
NOTES D'ÉTUDES

ET DE RECHERCHE

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DETERMINANTS AND POLICY IMPLICATIONS**

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Understanding Asset Prices: Determinants and Policy Implications

*An Overview of Recent Research Carried out at the Banque
de France*

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Abstract

The paper provides an overview of recent asset price developments in France in the light of analytical research carried out at the Banque de France. Like in many other countries, historically low interest rates have boosted asset price dynamics in France over recent years. The paper attempts to shed light on the main driving factors and assesses, in particular, the role played by “excess liquidity” in shaping current developments. Additional factors related to fierce competition in the French banking sector have also contributed to the upswing in residential property prices, exacerbating households’ demand through credit expansion and leading to a sharp and unprecedented increase in household debt, consistent with a financial-accelerator-like mechanism. On several occasions over the past two years, the Banque de France has expressed its concerns about lending for housing purchase and housing price developments, both from a monetary and a financial stability perspective. Finally, the paper presents some views, based on in-house research, on the role, if any, that asset prices could play in the setting of monetary policy.

Keywords: asset prices, monetary policy

JEL classification: E44, E50, G12

Résumé

Cet article analyse l'évolution récente des prix d'actifs en France à l'aune des travaux empiriques et théoriques effectués à la Banque de France au cours de ces dernières années. A l'instar de ce que l'on a pu observer dans de nombreux pays, le niveau historiquement et durablement bas des taux d'intérêt a été à l'origine d'une forte progression du prix des actifs en France. L'article cherche à mettre en évidence les principaux facteurs à l'origine de cette flambée des prix d'actifs et étudie en particulier le rôle des "excès de liquidité" dans cette dynamique. Il ressort que des facteurs additionnels, liés par exemple à l'intensité de la concurrence dans le secteur bancaire, ont pu contribuer à l'envolée des prix de l'immobilier résidentiel, en exacerbant la demande de crédit des ménages d'une part et en conduisant à une forte croissance de leur endettement d'autre part, conformément au mécanisme de l'accélérateur financier. De telles évolutions ont conduit la Banque de France à exprimer, à plusieurs reprises au cours de ces dernières années, ses inquiétudes quant à l'évolution conjointe des crédits et des prix immobiliers, tant pour des raisons de stabilité monétaire que pour des raisons de stabilité financières. Enfin, l'article présente quelques pistes de réflexion sur le rôle éventuel des prix d'actifs dans la conduite de la politique monétaire.

Mots-clés : prix d'actifs, politique monétaire

Classification JEL : E44, E50, G12

Non technical summary

This paper provides an overview of recent asset price developments in France in the light of analytical research carried out at the Banque de France. It first presents some stylised facts about recent asset price behaviour and developments and reviews the empirical research carried out at the Banque de France regarding their main determinants. The main lessons we can draw from this review are:

1- asset market prices have shown ample fluctuations in France over recent years. There is increasing evidence of the existence of wealth effects in France, though still difficult to spot from an econometric point of view. The recent surge in asset prices, in particular housing prices, is illustrative of an apparently increased interaction between residential property prices and credit constraints, in a context of historically low interest rates.

2- As far as their statistical properties are concerned, asset prices have, in general, not undergone dramatic changes, except for housing prices; in the latter case, the conjunction of easy monetary policy, low interest rates, fierce competition in the banking sector and measures to stimulate the French housing market have clearly contributed to the run-up in residential property prices.

3- Financial globalisation may have contributed to increasing the role of “common factors” or at least, occasionally facilitated the transmission of financial shocks across countries. For instance, there is strong evidence that the main developments in the French equity and bond markets are largely driven by international factors.

4- However, there are no clear signs of causality running from "excess liquidity" to asset prices. The causation, if any, rather appears to occur in the opposite direction. Indeed, on the period under review, such causation would be consistent with the portfolio shifts or “flight to liquidity” episodes evidenced in a context of increased uncertainty, in the aftermath of the stock market collapse in 2000.

5- Concerns about the risks of an abrupt correction in the bond and housing markets in the context of less easy monetary policy have led central banks to adjust their communication policies

vis-à-vis asset markets. The Banque de France for instance has on several occasions communicated its main concerns about the sustainability of current housing price developments and credit expansion.

6- Finally, recent research tends to strengthen the case for a monetary policy reaction to supposed or perceived asset price out-of-fundamental dynamics: first, stemming from an "insurance motive": a central bank, which may not have necessarily superior information, can send a credible signal that it fears possible non-fundamental price dynamics. In that case, an interest rate hike may be sufficient to curb the cascade by forcing market participants to re-assess their views about current price developments; second, by suggesting that monetary policy may have more leverage on asset prices by reacting to current private expectations of future asset prices rather than to current asset prices.

Résumé non technique

Cet article analyse l'évolution récente des prix d'actifs en France à l'aune des travaux empiriques et théoriques effectués à la Banque de France au cours de ces dernières années. Il présente dans un premier temps les principaux faits stylisés concernant l'évolution de ces prix et tente d'en déterminer les causes. Les principaux résultats qui ressortent de cet exercice sont les suivants :

1- les prix d'actifs ont connu des fluctuations marquées au cours de ces dernières années. Ces évolutions pourraient refléter la présence d'effets de richesse en France, bien que ces derniers demeurent difficiles à mettre en évidence d'un point de vue économétrique. La récente envolée des prix d'actifs, en particulier ceux de l'immobilier, s'explique notamment par le relâchement des contraintes de crédit dans un contexte de taux d'intérêt historiquement bas.

2- Toutefois, de telles évolutions ne présentent pas de ruptures majeures au regard des propriétés statistiques passées des prix d'actifs, sauf en ce qui concerne les prix de l'immobilier. Dans ce dernier cas, la conjonction d'une politique monétaire accommodante, du bas niveau des taux d'intérêt, d'une concurrence accrue au sein du système bancaire et de mesures destinées à dynamiser le marché immobilier ont clairement participé à l'envolée singulière des prix de l'immobilier.

3- La globalisation financière a sans doute contribué à accroître le poids des "facteurs communs" dans la dynamique des prix d'actifs et a pu occasionnellement faciliter la transmission internationale des chocs financiers entre les pays. Il apparaît ainsi que l'évolution des marchés boursier ou obligataire français est largement déterminée par des facteurs internationaux.

4- Il est difficile de mettre en évidence, à l'aune des mesures disponibles, un lien de causalité allant des "excès de liquidité" aux prix des actifs. Le sens de la causalité serait d'ailleurs plutôt opposé, en cohérence avec les mouvements de portefeuille ou les épisodes de "fuite vers la liquidité" observés dans un contexte d'incertitude accrue aux lendemains du krach boursier de 2000.

5- Les inquiétudes à l'égard du risque d'un ajustement brutal des marchés obligataires et immobiliers dans un contexte de durcissement des politiques monétaires ont conduit les banques centrales à ajuster leur communication vis-à-vis des marchés d'actifs. Ainsi, la Banque de France

a signalé à plusieurs reprises au cours de ces dernières années ses craintes et interrogations quant à la soutenabilité du rythme de hausse des prix et des crédits immobiliers.

6- Enfin des travaux théoriques récents semblent considérer qu'une réaction de politique monétaire à une évolution des prix d'actifs perçue comme non conforme aux fondamentaux serait envisageable. Une première raison découlerait du principe "d'assurance": une banque centrale, ne disposant pas nécessairement d'une meilleure information que celle des agents privés, pourrait envoyer un signal crédible manifestant une crainte relative à la présence de comportements moutonniers sur les marchés financiers. Dans ce contexte, une hausse des taux directeurs, même limitée, pourrait suffire à rompre une "cascade informationnelle" en forçant les agents économiques à procéder à une nouvelle évaluation des cours. une seconde raison tiendrait au fait qu'une réaction non agressive de politique monétaire, visant à interrompre une bulle en cours de formation en déconnectant la valeur présente du prix d'actif des anticipations des agents privés concernant sa valeur future, exercerait un effet de levier sur ces anticipations.

1 Introduction

The last two decades have been marked by far-reaching changes in French financial markets. The combined effects of financial deregulation and innovation against the backdrop of globalisation, the inception of the euro and its effects on financial integration may have contributed to strengthening the role of financial factors in the economic cycle (Clerc and Pfister, 2003). Though wealth effects remain difficult to spot in France (cf. Fraisse, 2004), the recent increase in asset prices, in particular housing prices, is illustrative of an apparently increased interaction between residential property prices and credit constraints, in a context of historically low interest rates. Baude (2005) finds that ample fluctuations in asset prices in France from the mid-1990s to the end of 2000 generated important wealth effects in particular for firms that relaxed their credits constraints and led to a significant increase in their indebtedness. Over recent years, the decline of interest rates to historical lows has mitigated the effects of the stock market crash. It has been conducive, amongst other factors, to an increase in the prices of other assets, in particular residential property prices. The combination of these two developments has favoured an additional increase in the level of indebtedness of both households and firms.

The main risks stemming from the current situation are related to the following issues: first, there are still many questions about why interest rates have reached and remained at historical lows for such a long period. Economists at the FED and the IMF have pointed out the key role played by a fall in risk premia, suggesting in addition the possibility of a current under-pricing of risks on financial asset markets that would leave them vulnerable to revisions in the macroeconomic outlook. Second, the removal of the accommodative policy stance could lead to debt servicing difficulties, in particular in the household sector. As an illustration, fierce competition in the French banking sector has contributed to the upswing in residential property prices, exacerbating households' demand through credit expansion and leading to a sharp and unprecedented increase in household debt (see for instance Boutillier, Gabrielli and Montfront, 2005). In this context, the

Banque de France has, on several occasions over the past two years, expressed its concerns about lending for housing purchase and housing price developments, both from a monetary and financial stability perspective.

Finally, financial globalisation may have contributed to increasing the role of “common factors” or at least, facilitated the transmission of financial shocks across countries. As far as the French economy is concerned, there is strong evidence that the main developments in the equity and bond markets are largely driven by international factors. This has so far not been the case for housing prices, which were considered to be more determined by country-specific factors. From this viewpoint, the significant upswing in housing prices that started in the late 1990s in France however presents some new interesting and challenging features: first, the housing boom is not only in the big cities, particularly Paris, but is a widespread phenomenon affecting most parts of the country. Second, there is anecdotal evidence of “contagion”, with strong demand stemming from English, Dutch and more recently Irish investors putting additional pressures on prices, i.e. demand originating from European countries where both financial and housing wealth effects are evidenced.

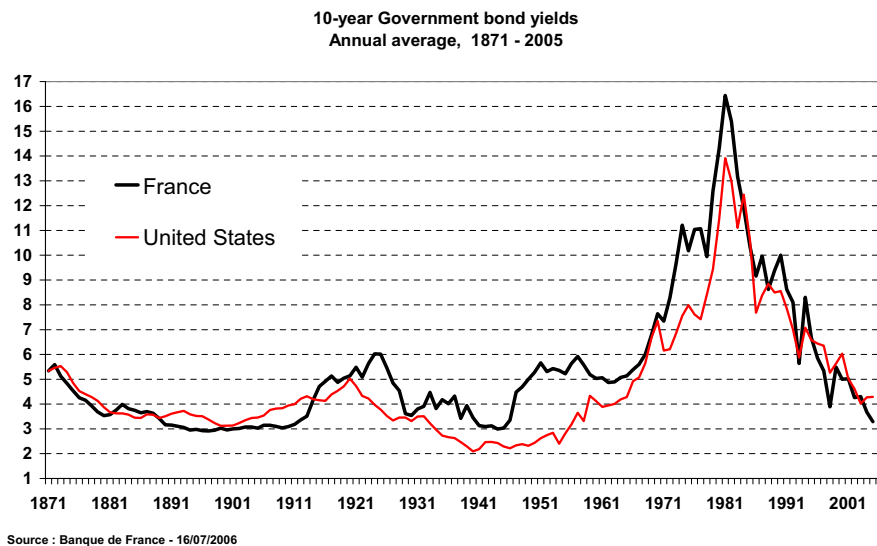
This paper is organised as follows: section 1 presents some stylised facts about recent asset price behaviour; section 2 reviews the empirical research carried out at the Banque the France regarding their main determinants; section 3 attempts to draw some monetary and financial stability implications.

2 Stylised facts about recent asset prices behaviour

The historically low level of interest rates has undoubtedly been a key driving factor shaping asset price dynamics in France.¹ As illustrated in Figure 1 below, last year long-term nominal rates reached a level unprecedented in the last sixty years. Short-term nominal rates behaved alike.

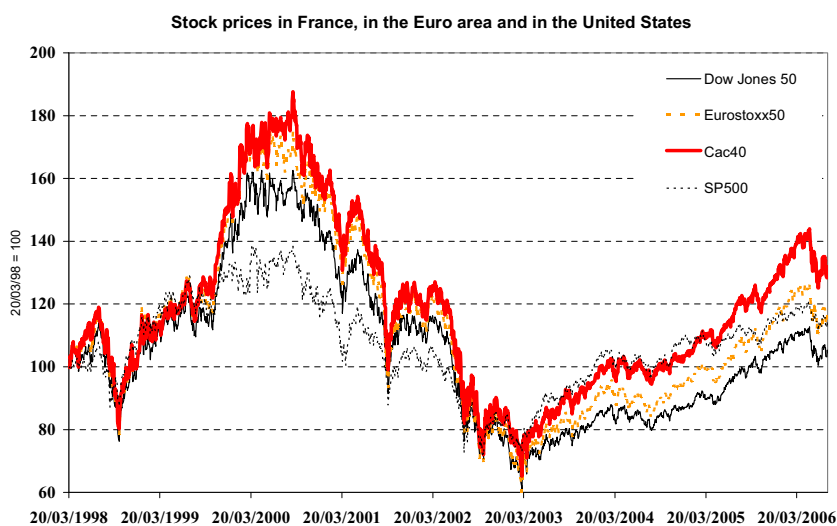
¹This may simply reflect the standard present-value statement (see for instance Cochrane, 2001) according to which p_t , the asset price is given by: $p_t = \sum_{j=1}^{\infty} \frac{E_t d_{t+j}}{R_{t,t+j}^f} + \sum_{j=1}^{\infty} cov_t(d_{t+j}, m_{t,t+j})$ where d stands for a stream of dividends or rents, $R_{t,t+j}^f = E_t(m_{t,t+j})^{-1}$ for the j period interest rate and $m_{t,t+j}$ for the pricing kernel

Figure 1



Indeed, the monetary policy stimulus resulting from aggressive monetary easing, at least in the United States in the context of a post-bubble era, prompted a surge in equity prices that occurred simultaneously in the United States and continental Europe in the first quarter of 2003 (Figure 2).

Figure 2:



Nevertheless, domestic factors, such as a better macroeconomic outlook, may also explain why the French stock market has outperformed its European counterparts over the last three years.

Taking a longer term perspective, Grouard, Lévy and Lubochinsky (2003) show, based on various available volatility indicators, that stock market volatility had exhibited an upward trend since 1997, in particular for technology, media and telecommunications stocks. This tendency was a global phenomenon, as illustrated in Figure 3.

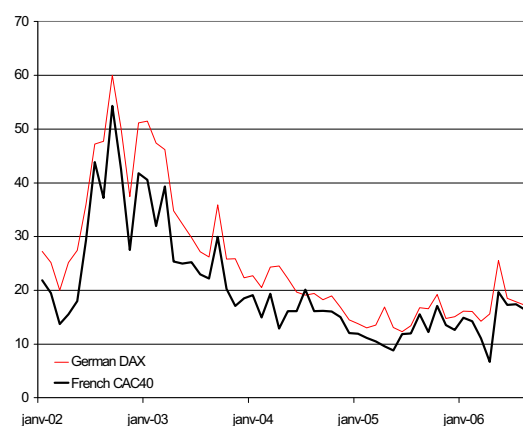
Figure 3:

Annual historical volatility of the SP500, CAC40 and FTSE 100 stock market indices (in %)



Source: Banque de France, Bloomberg

Monthly implied volatility of the CAC 40 and the DAX stock market indices



Source: Datastream

However, a peak was reached in 2002-2003, with annual historical volatility of the CAC index exceeding 38% while monthly volatility occasionally reached 60%. Since then, the trend has reversed and monthly volatility plummeted to 6% in April 2006, in line with the assumption of a fall in the risk premium. Like other financial markets, the French stock market experienced a sharp increase in volatility in May and June 2006, which was mainly interpreted as a reassessment of risk and a sound correction. However, this movement was short-lived and volatility declined again over the summer.

It remains unclear, from a long-term perspective, whether volatility has changed significantly over the last twenty years as current lows may simply be offsetting previous highs. Indeed, the statistical properties of volatility of French equity prices, i.e. volatility clusters and mean reversion, have not changed dramatically over recent years.

Housing prices have exhibited more unusual patterns (Figure 4 below). The current run-up in housing prices in France differs from past experiences in three important respects: first, the size of

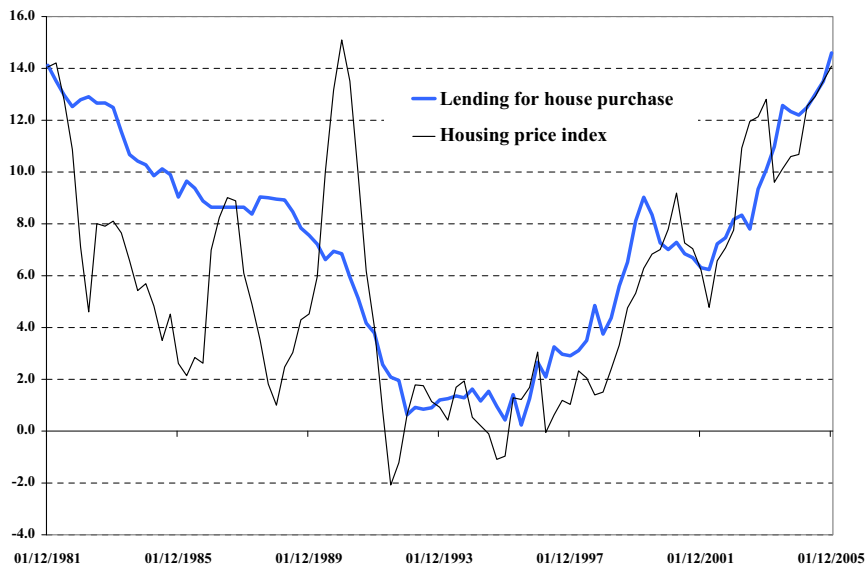
the current upturn is striking, in particular in real terms: from Q1 1997 to Q4 2005, the current expansion phase, housing prices increased by around 80%, by far exceeding previous housing price upturns: they rose for instance by around 33% between Q3 1984 and Q1 1991 and by 31.2% between Q1 1970 and Q1 1981; second, the duration of the current expansion phase has surpassed that of similar past episodes: 37 consecutive quarters of price increases versus 27 during the last cycle; third, housing prices have also tended to move together across countries and, as far as France is concerned, the rise has been observed all over the country, whereas it was limited to the big cities, in particular Paris, during past boom episodes.

Amongst the factors that could have played a role, besides the usual determinants, financial deregulation in the mortgage market has contributed to significantly reducing borrowing constraints on households. Fierce competition in the French banking sector has resulted in a lengthening of mortgage terms, with loan duration extended to 30 years, and the developments of variable payment mortgages. In France, home ownership has traditionally been financed with 5-year and longer fixed-rate loans, with more than 50% of the outstanding loans with terms of 10 years or more. However, the share of new loans at variable rates or an initial rate fixed for one year or less reached almost 30% in 2005.

These developments have originated in a sharp increase in household indebtedness. The ratio of households' total debt to real disposable income rose from 49% in 1996 to 64.9% in Q1 2006 (Secrétariat du Conseil national du crédit et du titre, 2004 and 2005, and regular updates posted on the Banque de France web site). The analyses carried out at the Banque de France tend to show that debt levels have remained manageable so far, as the increase in indebtedness has been partly offset by the decline in the borrowing rate. Indices of housing affordability computed by Moëc (2004 and 2006) exhibit for example a downward trend as from 1998 but still remain 2 percentage points above the level prevailing before the last housing price reversal in 1991. However, the two papers by Moëc rightly question the sustainability of the current pace of housing price increases and point out the vulnerability of the French housing market to a rise in interest rates.

In May 2006, the French government introduced new measures to modernise the mortgage market that will allow French property owners to release mortgage equity in order to increase borrowing (refillable mortgage) or enter into a reverse mortgage. The purpose of the reform is twofold: foster the use of mortgage loans by households in order to develop home ownership; and encourage mortgage equity withdrawal to raise consumption and economic growth. Mésonnier (2004) analysed the draft proposals of this mortgage market reform and pointed out that, from a financial stability perspective, new market products would raise indebtedness and risks for households and lenders, increasing their vulnerabilities to income and asset price fluctuations. However, it is fair to say that the final draft of the Order adopted last May accounted for these risks and has been mindful of protecting consumers by limiting the credit to the original amount of the loan.

Figure 4: **Housing prices and lending for house purchase in France**



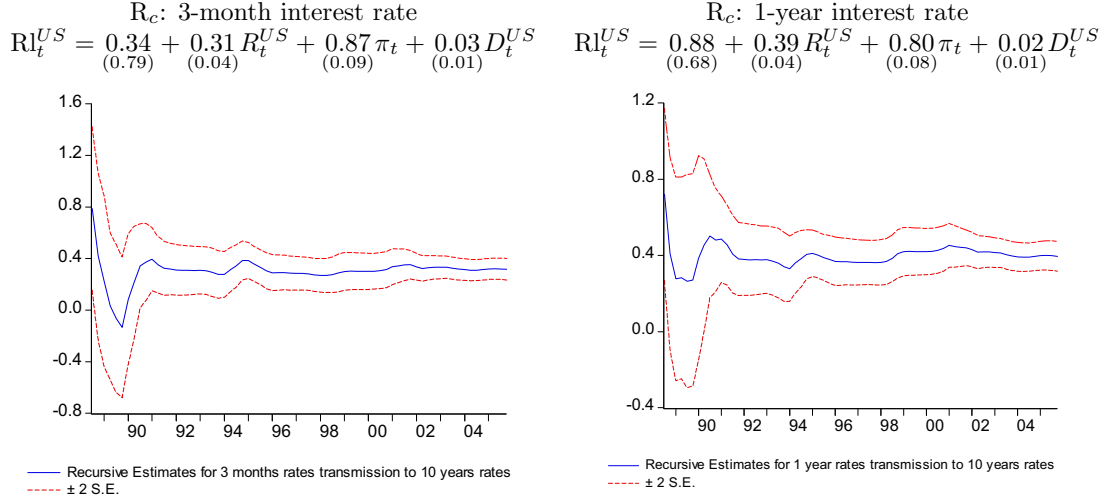
3 Determinants of asset prices

Long-term interest rates have played a key role in shaping asset price dynamics over the last few years, posing several challenges for central banks as these developments have been difficult to fully rationalise. In particular, long-term interest rates have apparently responded less than normally to changes in policy rates during the current tightening cycle and have even declined further last summer. These developments raise additional issues, in particular the question of whether the correlations within the same class of assets across countries have increased or not. It could be expected, for example, that the inception of the euro has fostered financial market integration within the euro area, increasing correlations amongst continental European financial markets and independence vis-à-vis the US markets.

In a recent contribution, Idier, Jardet and de Loubens (2007) offer an attempt to account for the level of long-term interest rates both in the United States and the euro area between 1986 and 2005. Besides usual determinants, such as core inflation, short-term nominal rates or public debt, they review the alternative explanations put forward in the financial market literature to account for the current lows, such as the “savings glut hypothesis”, the “global liquidity” assumption and the portfolio shifts stemming from increased uncertainties or regulatory constraints² and leading to a strong demand for bonds, in particular at longer maturities. They also examine the co-movements between the US and European bond markets. Their results first tend to show that European long-term interest rates have been heavily influenced by their US counterparts over the period under review. Second, their estimations do not evidence a weakening of the link between short- and long-term interest rates (Figure 5).

²In a recent OECD working paper, Ahrend, Catte and Price (2006) point out that recent regulatory and accounting changes (such as IAS 19) forced pension funds to adopt a much sharper focus on the management of the interest rate risk they face on the liability side of their balance sheets.

Figure 5: Recursive coefficients of short-term interest rates in the long-run equation



Third, several factors such as excess global liquidity, as measured by the gap between monetary growth and nominal GDP growth, net foreign demand of US long-term bonds and financial market uncertainties, as measured by equity prices, seem to have significantly impacted on US long-term interest rates. However, the contribution of all these factors only affects the short-term dynamics of long-term interest rates. The authors establish a sequence in which excess liquidity first impacted long-term rates between 2000 and 2003, followed by portfolio shifts, which played a significant role between 2002 and 2003. Net foreign demand of US government bonds took over at the end of 2003. As from the beginning of 2005, they found evidence of a greater contribution stemming from excess global liquidity again. European long-term interest rates exhibit a similar pattern and sequence of events.

As far as equity markets are concerned, Avouyi-Dovi and Matheron (2006) investigate the degree of correlation between stock prices and productivity. They start by isolating the long-term and cyclical components of the productivity growth rate and of stock returns both in the United States and the euro area. They then measure the co-variations between productivity and stock prices at different levels, i.e. between the previously isolated components, and study how correlations vary according to the different frequencies characterising these variables. In addition, they compare the cyclical components of stock returns in the United States and the euro area.

Their findings can be summarised as follows: first, there is a clear correlation between the cyclical components of the rate of stock returns with that of the productivity growth rate in the United States. Such a correlation also holds for the euro area, though to a lesser extent; second, the cyclical components of stock returns in the United States and the euro area co-vary positively, suggesting the possibility of contagion effects from the United States to the euro area.

The question of the degree of interdependence between European and US stock markets has been studied by Avouyi-Dovi and Neto (2004) in a paper that combines the conditional correlations defined by Engle (2001) with copula functions. Their main results corroborate the assumption that correlations tend to vary over time. They observe the presence of periods of strong and weak correlation and similar periods for volatilities. In particular, they show that in phases of high volatility, the correlation between stock returns tends to rise above its medium-term average. Conversely, in phases of low volatility, markets seem to display greater independence. This finding is common in the empirical literature and is due, to some extent, to the statistical link between sampling volatilities and correlations (Forbes and Rigobon, 2002). They analyse daily data for the period from 31 December 1993 to July 2002. Over this time span, they find some evidence of the convergence of German and French stock markets.

Idier (2006) complements this analysis by focusing on the process of consolidation in the stock exchange industry. In his contribution, risk transmission is analysed through overlapping rolling cointegration and shocks on correlations through dynamic conditional correlation multivariate GARCH model. The models are estimated on daily data from 1 January 1994 to 1 April 2006. The results tend to show that, up to 2000, the dynamics of stock prices in Europe (the DAX, CAC and FTSE indices are considered) were largely influenced by US stock market developments. The link between the United States and continental European stock markets weakened until 2003, in line with the hypothesis that monetary union should raise the independence of European stock markets. Since then however, the correlation amongst stock returns has increased again in the wake of US intervention in Iraq, with a tendency for European indices again to follow US markets.

On several occasions over recent years, the Banque de France has expressed its strong concerns on the association of booming residential real estate markets, very strong credit expansion and very low interest rates in the context of an accommodative monetary policy. Several studies published in its Monthly Bulletin have, for example, raised the issues of the sustainability of housing credit growth (Wilhelm, 2005) and the sustainability of housing price developments in France, the euro area and the United States (Moëc, 2006), or raised concerns that a property bubble may be inflating in France (Moëc, 2004). As regards the latter contribution, several indicators measuring potential housing price misalignments were computed but did not evidence that a housing bubble was inflating in France. Two contributions further investigated this issue.

First, Mésonnier and Lecat (2005) carry out an econometric exercise to account for housing price developments in a panel of 18 developed countries.³ The equation is estimated using the general method of moments as applied to dynamic panel data by Arellano and Bond (1991). The dynamic part stems from their attempt to capture the fairly strong persistence of housing price fluctuations and their tendency to revert to the mean as already evidenced in the empirical literature. These two features are factored in by the one-year lagged real house price rate of growth and the ratio of housing prices to real disposable income per capita. They also simultaneously consider the impact of the variations in the real short-term interest rate and the spread between short and long-term rates as variables determining the demand for housing loans via their impact on the user cost of capital. Other explanatory variables are the “fundamentals” expected in theory, such as the rate of growth of household disposable income and the rate of growth of population. The rate of growth of real credit to the private sector is introduced as a proxy for housing loans and the growth rate of real stock prices as a proxy for the fluctuations in households’ financial wealth. Finally, the model is completed by a dummy variable featuring changes in the regulation of mortgage lending.

Table 1 provides the main results of the estimation over the 1985-2002 period of the basic specification (column 1), two alternatives (column 2 and 3) and of a similar exercise carried out at

³Namely Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States.

the IMF (2004). Amongst the main results, the terms that describe the return to equilibrium and the three financial variables (the short-term rate, the spread and real credit growth) are highly significant. The paper suggests that over the past six years, with varying consequences across countries, monetary policy easing associated with the completion of the disinflation process and financial deregulation may have fostered macro-financial imbalances.

Table 1:

**Determinants of house prices in industrialised countries
(panel of 18 OECD countries)**

Dependant variable: Real house prices, growth rate	M1 (1985-2002)	M2 (1985-2002)	M3 (1985-2002)	FMI (1971-2003)
	1	2	3	4
Persistence:				
Real house prices, growth rate (lagged)	0.33 ***	0.39 ***	0.34 ***	0.52 ***
Error correction term (lagged price-to-income ratio <i>per capita</i>)	-0.15 ***	-0.17 ***	-0.14 ***	-0.14 ***
Income per head, growth rate	0.53	0.49	0.66	0.53 ***
Population, growth rate	7.04	1.04	6.00	1.75 ***
Real short-term interest rate	-1.30 ***	-1.42 ***	-1.48 ***	-0.51 ***
Term spread	-1.30 ***	-1.61 ***	-1.20 ***	–
Real credit, growth rate	0.52 ***	0.40 ***	0.43 ***	0.11 ***
Real stock prices, growth rate	–	0.01	–	–
Real stock prices, growth rate (lagged)	–	–	0.2	0.033 ***
Deregulation (proxy)	–	-0.11	-1.89	–
Bank crisis (proxy)	–	–	–	-2.43 ***
Number of observations	288	288	288	524
Sargan (p-value)	0.25	0.13	0.14	–
Arellano-Bond (p-value)	0.81	0.74	0.80	–

NB: The symbols ***, **, * denote a significance threshold of 1%, 5% and 10%, respectively. The Sargan test for overidentifying restrictions is used to validate the choice of instrumental variables used in the GMM. The Arellano and Bond test (1991) verifies the absence of second-order autocorrelation of residuals. The estimation by GMM is carried out on the equation in differences and the variables are instrumented by their second and even third lagged values in level form, except for the proxy for deregulation that is instrumented by itself.

Source: Mésonnier and Lecat (2005); Property prices: BIS; other macroeconomic variables: OECD.

Second, Villetelle (2005) looks more specifically at the behaviour of French property prices. Though his main purpose is not to assess whether housing prices are evolving broadly in line with fundamentals, his econometric framework sheds light on their recent behaviour. He estimates the following equation for housing prices:

$$B(L) \Delta \ln p_t = b_0 + \gamma \left(\ln p_{t-1} - \ln \frac{R_{t-1}}{N_{t-1}} \right) + \gamma_1 r_{t-1} + \gamma_2 \frac{H_{t-1}}{R_{t-1}} + B_1(L) \Delta \ln \left(\frac{R_t}{N_t} \right) + B_2(L) \Delta r_t + B_3(L) \Delta \left(\frac{H_t}{R_t} \right)$$

where p_t stands for residential property prices; R_t : nominal disposable income; H_t : nominal housing investment; N_t : total employment; $r_t = i_t - \Delta_4 \ln p_t$, the long-term real rate and i_t the long-term nominal interest rate. Table 2 presents the estimation results.

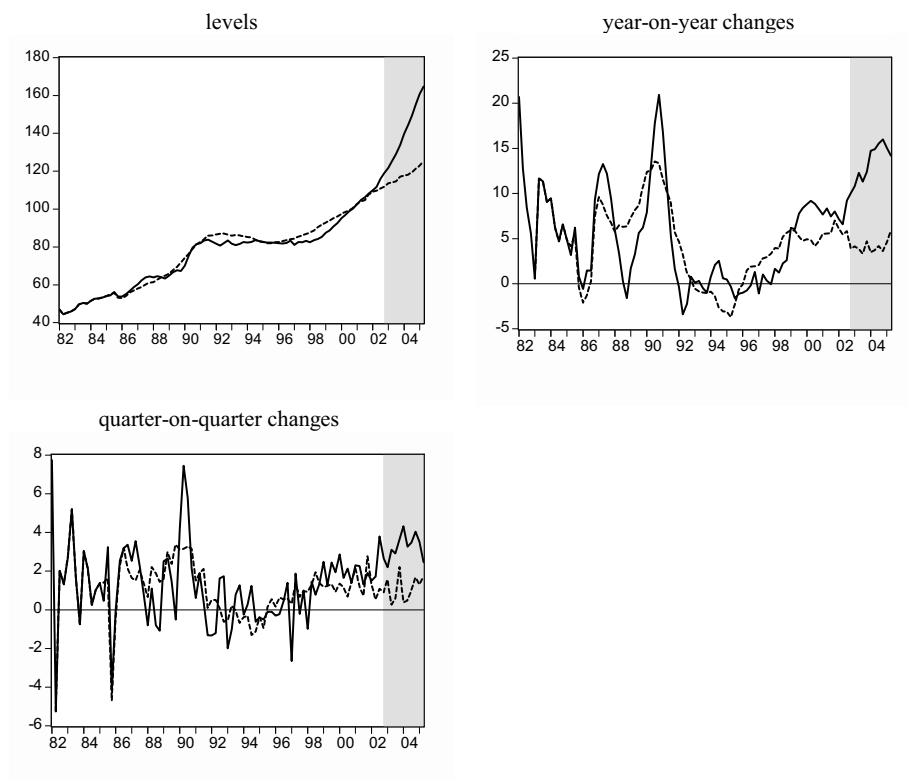
Table 2: Estimation results

	1983 Q1 -	2002 Q4
	Coeff.	T-Stat
b_0	0.048	0.51
γ	-0.053	-1.42
γ_1	1.344	4.15
γ_2	-0.354	-8.47
$\alpha = -\frac{\gamma_1}{\gamma}$	-1.291	-
$\beta = -\frac{\gamma_2}{\gamma}$	0.407	-
$\Delta \ln p_{t-2}$	-0.418	-5.23
$\Delta \ln p_{t-3}$	-0.307	-3.98
$\Delta \ln p_{t-4}$	-0.275	-
$\Delta \left(\frac{H_{t-1}}{R_{t-1}} \right)$	-4.038	-2.84
$\Delta \ln \left(\frac{H_{t-4}}{N_{t-4}} \right)$	0.598	2.89
I_{1985Q4}	-0.059	-4.41
DW	1.97	
R^2	0.81	
SER	1.33%	

As shown in Figure 6 below, the equation shows some signs of instability from the end of the 1990s and actual prices have diverged substantially from their past and usual determinants since 2002. This model may be too simplistic to conclude that French property prices exhibit bubble-like behaviour, in particular because it does not factor in other asset prices⁴ and the correct arbitrage conditions among them. However, it points out that housing price developments remain very puzzling over the recent period, even when the effects of financial variables, captured here by the short-term real interest rate (coefficient α), or those of financial deregulation, as measured by the dummy variable I_{1985Q4} that corresponds to the period of the dismantling of credit controls on the French banking sector, are accounted for.

⁴Empirical evidence suggests the existence of a lagged impact of stock price fluctuations on housing prices in industrialised countries of about one to three years (see for instance Borio and McGuire, 2004) and about two years in France according to in-house estimates.

Figure 6: Residential property prices: simulations



Source: Villetelle (2005); The shaded areas represent the out-of-sample period.

To conclude this section, we examine market participants' view according to which the coincident rally in asset prices has been primarily driven by the “excess liquidity” generated by the inordinately accommodative monetary policies of overly lax central banks. The main intuition here is that there is an extraordinary amount of liquidity in circulation that is being spent on equities, bonds, houses, etc.

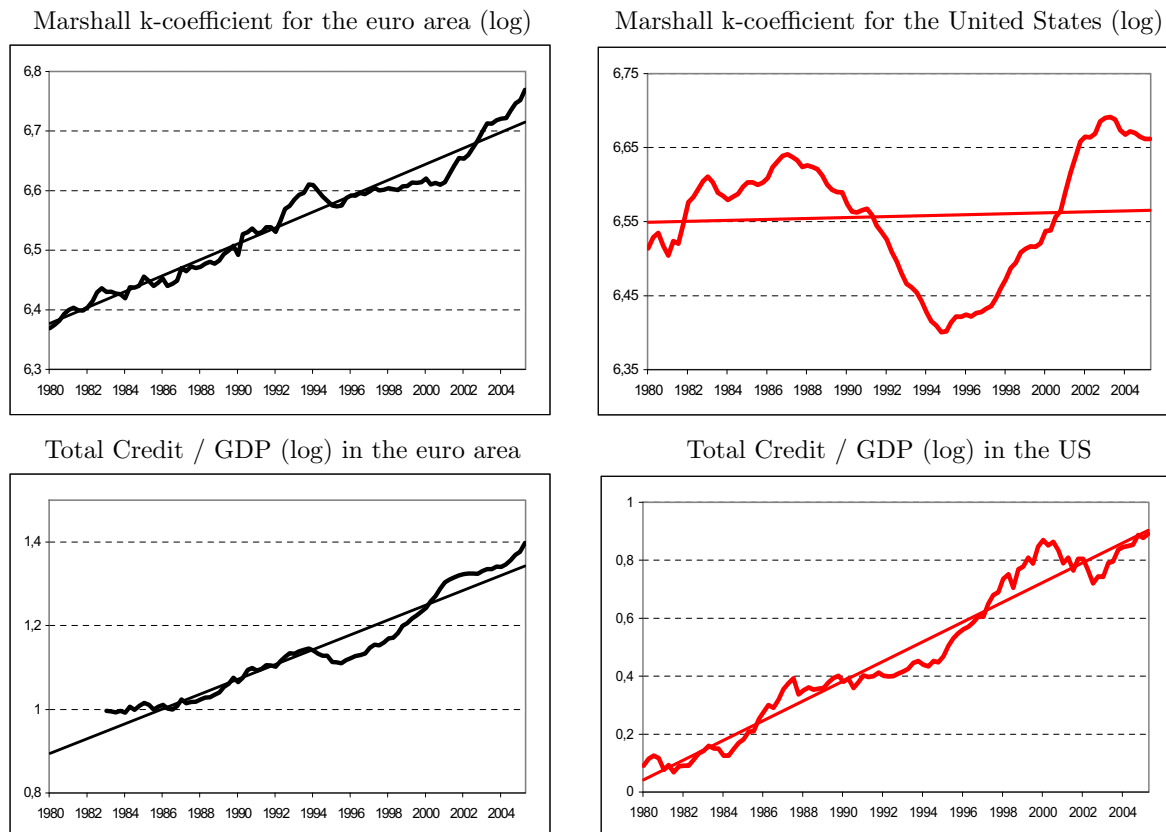
The concept of excess liquidity or global liquidity is however difficult to pin down. There is no universally-accepted definition and liquidity is generally captured by relevant price indicators (the level of interest rates, bid-ask spreads) rather than quantities. Gouteron and Szpiro (2005) investigate this issue by testing Granger causality between a set of “excess liquidity” measures and stock, bond and housing prices. In order to capture liquidity, various indicators are computed: “excess money”, that measures the extent to which overall money supply (M3 for the euro zone or M2 for the United States) is growing faster than nominal GDP. It corresponds to the “Marshallian-

k”, i.e. the reciprocal of money velocity; “excess credit”, that is measured exactly the same way by the ratio of total credit to nominal GDP. Both indicators are considered in terms of their deviation from a deterministic trend. Finally, an interest rate gap, i.e. the difference between the actual real interest rate and the natural interest rate (approximated by the long-term average of the real interest rate), completes this set of excess liquidity indicators.

Figure 7 below provides an overview of the quantity indicators of excess liquidity for both the euro area and the United States. Indeed, the different measures confirm that, after several years of very accommodative monetary policies, liquidity has become abundant and has even accelerated since 2004. The striking point is that the emergence of “excess liquidity” has not led to inflationary pressures in the prices of goods and services⁵ but, rather, has been accompanied by, if not led to, a sharp increase in the prices of a wide range of assets.

⁵For a recent discussion of the stability of money demand in the euro area and its implications for the reliability of “excess liquidity” measures based on cumulative money growth, see Bordes *et al.* (2007).

Figure 7: Excess liquidity indicators



In order to assess this conjecture, Gouteron and Szpiro run Granger causality tests. The main results are provided in Table 3 below.

Whatever the measure considered, there are no clear signs of causality going from excess liquidity to asset prices. The causation, if any, rather appears to occur in the opposite direction. Indeed, under the period under review, such causation would be consistent with the portfolio shifts or “flight to liquidity” episodes evidenced in a context of increased uncertainty, in the wake of the stock market collapse in 2001. It would also be consistent with the broad credit channel view, whereby an improvement in the collateral value of the borrower’s assets allows banks to increase their lending,⁶ the loan being spent eventually on the assets that were at the origin of the initial increase in the borrower’s net wealth, fuelling further asset price increases. However, it is fair to say

⁶In this view, the demand for loans stemming from the borrower leads the bank to borrow reserve money from other banks on the money market or directly from the central bank to create the loan and eventually meet its reserve requirements, thereby leading to an increase in the monetary base. In this context, the expansion of the monetary base is the consequence rather than the cause of the credit expansion.

that, according to these results, the causal link from asset prices to excess credit is not evidenced.

Table 3: Granger causality tests

Table 3: **Granger causality tests**

Euro area							
Granger causality tests	Lags (quarters)			Granger causality tests	Lags (quarters)		
	4	8	12		4	8	12
Excess money to stock prices	39.8	44.0	71.4	Stock prices to excess money	9.2	12.8	7.1
Excess credit to stock prices	72.3	13.1	56.7	Stock prices to excess credit	55.1	50.4	80.6
Interest rate gap to stock prices	46.7	56.8	93.7	Stock prices to interest gap	36.5	10.1	2.0
Excess money to housing prices	90.3	74.9	96.9	Housing prices to excess money	16.2	21.5	2.9
Excess credit to housing prices	90.0	86.8	99.1	Housing prices to excess credit	51.4	23.8	74.7
Interest rate gap to housing prices	87.9	71.5	32.6	Housing prices to interest rate gap	0.1	0.1	2.3
Excess money to bond prices	79.5	87.1	98.9	Bond prices to excess money	51.9	26.8	53.2
Excess credit to bond prices	94.8	95.3	97.4	Bond prices to excess credit	42.0	26.9	79.1
Interest rate gap to bond prices	71.3	68.6	72.4	Bond prices Interest rate gap	2.6	17.8	44.9

United States							
Granger causality tests	Lags (quarters)			Granger causality tests	Lags (quarters)		
	4	8	12		4	8	12
Excess money to stock prices	15.1	40.7	50.9	Stock prices to excess money	1.3	9.2	0.5
Excess credit to stock prices	56.2	71.3	87.8	Stock prices to excess credit	48.8	87.1	93.3
Interest rate gap to stock prices	57.7	53.8	2.4	Stock prices to interest gap	19.2	57.0	89.3
Excess money to housing prices	38.8	12.9	33.5	Housing prices to excess money	2.2	55.4	92.5
Excess credit to housing prices	65.9	36.8	68.1	Housing prices to excess credit	78.7	71.3	66.9
Interest rate gap to housing prices	1.4	23.8	42.8	Housing prices to interest rate gap	4.8	14.9	59.4
Excess money to bond prices	80.8	66.7	45.8	Bond prices to excess money	0.2	4.6	2.0
Excess credit to bond prices	25.7	45.1	19.7	Bond prices to excess credit	70.2	78.2	67.6
Interest rate gap to bond prices	9.3	5.9	34.4	Bond prices Interest rate gap	44.5	89.5	79.5

P-values: significant at the 10% level (bold)

Amongst the alternative determinants reviewed in this section, the historically low level of interest rates seems to have played a crucial role in asset price movements over the last ten years. The strong monetary and credit expansion that has accompanied these asset price fluctuations also reflect the incidence of the very low levels of interest rates. Taken together, these developments have many implications and raise many issues for the conduct of monetary policy.

4 Monetary policy and Financial Stability implications

Following the 2000 new tech stock market crash, in a context of increased macroeconomic and geopolitical uncertainty, many central banks across the world entered a phase of monetary easing which has contributed to the sharp fall of long-term real interest rates across the world. Low volatility and very narrow credit spreads completed this broad picture. The response of central

banks, in particular the FED, to the stock market bust is indeed the way central banks usually deal with asset price bubbles. This response is asymmetric, as pointed out by Chairman Greenspan on several occasions, and can be stated as follows: monetary policy should not react to asset bubbles when they are on the way up but only respond to observed declines in asset prices. In the context of the post-bubble era, asset prices responded to aggressive monetary policy easing in a way that is consistent with the traditional monetary policy transmission mechanism: asset prices went up, mitigating the fall of the net financial wealth caused by the stock market crash. The issue is whether central banks did not go too far, feeding bubbles on other asset markets.

This asymmetric response of central banks may simply reflect the fact that asset bubble boom-and-bust dynamics are themselves asymmetric in several dimensions (Greenspan, 1999). First, because rapidly falling asset prices are likely to cause more serious damage to the economy than rising asset prices. Asset bubble collapses usually lead to severe economic recession and systemic financial distress. Second, because asset price booms are not systematically followed by asset price busts. Bordo and Jeanne (2002) for example use a mechanical rule to identify boom-and-bust asset price dynamics in a set of 15 industrialised countries as from 1970. They find that out of 24 boom episodes identified for stock prices, only 3 were followed by busts, and that out of 19 boom episodes evidenced for property prices, 10 were followed by busts. They note however that property boom-bust dynamics tend to be local phenomena associated generally with only one big city. The current run-up in housing prices therefore raises additional issues as it is widespread and appears to be a global rather than a local phenomenon. This new situation may be a case for a monetary policy response.

In the context of monetary policy making, asset prices generally play an important role as information variables or as leading indicators of output, growth or financial distress. Using quarterly data from the 1970s, Clerc (2003) investigates the forecasting performance of asset prices and a wide set of potential leading indicators for output growth and inflation in the euro area. Following Stock and Watson's methodology (2001), the author performs out-of-sample forecasting

exercises. Some asset prices and financial variables are found to have a predictive power for real output growth and, to a lesser extent, for inflation, yet are barely statistically significant. Asset prices are outperformed by some monetary aggregates, such as M2, and other leading indicator candidates, such as oil prices, not only with respect to their forecasting abilities but also to their ability to detect turning points. However, it is found, like in Stock and Watson, that combining forecasts of poorly performing indicators can sometimes lead to reliable forecasts. This tends to be the case for asset prices and other financial market variables both for real GDP and inflation in the euro area. The policy implication is that it is probably not advisable to rely or focus on a subset of leading indicators, in particular as far as asset prices are concerned, but rather to gather the maximum reliable information for assessing future economic developments. It leaves open the issue, especially for inflation targeting central banks, of whether monetary policy needs, in certain circumstances, to respond more actively to asset price developments, in particular when these developments alter the central bank's assessment of the risks to its central scenario and this assessment plays an important role in the central bank's communication with the public.

Asset prices may play an even greater role if they are explicitly considered as an objective for the central bank. Some economists who advocate more activist monetary policies have recommended, for example, that asset prices be factored into the definition of price stability. Goodhart and Hofmann (2004) make the case for housing prices. Indeed, the global liquidity assumption examined earlier on encapsulates such an implication. This assumption is in particular consistent with the initial quantitative theory put forward by I. Fisher in 1911. In this approach, the quantitative equation states that $MV=PT$, where M stands for money, V for velocity, P for the price level and T for the volume of transactions. T represents both economic and financial transactions, and thus P is a price index aggregating both the prices of goods and services and financial prices. The fact that monetary expansion has not led to inflationary pressures as captured by usual consumer price indices does not mean that money is innocuous for the economy but that it feeds through to asset price inflation. The main implication would be that most central banks focus on the inappropriate

price index and that their resistance to responding directly to asset price inflation is irresponsible as it favours the development of financial imbalances. It also has a financial stability implication as the current removal of monetary accommodation, i.e. the withdrawal of global liquidity, could severely undermine asset prices and put several sectors in financial distress.

The “excess liquidity” assumption has another important implication for monetary policy as it is not completely consistent with the portfolio choice theory underlying the standard money demand functions central banks may rely upon for their analyses. In the standard approach, money and assets are perfect substitutes, so that an increase in money demand, driven by a decline in the opportunity cost of money, implies a reduction in the demand for other assets. This contradicts the current situation characterised by monetary expansion and a global increase in the holding of assets. To rationalise these developments, money and assets must be imperfect substitutes. Such a point is made in the neo-monetarist literature, e.g. in Andrès, Lopez-Salido and Nelson (2004), who introduce in a dynamic optimising model with money the assumption that agents who purchase long-term securities would like to hold additional money to compensate themselves for the loss of liquidity. This makes the spread between interest rates a function of the relative quantities of assets. As a result, the term structure of interest rates is shifted by the ratio of money to long-term holdings. The implication of such a result for monetary policy is that it opens a new transmission channel whereby money creation could exert additional effects on long-term rates for a given path of the short-term interest rate.

The excess liquidity assumption lacks empirical evidence so far, as illustrated by Gouteron and Szpiro (2005). However, the conjunction of monetary easing, historically low long-term interest rates, monetary and credit expansion and buoyant asset markets have rendered central banks slightly more sensitive and vigilant vis-à-vis asset price fluctuations. The housing market is a striking case in point as recent episodes of monetary policy tightening could be seen as attempts to address the risks stemming from this particular market, despite the fact that house prices do not appear to help forecast consumer prices over the short to medium term. However, major financial

stability concern may be a more relevant rationale for making the cooling of the housing market an important objective of the current removal of monetary accommodation across the world: the high level of indebtedness in the household sector and the fierce competition in the banking sector have for example led to situations in which households have been able to borrow from banks without lodging any internal funds as collateral, or simply with no equity. This puts additional risks on the banking sector that may spread to other financial institutions such as insurance companies in the event of an abrupt adjustment in the housing market.

Finally, central banks have made tremendous efforts over recent years to improve their communication and their transparency vis-à-vis the general public and the financial markets. One objective of being more transparent about policy intentions is to reduce unintended uncertainty and heightened volatility around monetary policy decisions on financial and asset markets by disclosing some relevant information. This may introduce a new rationale for central banks to lean against asset bubbles. So far, the analytical research carried out at the Banque de France has been in the vein of the seminal paper by Bernanke and Gertler (2001), leading to the conclusion that a central bank should only take account of and respond to asset price developments insofar as they have an impact on its macroeconomic policy goal, in particular price stability (e.g. Clerc, 2001). Épaulard, Loisel, Pommeret and Portier (2006) tackle this issue from a very different perspective that corresponds, to a certain extent, to the “insurance” motive put forward by B. Bernanke (2002) who declared: “it may be worthwhile for a central bank to take out a little ‘insurance’, so to speak, against the formation of an asset-price bubble and its potentially adverse effects”. In their ongoing research, they consider an economy prone to an asset price bubble generated by an informational cascade about the uncertain productivity of a new technology. The central bank does not have superior information on the true productivity of this new technology, nor has it identified with certainty that an asset bubble may be inflating, but it is simply worried about the possibility of rational herd behaviour in the stock market price. In this context, an interest rate hike can send the market the signal that something might be going wrong and that the central bank fears the

existence of possible out-of-fundamental price dynamics and this signal might be sufficient to stop the cascade by forcing market participants to re-assess their views about the productivity of the new technology. Another contribution by Loisel (2006) tends to strengthen the case for a monetary policy reaction to perceived asset-price bubbles by suggesting that monetary policy may have more leverage on asset prices (and hence might curb asset-price bubbles without aggressive interest-rate hikes) by reacting to current private expectations of future asset prices rather than to current asset prices.

5 Conclusion

The main lessons we can draw from this literature review are:

- asset market prices have shown ample fluctuations in France over recent years. There is increasing evidence of the existence of wealth effects in France, though still difficult to spot from an econometric point of view. The recent surge in asset prices, in particular housing prices, is illustrative of an apparently increased interaction between residential property prices and credit constraints, in a context of historically low interest rates.

- As far as their statistical properties are concerned, asset prices have, in general, not undergone dramatic changes, except for housing prices; in the latter case, the conjunction of easy monetary policy, low interest rates, fierce competition in the banking sector and measures to stimulate the French housing market have clearly contributed to the run-up in residential property prices.

- Financial globalisation may have contributed to increasing the role of “common factors” or at least, occasionally facilitated the transmission of financial shocks across countries. For instance, there is strong evidence that the main developments in the French equity and bond markets are largely driven by international factors.

- However, there are no clear signs of causality running from "excess liquidity" to asset prices. The causation, if any, rather appears to occur in the opposite direction. Indeed, on the period under review, such causation would be consistent with the portfolio shifts or “flight to liquidity”

episodes evidenced in a context of increased uncertainty, in the aftermath of the stock market collapse in 2000.

- Concerns about the risks of an abrupt correction in the bond and housing markets in the context of less easy monetary policy have led central banks to adjust their communication policies vis-à-vis asset markets. The Banque de France for instance has on several occasions communicated its main concerns about the sustainability of current housing price developments and credit expansion.

- Finally, recent research tends to strengthen the case for a monetary policy reaction to supposed or perceived asset price out-of-fundamental dynamics: first, stemming from an "insurance motive": a central bank, which may not have necessarily superior information, can send a credible signal that it fears possible non-fundamental price dynamics. In that case, an interest rate hike may be sufficient to curb the cascade by forcing market participants to re-assess their views about current price developments; second, by suggesting that monetary policy may have more leverage on asset prices by reacting to current private expectations of future asset prices rather than to current asset prices.

- developing techniques to break asset prices down – in particular short and long-term rates – into their constituent components (riskless rate, risk premia...) in order to isolate in particular the factors driving risk premia;

- exploring the information content of financial prices;

- analysing if and how central banks should react to asset price fluctuations in the context of DSGE models.

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