prices)
	Source	*ECB, Eurostat, IMF*	*BIS, Global Financial Data, IMF*	*IMF*	*ECB, Eurostat, IMF*
Investment	*Definition*	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation (SNA 93), current prices	investment, gross fixed capital formation, total (ESA 95), current prices	investment, gross fixed capital formation, current prices
	Source	*Eurostat*	*BIS, IMF, Reserve Bank of New Zealand*	*Eurostat, IMF*	*Eurostat, IMF*
Monetary aggregates	*Definition*	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	M3 stock	M2 stock	M3 stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)
	Source	*ECB calculations, ECB*	*OECD*	*OECD*	*ECB calculations, ECB*
Credit aggregates	*Definition*	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)	credit to the private sector	credit by all financial institutions	loans to the private sector stock (adjusted after October 1997 for the effect of reclassifications, other revaluations and exchange rate variations)
	Source	*ECB, ECB calculations*	*OECD, Reserve Bank of New Zealand*	*OECD*	*ECB, ECB calculations*
Stock market prices	*Definition*	stock exchange all shares price index	NZSE All shares Capital index	OSE Total TOTX share prices index	shares overall price index and, before 1985, Madrid general index
	Source	*BIS, Global Financial Data*	*OECD*	*Global Financial data, OECD*	*BIS, Global Financial Data*

		Netherlands	New Zealand	Norway	Spain
House prices	*Definition*	residential property prices	residential property prices	residential property prices	residential property prices
	Source	*ECB*	*BIS, Reserve Bank of New Zealand*	*BIS, Statistics Norway*	*ECB*
Short-term interest rate	*Definition*	3-month money market interest rates (before 1972 3-month treasury bills)	3-month bank bills yield	3-month money market interst rates - Nibor - (before 1978 call money rate)	3-month money market interest rates
	Source	*Reuters*	*OECD*		*Reuters*
Long-term interest rate	*Definition*	10-year government bond yield	10-year government bond yield	10-year government bond yield	10-year government bonds yield (before 1977 10-year government bonds yield)
	Source	*BIS, IMF*	*BIS, IMF*	*BIS, IMF*	*BIS, Global Financial Data*
Nominal effective exchange rate	*Definition*	nominal effective exchange rate	nominal effective exchange rate calculated on the basis of representative market rates for the currencies in the basket	nominal effective exchange rate	nominal effective exchange rate
	Source	*IMF*	*BIS, Reserve Bank of New Zealand*	*IMF*	*IMF*
Real effective exchange rate	*Definition*	real effective exchange rate	real effective exchange rate, New Zealand dollar, 1990=100	real effective exchange rate, Norvegian Kroner, 1990=100	real effective exchange rate
	Source	*IMF*	*BIS*	*BIS*	*IMF*
Debt	*Definition*	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series)(as a percentage of nominal GDP)	public government debt (as a percentage of nominal GDP)	government debt (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)
	Source	*European Commission*	*Global Financial Data, IMF, Reserve Bank of New Zealand*	*European Commission, IMF, OECD*	*European Commission*
Deficit	*Definition*	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	government deficit (-) or surplus	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)

		Sweden	Switzerland	United Kingdom	United States
Inflation rate	*Definition*	year-on-year changes in the HICP, before 1992 based on the rates of change of CPI (excluding owner occupied housing)	year-on-year changes in the CPI - all items (base year = 2000)	year-on-year change in the retail prices index - all items	year-on-year changes in the CPI - all items (all urban consumers)
	Source	*ECB, Eurostat*	*OECD*	*UK Office for National Statistics*	*BIS*
Nominal GDP	*Definition*	gross domestic product at market prices (current prices)	gross domestic product at market prices (current prices, ESA 95)	Gross domestic product at market prices (current prices)	gross domestic product at market prices (current prices, including 1999 revisions)
	Source	*Eurostat, Global financial data*	*BIS, IMF*	*Eurostat*	*BIS*
Real GDP	*Definition*	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (ESA 95, constant 2000 prices, chained)	gross domestic product at market prices (constant 1995 prices)	gross domestic product at market prices (constant 2000 prices, chained)
	Source	*Eurostat, Global Financial Data*	*BIS, IMF*	*Eurostat*	*BIS*
Investment	*Definition*	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation, total (ESA 95), current prices	investment, gross fixed capital formation, current prices	investment, gross fixed capital formation, total, current prices
	Source	*Eurostat*	*BIS, IMF*	*Eurostat*	*BIS*
Monetary aggregates	*Definition*	M3 stock	M3 stock	M4 stock	M2 (M1 plus small time and saving deposits and money market funds)
	Source	*OECD*	*OECD*	*OECD*	*BIS*
Credit aggregates	*Definition*	credit to the private sector	credit to the private sector	loans to the private sector	commercial bank credit
	Source	*BIS, IMF*	*IMF, OECD*	*Bank of England*	*OECD*
Stock market prices	*Definition*	shares overall index (SAX) and, before 1996, share prices AFGX index	UBS 100 share price index	FTSE 100 - price index	S&P 500 composite price index
	Source	*BIS, OECD*	*OECD*	*Global Financial Data, Reuters*	*Reuters*

		Sweden	Switzerland	United Kingdom	United States
House prices	*Definition*	residential property prices	residential property prices	residential property prices	residential property prices
	Source	*BIS, Statistics Sweden*	*BIS, OECD, Swiss National Bank*	*Communities and Local Government (DCLG), UK Office for National Statistics*	*BIS, Office of Federal Housing Enterprise Oversight (OFHEO)*
Short-term interest rate	*Definition*	3-month treasury bills yield	3-months money market interest rate (before 1974 discount rate)	3-month sterling interbank deposits interest rate (before 1977 treasury bill interest rate)	3-month money market treasury bills interest rates
	Source	*Global Financial data, OECD*	*IMF, OECD*	*BIS, IMF*	*BIS*
Long-term interest rate	*Definition*	10-year government bond yield	10-year government bond yield	10-year government bond yield	10-year government bond yield (before 1966 10-year tresury bonds yield)
	Source	*BIS, IMF*	*IMF*	*BIS, IMF*	*BIS, Reuters*
Nominal effective exchange rate	*Definition*	nominal effective exchange rate	nominal effective exchange rate	nominal effective exchange rate, broad index	nominal effective exchange rate, broad index, weighted average of the foreign exchange value of the US dollar against the currencies of a broad group of US trading partners
	Source	*IMF*	*BIS*	*BIS*	*BIS, FED*
Real effective exchange rate	*Definition*	real effective exchange rate, Swedish Kronor, 1990=100	real effective exchange rate, Swiss franc, 1990=100	real effective exchange rate, Sterling pound, 1990=100	real effective exchange rate, US dollar, 1990=100
	Source	*BIS*	*BIS*	*BIS*	*BIS*
Debt	*Definition*	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	total government debt (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)	general government consolidated gross debt Excessive deficit procedure (based on ESA 1995) and former definition (linked series) (as a percentage of nominal GDP)
	Source	*European Commission*	*BIS, IMF*	*European Commission*	*European Commission*
Deficit	*Definition*		net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)	net lending (+) or net borrowing (-); general government Excessive deficit procedure (as a percentage of nominal GDP)

Notes: sources are reported in italics. To backdate a series, the growth rates of the longer available series further back in the past are used.

[1]For the BIS source of house price series see the paper "What drives housing price dynamics: cross-country evidence", by K. Tsatsaronis and H. Zhu.

[2]For more information on the construction of M3 and GDP series for the euro area, see the ECB Occasional Paper no. 3 "Estimating the trend of M3 income velocity underlying the reference value for monetary growth", by Claus Brand, Dieter Gerdesmeier and Barbara Roffia, May 2002.

[3]For more information on the AWM dataset, see the ECB Working Paper no. 42 "An area-wide model (AWM) for the euro area", by Gabriel Fagan, Jérôme Henry and Ricardo Mestre, January 2001.

References

Ahearne, A., J. Ammer, B. Doyle, L. Kole and R. Martin (2005), "House prices and monetary policy: A cross-country study", Board of Governors of the Federal Reserve System, International Finance Discussion Paper No.841.

Altissimo, F, E. Gaiotti and A. Locarno (2001), "Monetary analysis in the Bank of Italy prior to EMU: The role of real and monetary variables in the models of the Italian economy", in H.J. Klöckers and C. Willeke (eds), *Monetary analysis: tools and applications*, ECB, pp.145-164.

Assenmacher-Wesche, K. and S. Gerlach (2006a), "Money at low frequencies", CEPR Discussion Paper No.5868.

Assenmacher-Wesche, K. and S. Gerlach (2006b), "Understanding the link between money growth and inflation in the euro area", CEPR Discussion Paper No.5683.

Bachmeier, L.J. and N.R. Swanson (2005), "Predicting inflation: does the quantity theory help?", *Economic Inquiry*, Vol.43, No.3, pp.570-585.

Banerjee, A., M. Marcellino and I. Masten (2005), "Leading indicators for the Euro area inflation and GDP growth", *Oxford Bulletin of Economics & Statistics*, Vol.67, pp.785-813.

Benati, L. (2006), "UK monetary regimes and macroeconomic stylised facts", Bank of England Working Paper No.290.

Bernanke, B. and M. Gertler (1995), "Inside the black box: the credit channel of monetary policy transmission", *Journal of Economic Perspectives*, Vol.9, pp.27-48.

Bordo, M., B. Eichengreen, D. Klingebiel, and M.S. Martinez-Peria (2001), "Is the crisis problem growing more severe?", *Economic Policy*, Vol. 32, No.2, pp.51-82.

Bordo, M.D. and O. Jeanne (2002), "Monetary policy and asset prices: does "benign neglect" make sense?", *International Finance* Vol. 5, No. 2, pp.139-164.

Borio, C. and P. Lowe (2002), "Asset prices, financial and monetary stability: exploring the nexus", BIS Working Paper No.114.

Borio, C. and P. Lowe (2004), "Securing sustainable price stability: should credit come back from the wilderness?", BIS Working Paper No.157.

Bruggeman, A.,G. Camba-Méndez, B. Fischer and J. Sousa (2005), "Structural Filters for Monetary Analysis", ECB Working Paper No.470.

Brunner, K. and A.H. Meltzer (1973), "Mr Hicks and the 'Monetarists'", *Economica*, 1973, Vol.40, pp.44-59.

Catte, P., N. Girouard, R. Price and C. André (2004), "Housing market, wealth and the business cycle", OECD, Economic Department Working Paper No.394.

De Grauwe, P. and M. Polan (2005), "Is inflation always and everywhere a monetary phenomenon?", *Scandinavian Journal of Economics*, Vol.107, No.2, pp.239.260.

De Gregorio, J. (2004), "Rapid Growth of Monetary Aggregates and Inflation: the International Evidence", Central Bank of Chile, Working Paper No.256

Detken, C. and F. Smets (2004), "Asset price booms and monetary policy", in Horst Siebert (ed.) *Macroeconomic Policies in the World Economy*, Springer, Berlin, pp189-227.

Dwyer, G.P. and R.W. Hafer (1999), "Are Money Growth and Inflation still Related" *Federal Reserve Bank of Atlanta Economic Review*, Vol.84, No.2, pp.32-43.

Engert, W. and J. Selody (1998), "Uncertainty and multiple paradigms of the transmission mechanism", Bank of Canada Working Paper No. 98/7.

Fitzgerald, T.J. (1999), "Money growth and inflation: how long is the long run?", *Economic Commentary*, Federal Reserve Bank of Cleveland.

Gerlach, S. and L. Svensson (2003), "Money and Inflation in the Euro Area: a Case for Monetary Indicators?", *Journal of Monetary Economics*, Vol.50, No.8, pp.1649-1672.

Greene, W.H. (2003), *Econometric Analysis*, Fifth Edition, Prentice Hall International.

Helbling, T. and M. Terrones (2003), "When bubbles burst", in *World Economic Outlook*, IMF, Washington, April, pp.61-94.

Jaeger, A. (2003), "The ECB's Money Pillar: an Assessment", IMF Working Paper No.82.

Kindleberger, C. (1978), *Manias, Panics and Crashes: A History of Financial Crises*, John Wiley: New York.

Leeper E.M. and J.E. Roush (2002), "Putting 'M' back into Monetary Policy", *Journal of Money Credit and Banking*, Vol.35, No.6, pp.1217-1256.

Lothian, J.R. (1985), "Equilibrium Relationships between Money and other Economic Variables", *American Economic Review*, Vol.75, pp.828-835.

Lucas, R.E. (1980), "Two Illustrations of the Quantity Theory of Money", *American Economic Review*, Vol.70, pp.1005-1014.

Machado, J.A.F. and J. Sousa (2006), "Identifying asset price booms and busts with quantile regressions", Banco de Portugal Working Papers No. 8.

McCandless G.T. and W.E. Weber (1995), "Some Monetary Facts", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol.19, pp.2-11.

Nelson, E. (2003), "The future of monetary aggregates in monetary policy analysis", *Journal of Monetary Economics*, Vol.50, No.5, pp.1029-1059.

Nicoletti-Altimari, S. (2001), "Does Money Lead Inflation in the Euro Area?", ECB Working Paper No.63.

Orphanides, A. and S. van Norden (2005), "The reliability of inflation forecast based on output gap estimates in real time" ", *Journal of Money Credit and Banking*, Vol.37, No.6, pp.583-600.

Smets, F. (2003), "Maintaining price stability: how long is the medium term", *Journal of Monetary Economics*, Vol.50, No.6, pp.1293-1309.

Stevens, G.R. (2003), "Structural change and the conduct of monetary policy", Remarks at the Federal Reserve –Bank of Kansas City Economic Symposium, Jackson Hole.

Stiglitz, J. and A. Weiss (1981), "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, Vol. 73, No. 3, pp. 393–410.

Stock J.H. and M.W. Watson (1999), Forecasting Inflation", *Journal of Monetary Economics*, Vol.44, No.2, pp.293-335.

Stock J.H. and M.W. Watson (2006), "Why has US inflation become more hard to forecast", NBER Working Paper No.12324.

Trecroci, C. and J.-L. Vega (2000), "The information content of M3 for future inflation", ECB Working Paper No.33.

Van den Noord, P. (2006), "Are house price near a peak? A probit analysis for 17 OECD countries", OECD, Economic Department Working Paper No.488.

RECENTLY PUBLISHED "TEMI" (*)

N. 631 – *New Eurocoin: Tracking economic growth in real time*, by Filippo Altissimo, Riccardo Cristadoro, Mario Forni, Marco Lippi and Giovanni Veronese (June 2007).

N. 632 – *Oil supply news in a VAR: Information from financial markets*, by Alessio Anzuini, Patrizio Pagano and Massimiliano Pisani (June 2007).

N. 633 – *The reliability of EMU fiscal indicators: Risks and safeguards*, by Fabrizio Balassone, Daniele Franco and Stefania Zotteri (June 2007).

N. 634 – *Prezzi delle esportazioni, qualità dei prodotti e caratteristiche di impresa: un'analisi su un campione di imprese italiane*, by Matteo Bugamelli (June 2007).

N. 635 – *Openness to trade and industry cost dispersion: Evidence from a panel of Italian firms*, by Massimo Del Gatto, Gianmarco I.P. Ottaviano and Marcello Pagnini (June 2007).

N. 636 – *The weighting process in the SHIW*, by Ivan Faiella and Romina Gambacorta (June 2007).

N. 637 – *Emerging markets spreads and global financial conditions*, by Alessio Ciarlone, Paolo Piselli and Giorgio Trebeschi (June 2007).

N. 638 – *Comparative advantage patterns and domestic determinants in emerging countries: An analysis with a focus on technology*, by Daniela Marconi and Valeria Rolli (September 2007).

N. 639 – *The generation gap: Relative earnings of young and old workers in Italy*, by Alfonso Rosolia and Roberto Torrini (September 2007).

N. 640 – *The financing of small innovative firms: The Italian case*, by Silvia Magri (September 2007).

N. 641 – *Assessing financial contagion in the interbank market: Maximum entropy versus observed interbank lending patterns*, by Paolo Emilio Mistrulli (September 2007).

N. 642 – *Detecting long memory co-movements in macroeconomic time series, by* Gianluca Moretti (September 2007).

N. 643 – *The producer service sector in Italy: Long-term growth and its local determinants*, by Valter Di Giacinto and Giacinto Micucci (September 2007).

N. 644 – *Aggregazioni bancarie e specializzazione nel credito alle PMI: peculiarità per area geografica*, by Enrico Beretta and Silvia Del Prete (November 2007).

N. 645 – *Costs and benefits of creditor concentration: An empirical approach*, by Amanda Carmignani and Massimo Omiccioli (November 2007).

N. 646 – *Does the underground economy hold back financial deepening? Evidence from the Italian credit market*, by Giorgio Gobbi and Roberta Zizza (November 2007).

N. 647 – *Optimal monetary policy under low trend inflation*, by Guido Ascari and Tiziano Ropele (November 2007).

N. 648 – *Indici di bilancio e rendimenti di borsa: un'analisi per le banche italiane*, by Angela Romagnoli (November 2007).

N. 649 – *Bank profitability and taxation,* by Ugo Albertazzi and Leonardo Gambacorta (November 2007).

N. 650 – *Modelling bank lending in the euro area: A non-linear approach,* by Leonardo Gambacorta and Carlotta Rossi (November 2007).

N. 651 – *Revisiting poverty and welfare dominance,* by Gian Maria Tomat (November 2007).

N. 652 – *The general equilibrium effects of fiscal policy: Estimates for the euro area,* by Lorenzo Forni, Libero Monteforte and Luca Sessa (November 2007).

N. 653 – *Securitisation and the bank lending channel,* by Yener Altunbas, Leonardo Gambacorta and David Marqués (November 2007).

N. 654 – *The cyclical response of fiscal policies in the euro area. Why do results of empirical research differ so strongly?*, by Roberto Golinelli and Sandro Momigliano (January 2008).

N. 655 – *What's behind "inflation perceptions"? A survey-based analysis of Italian consumers*, by Paolo Del Giovane, Silvia Fabiani and Roberto Sabbatini (January 2008).

N. 656 – *The effects of fiscal policy in Italy: Evidence from a VAR model*, by Raffaela Giordano, Sandro Momigliano, Stefano Neri and Roberto Perotti (January 2008).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2004

P. ANGELINI and N. CETORELLI, *Gli effetti delle modifiche normative sulla concorrenza nel mercato creditizio,* in F. Panetta (eds.), Il sistema bancario negli anni novanta: gli effetti di una trasformazione, Bologna, il Mulino, **TD No. 380 (October 2000)**.

P. CHIADES and L. GAMBACORTA, *The Bernanke and Blinder model in an open economy: The Italian case*, German Economic Review, Vol. 5, 1, pp. 1-34, **TD No. 388 (December 2000)**.

M. BUGAMELLI and P. PAGANO, *Barriers to investment in ICT*, Applied Economics, Vol. 36 , 20, pp. 2275-2286, **TD No. 420 (October 2001)**.

F. BUSETTI, *Preliminary data and econometric forecasting: An application with the Bank of Italy quarterly model*, CEPR Discussion Paper, 4382, **TD No. 437 (December 2001)**.

A. BAFFIGI, R. GOLINELLI and G. PARIGI, *Bridge models to forecast the euro area GDP*, International Journal of Forecasting, Vol. 20, 3, pp. 447-460, **TD No. 456 (December 2002)**.

D. AMEL, C. BARNES, F. PANETTA and C. SALLEO, *Consolidation and efficiency in the financial sector: A review of the international evidence*, Journal of Banking and Finance, Vol. 28, 10, pp. 2493-2519, **TD No. 464 (December 2002)**.

M. PAIELLA, *Heterogeneity in financial market participation: Appraising its implications for the C-CAPM*, Review of Finance, Vol. 8, 3, pp. 445-480, **TD No. 473 (June 2003)**.

F. CINGANO and F. SCHIVARDI, *Identifying the sources of local productivity growth*, Journal of the European Economic Association, Vol. 2, 4, pp. 720-742, **TD No. 474 (June 2003)**.

E. BARUCCI, C. IMPENNA and R. RENÒ, *Monetary integration, markets and regulation*, Research in Banking and Finance, 4, pp. 319-360, **TD No. 475 (June 2003)**.

G. ARDIZZI, *Cost efficiency in the retail payment networks: first evidence from the Italian credit card system*, Rivista di Politica Economica, Vol. 94, 3, pp. 51-82, **TD No. 480 (June 2003)**.

E. BONACCORSI DI PATTI and G. DELL'ARICCIA, *Bank competition and firm creation*, Journal of Money Credit and Banking, Vol. 36, 2, pp. 225-251, **TD No. 481 (June 2003)**.

R. GOLINELLI and G. PARIGI, *Consumer sentiment and economic activity: a cross country comparison*, Journal of Business Cycle Measurement and Analysis, Vol. 1, 2, pp. 147-170, **TD No. 484 (September 2003)**.

L. GAMBACORTA and P. E. MISTRULLI, *Does bank capital affect lending behavior?*, Journal of Financial Intermediation, Vol. 13, 4, pp. 436-457, **TD No. 486 (September 2003)**.

F. SPADAFORA, *Il pilastro privato del sistema previdenziale: il caso del Regno Unito,* Economia Pubblica, 34, 5, pp. 75-114, **TD No. 503** (**June 2004**).

C. BENTIVOGLI and F. QUINTILIANI, *Tecnologia e dinamica dei vantaggi comparati: un confronto fra quattro regioni italiane*, in C. Conigliani (eds.), *Tra sviluppo e stagnazione: l'economia dell'Emilia-Romagna*, Bologna, Il Mulino, **TD No. 522 (October 2004)**.

R. BRONZINI, FDI Inflows, *Agglomeration and host country firms' size: Evidence from Italy*, Regional Studies, Vol. 41, 7, pp. 963-978, **TD No. 526 (December 2004).**

G. GOBBI and F. LOTTI, *Entry decisions and adverse selection: An empirical analysis of local credit markets,* Journal of Financial Services Research, Vol. 26, 3, pp. 225-244, **TD No. 535 (December 2004)**.

E. GAIOTTI and F. LIPPI, *Pricing behavior and the introduction of the euro: Evidence from a panel of restaurants*, Giornale degli Economisti e Annali di Economia, 2004, Vol. 63, 3-4, pp. 491-526, **TD No. 541 (February 2005)**.

L. GAMBACORTA, *How do banks set interest rates?,* NBER Working Paper, 10295, **TD No. 542 (February 2005).**

A. CICCONE, F. CINGANO and P. CIPOLLONE, *The private and social return to schooling in Italy*, Giornale degli Economisti e Annali di Economia, Vol. 63, 3-4, pp. 413-444, **TD No. 569 (January 2006)**.

L. DEDOLA and F. LIPPI, *The monetary transmission mechanism: Evidence from the industries of 5 OECD countries*, European Economic Review, 2005, Vol. 49, 6, pp. 1543-1569, **TD No. 389 (December 2000)**.

D. Jr. MARCHETTI and F. NUCCI, *Price stickiness and the contractionary effects of technology shocks*. European Economic Review, Vol. 49, 5, pp. 1137-1164, **TD No. 392 (February 2001)**.

G. CORSETTI, M. PERICOLI and M. SBRACIA, *Some contagion, some interdependence: More pitfalls in tests of financial contagion*, Journal of International Money and Finance, Vol. 24, 8, pp. 1177-1199, **TD No. 408 (June 2001)**.

GUISO L., L. PISTAFERRI and F. SCHIVARDI, *Insurance within the firm*. Journal of Political Economy, Vol. 113, 5, pp. 1054-1087, **TD No. 414** (**August 2001**)

R. CRISTADORO, M. FORNI, L. REICHLIN and G. VERONESE, *A core inflation indicator for the euro area*, Journal of Money, Credit, and Banking, Vol. 37, 3, pp. 539-560, **TD No. 435 (December 2001)**.

F. ALTISSIMO, E. GAIOTTI and A. LOCARNO, *Is money informative? Evidence from a large model used for policy analysis*, Economic & Financial Modelling, Vol. 22, 2, pp. 285-304, **TD No. 445 (July 2002)**.

G. DE BLASIO and S. DI ADDARIO, *Do workers benefit from industrial agglomeration?* Journal of regional Science, Vol. 45, (4), pp. 797-827, **TD No. 453 (October 2002).**

G. DE BLASIO and S. DI ADDARIO, *Salari, imprenditorialità e mobilità nei distretti industriali italiani*, in L. F. Signorini, M. Omiccioli (eds.), *Economie locali e competizione globale: il localismo industriale italiano di fronte a nuove sfide*, Bologna, il Mulino, **TD No. 453 (October 2002).**

R. TORRINI, *Cross-country differences in self-employment rates: The role of institutions*, Labour Economics, Vol. 12, 5, pp. 661-683, **TD No. 459 (December 2002)**.

A. CUKIERMAN and F. LIPPI, *Endogenous monetary policy with unobserved potential output*, Journal of Economic Dynamics and Control, Vol. 29, 11, pp. 1951-1983, **TD No. 493 (June 2004)**.

M. OMICCIOLI, *Il credito commerciale: problemi e teorie*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 494 (June 2004)**.

L. CANNARI, S. CHIRI and M. OMICCIOLI, *Condizioni di pagamento e differenziazione della clientela*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 495 (June 2004)**.

P. FINALDI RUSSO and L. LEVA, *Il debito commerciale in Italia: quanto contano le motivazioni finanziarie?*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 496 (June 2004)**.

A. CARMIGNANI, *Funzionamento della giustizia civile e struttura finanziaria delle imprese: il ruolo del credito commerciale*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 497 (June 2004)**.

G. DE BLASIO, *Credito commerciale e politica monetaria: una verifica basata sull'investimento in scorte*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 498 (June 2004)**.

G. DE BLASIO, *Does trade credit substitute bank credit? Evidence from firm-level data.* Economic notes, Vol. 34, 1, pp. 85-112, **TD No. 498 (June 2004).**

A. DI CESARE, *Estimating expectations of shocks using option prices*, The ICFAI Journal of Derivatives Markets, Vol. 2, 1, pp. 42-53, **TD No. 506 (July 2004).**

M. BENVENUTI and M. GALLO, *Il ricorso al "factoring" da parte delle imprese italiane*, in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 518 (October 2004)**.

L. CASOLARO and L. GAMBACORTA, *Redditività bancaria e ciclo economico*, Bancaria, Vol. 61, 3, pp. 19-27, **TD No. 519 (October 2004)**.

F. PANETTA, F. SCHIVARDI and M. SHUM, *Do mergers improve information? Evidence from the loan market*, CEPR Discussion Paper, 4961, **TD No. 521 (October 2004)**.

P. DEL GIOVANE and R. SABBATINI, *La divergenza tra inflazione rilevata e percepita in Italia*, in P. Del Giovane, F. Lippi e R. Sabbatini (eds.), *L'euro e l'inflazione: percezioni, fatti e analisi*, Bologna, Il Mulino, **TD No. 532 (December 2004).**

R. TORRINI, *Quota dei profitti e redditività del capitale in Italia: un tentativo di interpretazione*, Politica economica, Vol. 21, 1, pp. 7-41, **TD No. 551 (June 2005)**.

M. OMICCIOLI, *Il credito commerciale come "collateral"*, in L. Cannari, S. Chiri, M. Omiccioli (eds.), Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia, Bologna, il Mulino, **TD No. 553 (June 2005)**.

L. CASOLARO, L. GAMBACORTA and L. GUISO, *Regulation, formal and informal enforcement and the development of the household loan market. Lessons from Italy*, in Bertola G., Grant C. and Disney R. (eds.) The Economics of Consumer Credit: European Experience and Lessons from the US, Boston, MIT Press, **TD No. 560 (September 2005)**.

S. DI ADDARIO and E. PATACCHINI, *Lavorare in una grande città paga, ma poco*, in Brucchi Luchino (ed.), *Per un'analisi critica del mercato del lavoro*, Bologna , Il Mulino, **TD No. 570 (January 2006)**.

P. ANGELINI and F. LIPPI, *Did inflation really soar after the euro changeover? Indirect evidence from ATM withdrawals*, CEPR Discussion Paper, 4950, **TD No. 581 (March 2006)**.

S. FEDERICO, *Internazionalizzazione produttiva, distretti industriali e investimenti diretti all'estero*, in L. F. Signorini, M. Omiccioli (eds.), *Economie locali e competizione globale: il localismo industriale italiano di fronte a nuove sfide*, Bologna, il Mulino, **TD No. 592 (October 2002).**

S. DI ADDARIO, *Job search in thick markets: Evidence from Italy*, Oxford Discussion Paper 235, Department of Economics Series, **TD No. 605 (December 2006)**.

2006

F. BUSETTI, *Tests of seasonal integration and cointegration in multivariate unobserved component models*, Journal of Applied Econometrics, Vol. 21, 4, pp. 419-438, **TD No. 476 (June 2003).**

C. BIANCOTTI, *A polarization of inequality? The distribution of national Gini coefficients 1970-1996*, Journal of Economic Inequality, Vol. 4, 1, pp. 1-32, **TD No. 487 (March 2004)**.

L. CANNARI and S. CHIRI, *La bilancia dei pagamenti di parte corrente Nord-Sud (1998-2000)*, in L. Cannari, F. Panetta (a cura di), Il sistema finanziario e il Mezzogiorno: squilibri strutturali e divari finanziari, Bari, Cacucci, **TD No. 490 (March 2004).**

M. BOFONDI and G. GOBBI, *Information barriers to entry into credit markets*, Review of Finance, Vol. 10, 1, pp. 39-67, **TD No. 509 (July 2004).**

FUCHS W. and LIPPI F., *Monetary union with voluntary participation*, Review of Economic Studies, Vol. 73, pp. 437-457 **TD No. 512 (July 2004).**

GAIOTTI E. and A. SECCHI, *Is there a cost channel of monetary transmission? An investigation into the pricing behaviour of 2000 firms*, Journal of Money, Credit and Banking, Vol. 38, 8, pp. 2013-2038 **TD No. 525 (December 2004)**.

A. BRANDOLINI, P. CIPOLLONE and E. VIVIANO, *Does the ILO definition capture all unemployment?*, Journal of the European Economic Association, Vol. 4, 1, pp. 153-179, **TD No. 529 (December 2004)**.

A. BRANDOLINI, L. CANNARI, G. D'ALESSIO and I. FAIELLA, *Household wealth distribution in Italy in the 1990s*, in E. N. Wolff (ed.) International Perspectives on Household Wealth, Cheltenham, Edward Elgar, **TD No. 530 (December 2004)**.

P. DEL GIOVANE and R. SABBATINI, *Perceived and measured inflation after the launch of the Euro: Explaining the gap in Italy*, Giornale degli economisti e annali di economia, Vol. 65, 2 , pp. 155-192, **TD No. 532 (December 2004).**

M. CARUSO, *Monetary policy impulses, local output and the transmission mechanism*, Giornale degli economisti e annali di economia, Vol. 65, 1, pp. 1-30, **TD No. 537 (December 2004).**

L. GUISO and M. PAIELLA, *The role of risk aversion in predicting individual behavior, In P. A. Chiappori e C. Gollier (eds.) Competitive Failures in Insurance Markets: Theory and Policy Implications, Monaco, CESifo*, **TD No. 546 (February 2005).**

G. M. TOMAT, *Prices product differentiation and quality measurement: A comparison between hedonic and matched model methods*, Research in Economics, Vol. 60, 1, pp. 54-68, **TD No. 547 (February 2005)**.

F. LOTTI, E. SANTARELLI and M. VIVARELLI, *Gibrat's law in a medium-technology industry: Empirical evidence for Italy*, in E. Santarelli (ed.), Entrepreneurship, Growth, and Innovation: the Dynamics of Firms and Industries, New York, Springer, **TD No. 555 (June 2005).**

F. BUSETTI, S. FABIANI and A. HARVEY, *Convergence of prices and rates of inflation*, Oxford Bulletin of Economics and Statistics, Vol. 68, 1, pp. 863-878, **TD No. 575 (February 2006).**

M. CARUSO, *Stock market fluctuations and money demand in Italy, 1913 - 2003*, Economic Notes, Vol. 35, 1, pp. 1-47, **TD No. 576 (February 2006)**.

S. IRANZO, F. SCHIVARDI and E. TOSETTI, *Skill dispersion and productivity: An analysis with matched data*, CEPR Discussion Paper, 5539, **TD No. 577 (February 2006).**

R. BRONZINI and G. DE BLASIO, *Evaluating the impact of investment incentives: The case of Italy's Law 488/92*. Journal of Urban Economics, Vol. 60, 2, pp. 327-349, **TD No. 582 (March 2006).**

R. BRONZINI and G. DE BLASIO, *Una valutazione degli incentivi pubblici agli investimenti*, Rivista Italiana degli Economisti , Vol. 11, 3, pp. 331-362, **TD No. 582 (March 2006).**

A. DI CESARE, *Do market-based indicators anticipate rating agencies? Evidence for international banks*, Economic Notes, Vol. 35, pp. 121-150, **TD No. 593 (May 2006).**

L. DEDOLA and S. NERI, *What does a technology shock do? A VAR analysis with model-based sign restrictions*, Journal of Monetary Economics, Vol. 54, 2, pp. 512-549, **TD No. 607 (December 2006)**.

R. GOLINELLI and S. MOMIGLIANO, *Real-time determinants of fiscal policies in the euro area*, Journal of Policy Modeling, Vol. 28, 9, pp. 943-964, **TD No. 609 (December 2006).**

P. ANGELINI, S. GERLACH, G. GRANDE, A. LEVY, F. PANETTA, R. PERLI,S. RAMASWAMY, M. SCATIGNA and P. YESIN, *The recent behaviour of financial market volatility*, BIS Papers, 29, **QEF No. 2 (August 2006)**.

2007

L. CASOLARO. and G. GOBBI, *Information technology and productivity changes in the banking industry*, Economic Notes, Vol. 36, 1, pp. 43-76, **TD No. 489 (March 2004)**.

M. PAIELLA, *Does wealth affect consumption? Evidence for Italy*, Journal of Macroeconomics, Vol. 29, 1, pp. 189-205, **TD No. 510 (July 2004).**

F. LIPPI. and S. NERI, *Information variables for monetary policy in a small structural model of the euro area*, Journal of Monetary Economics, Vol. 54, 4, pp. 1256-1270, **TD No. 511 (July 2004)**.

A. ANZUINI and A. LEVY, *Monetary policy shocks in the new EU members: A VAR approach*, Applied Economics, Vol. 39, 9, pp. 1147-1161, **TD No. 514 (July 2004)**.

R. BRONZINI, *FDI Inflows, agglomeration and host country firms' size: Evidence from Italy*, Regional Studies, Vol. 41, 7, pp. 963-978, **TD No. 526 (December 2004).**

L. MONTEFORTE, *Aggregation bias in macro models: Does it matter for the euro area?*, Economic Modelling, 24, pp. 236-261, **TD No. 534 (December 2004)**.

A. DALMAZZO and G. DE BLASIO, *Production and consumption externalities of human capital: An empirical study for Italy*, Journal of Population Economics, Vol. 20, 2, pp. 359-382, **TD No. 554 (June 2005).**

M. BUGAMELLI and R. TEDESCHI, *Le strategie di prezzo delle imprese esportatrici italiane*, Politica Economica, v. 3, pp. 321-350, **TD No. 563 (November 2005)**.

L. GAMBACORTA and S. IANNOTTI, *Are there asymmetries in the response of bank interest rates to monetary shocks?*, Applied Economics, v. 39, 19, pp. 2503-2517, **TD No. 566 (November 2005).**

S. DI ADDARIO and E. PATACCHINI, *Wages and the city. Evidence from Italy*, Development Studies Working Papers 231, Centro Studi Luca d'Agliano, **TD No. 570 (January 2006)**.

P. ANGELINI and F. LIPPI, *Did prices really soar after the euro cash changeover? Evidence from ATM withdrawals*, International Journal of Central Banking, Vol. 3, 4, pp. 1-22, **TD No. 581 (March 2006)**.

A. LOCARNO, *Imperfect knowledge, adaptive learning and the bias against activist monetary policies*, International Journal of Central Banking, v. 3, 3, pp. 47-85, **TD No. 590 (May 2006)**.

F. LOTTI and J. MARCUCCI, *Revisiting the empirical evidence on firms' money demand*, Journal of Economics and Business, Vol. 59, 1, pp. 51-73, **TD No. 595 (May 2006)**.

P. CIPOLLONE and A. ROSOLIA, *Social interactions in high school: Lessons from an earthquake*, American Economic Review, Vol. 97, 3, pp. 948-965, **TD No. 596 (September 2006).**

A. BRANDOLINI, *Measurement of income distribution in supranational entities: The case of the European Union*, in S. P. Jenkins e J. Micklewright (eds.), Inequality and Poverty Re-examined, Oxford, Oxford University Press, **TD No. 623 (April 2007).**

M. PAIELLA, *The foregone gains of incomplete portfolios*, Review of Financial Studies, Vol. 20, 5, pp. 1623-1646, **TD No. 625 (April 2007).**

K. BEHRENS, A. R. LAMORGESE, G.I.P. OTTAVIANO and T. TABUCHI, *Changes in transport and non transport costs: local vs. global impacts in a spatial network*, Regional Science and Urban Economics, Vol. 37, 6, pp. 625-648, **TD No. 628 (April 2007).**

R. GIORDANO, S. MOMIGLIANO, S. NERI and R. PEROTTI, *The Effects of Fiscal Policy in Italy: Evidence from a VAR Model*, European Journal of Political Economy, Vol. 23, 3, pp. 707-733, **TD No. 656 (December 2007).**

FORTHCOMING

P. ANGELINI, *Liquidity and announcement effects in the euro area*, Giornale degli economisti e annali di economia, **TD No. 451 (October 2002).**

S. MAGRI, *Italian households' debt: The participation to the debt market and the size of the loan*, Empirical Economics, **TD No. 454 (October 2002)**.

L. MONTEFORTE and S. SIVIERO, *The Economic Consequences of Euro Area Modelling Shortcuts*, Applied Economics, **TD No. 458 (December 2002).**

L. GUISO and M. PAIELLA,, *Risk aversion, wealth and background risk*, Journal of the European Economic Association, **TD No. 483 (September 2003).**

G. FERRERO, *Monetary policy, learning and the speed of convergence*, Journal of Economic Dynamics and Control, **TD No. 499 (June 2004).**

F. SCHIVARDI e R. TORRINI, *Identifying the effects of firing restrictions through size-contingent Differences in regulation*, Labour Economics, **TD No. 504 (giugno 2004)**.

S. MOMIGLIANO, J. Henry and P. Hernández de Cos, *The impact of government budget on prices: Evidence from macroeconometric models*, Journal of Policy Modelling, **TD No. 523 (October 2004).**

D. Jr. MARCHETTI and F. Nucci, *Pricing behavior and the response of hours to productivity shocks*, Journal of Money Credit and Banking, **TD No. 524 (December 2004).**

L. GAMBACORTA, *How do banks set interest rates?*, European Economic Review, **TD No. 542 (February 2005).**

A. NOBILI, *Assessing the predictive power of financial spreads in the euro area: does parameters instability matter?*, Empirical Economics, Vol. 31, 4, pp. , **TD No. 544 (February 2005)**.

P. ANGELINI and A. Generale, *On the evolution of firm size distributions*, American Economic Review, **TD No. 549 (June 2005).**

R. FELICI and M. PAGNINI,, *Distance, bank heterogeneity and entry in local banking markets*, The Journal of Industrial Economics, **TD No. 557 (June 2005).**

M. BUGAMELLI and R. TEDESCHI, *Le strategie di prezzo delle imprese esportatrici italiane*, Politica Economica, **TD No. 563 (November 2005).**

S. DI ADDARIO and E. PATACCHINI, *Wages and the city. Evidence from Italy*, Labour Economics, **TD No. 570 (January 2006)**.

M. BUGAMELLI and A. ROSOLIA, *Produttività e concorrenza estera*, Rivista di politica economica, **TD No. 578 (February 2006).**

E. VIVIANO, *Entry regulations and labour market outcomes. Evidence from the Italian retail trade sector*, Labour Economics, **TD No. 594 (MAY 2006)**.

S. FEDERICO and G. A. MINERVA, *Outward FDI and local employment growth in Italy*, Review of World Economics, **TD No. 613 (February 2007).**

F. BUSETTI and A. HARVEY, *Testing for trend*, Econometric Theory **TD No. 614 (February 2007).**

V. CESTARI, P. DEL GIOVANE and C. ROSSI-ARNAUD, *Memory for Prices and the Euro Cash Changeover: An Analysis for Cinema Prices in Italy*, In P. Del Giovane e R. Sabbatini (eds.), The Euro Inflation and Consumers' Perceptions. Lessons from Italy, Berlin-Heidelberg, Springer, **TD No. 619 (February 2007).**

B. ROFFIA and A. ZAGHINI, *Excess money growth and inflation dynamics*, International Finance, **TD No. 629 (June 2007)**.

M. DEL GATTO, GIANMARCO I. P. OTTAVIANO and M. PAGNINI, *Openness to trade and industry cost dispersion: Evidence from a panel of Italian firms*, Journal of Regional Science, **TD No. 635 (June 2007)**.

A. CIARLONE, P. PISELLI and G. TREBESCHI, *Emerging Markets' Spreads and Global Financial Conditions*, Journal of International Financial Markets, Institutions & Money, **TD No. 637 (June 2007).**

S. MAGRI, *The financing of small innovative firms: The Italian case*, Economics of Innovation and New Technology, **TD No. 640 (September 2007)**.