The European Central Bank Behaviour and the Asset Prices Evolution

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Abstract

The objective of our work has been to study the behaviour of the European Central Bank towards the asset prices evolution. To do this, we have first examine the different arguments that are in favour or that fight the asset prices integration to the European Central Bank monetary policy objective. We have then estimated, with the general moment method, a European Central Bank reaction function for the 1999:1-2002:12 period. It seems, then, that the European Central Bank doesn't react to asset prices level but to their volatility measured by their standart error. These results reveal, considering the period used here, the lender in last resort role that the European Central Bank has to play and that it has played just after the 2001 september events.

Key Words : Monetary policy rules, asset prices, financial stability, lender in last ressort.

JEL : E48, E52

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There was a rise in asset prices in the late 1990's in Europe and more so in the United States. In 1996 Alan Greenspan called it a "exuberant increase". In contrast, inflation, measured by the movement of goods and services prices remained low and stable. Now, the financial markets have acquired considerable importance in the real economy. So, this situation has led us to ask if the European Central Bank should include stock market prices as significantly important within its monetary policy.

The first part of this article deals with debates concerning the integration of the stock market prices in the European Central Bank's monetary policy objective. The second part estimates the European Central Bank's reaction function. For this we use the general method moments. Our estimations covers period from 1999:1 to 2002:12. They are not only taking stock prices level into account but also stock prices volatility. They also try to evaluate the importance of the European Central Bank's role as lender of last resort, noting especially its monetary policy after the attack of 11th September 2001 in the United States.

1. Debate on the Integration of Asset Prices as Objective in the Monetary Policy of the European Central Bank

1.1. The measure of inflation by the consumer price index alone is insufficient - Goodhart's position (1999)

According to Goodheart (1999), the range of prices needed to manage the monetary policy should not be limited to goods and services. He suggests monetary authorities should also consider financial asset prices.

Indeed, Goodhart thinks that a rising consumer price index is a poor measure of inflation. Inflation only represents a fall in the value of money. Buying shares should come under the same heading as buying goods and services to provide a more accurate economic assessment of movements in purchasing power. If an agent sells his cash ressources now in order to buy shares in order to obtain some dividends, and if the dividends increase, we face to financial inflation.

There are other arguments suggesting that central banks should attend to the movements in asset prices which, in various ways, provide more accurate information to set up monetary policy.

1.2. The information content of asset prices

The information content of asset prices could encourage central banks, in particular the European Central Bank, to place them at the centre of their monetary policy objectives. Asset prices could provide information on future prices of goods and services or on future real activity, and also on possible macroeconomic imbalances.

To begin with, share prices could contain information of future prices of goods and services or information on future real activity. Indeed, asset prices inflation could transfert to goods and services prices.

Actually, a rise in share prices could incorpore anticipation of goods and services prices increase which would be right ex-post. Share prices could be an early indicator of real variables. With this information monetary authorities would be able to react quickly to signs of excessive booms or disturbing slumps in economic activity. Borio, Kennedy and Prowse (1994) looked at the share price index in detail to see if it could give information on future activity or on future movement in consumer prices. They have used aggregated indices where the index of each asset (shares, business real assets and private real assets) was weighted by the part of each one in the wealth of the non-financial agents. Their results are not very conclusive. Indeed, variations in asset prices give information on future changes in the gross domestic product only for six countries: Australia, Denmark, the USA, Finland, Holland and the United Kingdom. Further, the aggregated index of asset prices only anticipates price inflation in five countries: Canada, Denmark, the USA, Norway and Sweden.

These results are not likely to convince the European Central Bank that asset prices should be included in its reaction function. Indeed, in the Euro-zone these results give no information on future inflation of goods and services and no information on future activity. Nevertheless, it must be recognised that these results could be very sensitive to the coefficients witch have been retained and to the weighs choosen.

Equally, share price changes could give information on eventual anomalies at the macroeconomic level. Thus, according to Artus (2001), any central bank, including the European Central Bank, could include share prices among its objectives because these price movements might show a macroeconomic imbalance, where such imbalances are not discernible from variations in the price of goods. Action could then be taken to counteract the problem. According to Artus, "the free movement of goods worldwide and the reactivity of supply market" are elements which limit variations in the price of goods. So he thinks that a rise in share prices could appear where there is an excessive distribution of credit which will not necessarily be noticed from variations in the market price of goods. Therefore, "acceleration in the growth of credit in the Euro-zone since 1997" has had no "effect on inflation" whereas it had been clearly recognised in the movement of real asset prices or share prices.

If the studies on wealth effect show a link between inflation on share prices and inflation on prices of goods and services, then they also could well justify the argument that the European Central Bank should take account of share prices in its controlling function.

1.3. Effects of Wealth

The wealth effect is understood to be the process by which shareholders will be sensitive towards the movement of potential increasing and decreasing of the value of their assets, which could change their investment and consumption choices. Therefore, if householders, attempting to optimise their intertemopral consumption function, believe an increase in wealth is permanent, then they will increase their consumption. It is the same for businesses seeking investment growth. Likewise a rise in share prices could encourage a rise in credit supply to private brokers. This is because it increases the value of assets which can serve as insurance, and because it reduces costs accruing from "moral hazard", attempting to limit the engagements in potentially risky ventures.

The existence of wealth effect, linked to an escalation of share prices on the stock exchange, can cause, in some particular conditions, the monetary authorities to fear a return of inflation on the consumer price index. The general resumption of inflation leads to a poor allocation of resources. This could justify an intervention by the central bank to stop the process near its source.

Concerning the United States, Porteba and Samwick (1995) have shown that a rise of 10% in the stock market share prices induced a rise in the real consumption by 0.3% per capita, with a late of a quarter. Elsewhere, the cumulative effect of this rise in the financial market is 6.4% over four quarterly terms. This is more than double the initial effect on the first quarter. In addition when one distinguishes the different types of consumer market, the impact of a rise in share prices shows specific sensitivities. For example, demand for consumer durables grew the most from this flow of wealth (+2.9% durable goods consumption over 4 quarters). But the curent consumer goods market showed little sensitivity towards the share price on the financial market.

These results are confirmed by Kennedy, Palerm, Pigott and Terible (1998). They calculated that 20% of the world's financial stock markets were influenced by a rise of 0.6% in the volume of consumption in the United States. Nevertheless, their study took note of other countries and shows that , under the same conditions, the rise would be 0.4% in Canada, 0.3% in the United Kingdom, 0.2% in Japan and 0.1% in Continental Europe (Germany, France, Italy). Moreover, there is no impact on the price of goods and services during the first year in any of the OECD countries. Then in the second year it is 0.3% in Japan, 0.2% in the United States and in the United Kingdom and only 0.1% in Germany, France and Italy.

However, these results do not give a strong indication that share prices should be included in the monetary policy objective of the European Central Bank. This is because the effect of increased wealth in Europe is negligible.

1.4. Moral Hazard

According to Jaillet (1999), monetary authorities are hardly likely to include share prices among their monetary policy objective and then in their reaction function. This is because of the possibility of moral hazard. That is to say, if share prices are taken on board as an objective, then the inability to read monetary policy based on such an additional objective will jeopardize the economy with the emergence of increased risk. The problem of moral hazard arises because of the interventions to maintain share prices. These interventions provide insurance to speculators in the financial market. The problem is asymmetrical. If a central bank tightens its policy when faced with increasing share prices, should it relax its policy when faced with decreasing share prices?

There is a supplementary debate linked to the question of whether central banks should incorporate share prices at the heart of their monetary policy. This debate deals with the effect of such a monetary policy on stability at the macroeconomic level.

1.5. Asset prices, monetary policy rules and macroeconomic stability.

Certain authors, such as Bernanke and Gertler (1999) are not to integrate share prices in the European Central Bank reaction function. They think it has a destabilizing effect at the macroeconomic level. However, Cecchetti, Genberg, Lipsky and Wadhwani (2000) oppose this view.

Bernanke and Gertler (1999) are not to integrate share prices in the European Central Bank reaction function. They think it has a destabilizing effect at the macroeconomic level. Bernanke and Gertler (1999) consider that the pure inflation target without asset prices target is the best monetary policy rule for any economy. Using a model with wealth effect and a financial accelerator, they show that to target share prices can be destabilizing at macroeconomic level. Bernanke and Gertler consider the effect of different monetary policies responding to the bursting of a positive technological bubble. Results vary widely as to whether the monetary policy is accommodating or not. In the case of a pure inflation target and with accommodating[2] policy, the decline in production after the bubble in the economy is greater than the initial expansion. Without a new bubble, production will not keep on diminishing but will find a stable position somewhat below the initial production level. In contrast, with a pure inflation target but with an aggressive[3] monetary policy the effect of the bubble are much more restrained. Even if the monetary policy doesn't care about asset prices, the agents anticipate that the interest rate will be very reactive to inflation. It is sufficient to limit the response of share prices to the bubble and to stabilize both inflation and production. In the context of an inflation target with regard to share prices, if the monetary policy is accommodating, then public expectations of higher interest rate following the bubble, will push down the fundamental component of shares whilst the whole price of shares will rise. Increased interest rate and fall in fundamental value component are compensating the stimulating effects of the bubble, so that inflation and output both fall. This corresponds to the detrimental effects to the economy which could occur when a central bank responds to variations in share prices on the stock market. In contrast, if the central bank adopts this kind of inflation target rule responding to share prices aggressively, then the central banks response hardly alters the dynamics of the economy. In effect, the real interest rate adjustment, face on anticipated movements in inflation, compensates for any adverse results generated by a monetary policy responding to share prices.

Bernanke and Gertler say it could be harmful to simultaneously respond to movements in share prices and to follow a accommdating policy vis-a-vis the inflation. The look at the unconditional variances of production and of inflation lead them to conclude that the best monetary policy rule is an aggressive response to inflation which ignores share prices.

Nevertheless, some researchers make the opposite case. Cecchetti, Genberg, Lipsky and Wadhwani (2000) think it is not necessarily damaging to macroeconomic stability if monetary policy rules incorporate share prices. These economists show that given that an output-gap term is incorporate into the monetary policy rule, the effect of destabilisation in the economy which these share prices can create, vanishes. It is the same in the case of an accommodating monetary policy. In effect, to take into account the output-gap variable in the

[2] The response coefficient applied to the inflation of goods and services in the monetary policy rule is less than 1.
[3] The response coefficient applied to the inflation of goods and services in the monetary policy rule is bigger than 1.

monetary policy rule constitutes a counter balance to excessive variations in production when the central bank integrates share prices into its rule. Moreover, they also find that by taking into account interest rate in the rule reinforce the macroeconomic stability.

The different arguments above consider flow of information, wealth effects and macroeconomic stability in relation to share prices. But they do not suggest clearly that monetary authorities should include share prices among their objectives. In our case the authority is the European Central Bank. However, to be attentive on share prices evolution by the European Central Bank is seen as very important for its strategy, as for other central banks, in its role as lender of last resort.

1.6. Movement in share prices, central banks and speculative bubbles

Central banks ahave to follow share price movements despite their unwillingness to include them at theirreaction function. The reason for this preoccupation is that share prices can give warning to speculative bubbles, of which the consequences prove to be very important in real terms.

In theory, with efficient markets hypothesis, monetary authorities are not normally concerned with movements in share prices. The price index of goods and services, correctly balanced for the whole range of prices, should give all the information needed for future movement in share prices. In the same way, share prices normally represent actualised chronicle of the future anticipated prices for the duration of their market life. However, the contrast between movement in the consumer price index and movement in share prices could be so great that it becomes difficult to maintain the concept of an efficient market. We are forced to admit that these prices have some own dynamics. These are speculative bubbles. According to Blanchard and Watson (1984) these correspond to “price movements without any apparent relation to the fundamental value, taking for example, the form of important increase of prices followed by a slump, or at least a consolidation”.

It is a question of anderstanding what happens when the speculative bubble burst. The first case is that the rupture changes the transmission mechanisms of the monetary policy. Thus Jaillet and Sicsic (1998) point to a danger which resides in an inflexible mechanism when implementing a monetary policy. There could be a sufficiently strong inertia in lending rates to borrowers in relation to market rates. This leads to damaged balance sheet of banks. In addition a paralysis of exchanges between banks themselves could surface following the breakdown of the bubble. Therefore the banking system becomes so fragile that the central bank cannot rely on the other banks to put its monetary policy mechanism into effect. This is especially the case when the market itself is paralysed. Then, the thriving credit institutions are unwilling to lend to institutions considered to be less healthy. The open market interventions are not efficient any more. This is because only struggling institutions present themselves for refinancing. They have no other option and are prepared to burden themselves with very high rates as their only chance of survival.

Deflationary crises and the systemic risk are also consequences of a sudden end to speculative bubbles. These justify the central bank's concern for share price movements. According to Aglietta (1991) "The uncertainty of the economic system is the outcome of some situations in which the agents responses to perceived risks, far fromleading to a better allocation of individual risks; leads to increased general insecurity." From the study of the history of financial crises, he sees three types of negative external effects that can occur. Firstly, the failure of markets (capital or stock markets). Where the agent behaviour creates a difference between the movement in share prices and their fundamental value. Secondly, discontinuities can occur in the flow of credit when a supply of flexible credit with little risk is subsequently replaced by a rationing of credit. Such discontinuities bring about an overall change of opinion mainly resulting from information asymmetries. Thirdly, he describes a cumulative dynamic develops among different sectors of the financial system. Fisher (1933) described this process for the crisis in 1929. Under certain conditions financial crises can report on the real economy through a particular bias notably the debt of private households and businesses.

Finally, with regard to the potential consequences of speculative bubbles, the European Central Bank has to be very attentive on share prices movements. This is because it must be ready to play its part as lender of last resort.

In effect, according to Aglietta (1998), "The lender of last resort is a key function of the central bank. There, it holds the unique position of maintaining confidence in the currency. Also, in order to carry out its task effectively, a central bank must have a conception of monetary stability beyond the level of goods and services. The leader of last resorts has a key role in the control of money because it provides universal assurance against the systemic risk, where private insurance is powerless." Complementary to this, like Fisher (1999), it is possible to refer to the definition put by Meltzer (1986): « The central bank is called the lender of last resort because it is capable of lending - and to prevent failures of solvent banks - in periods when no other lender is either capable of lending or willing to lend in sufficient volume to prevent or end a financial panic. »

The European Central Bank, precisely because it is the central bank of Europe, is understood to confine its power to guiding monetary policy within the Euro-zone. It must also carry out its function as lender of last resort, taking care of the banking system as the centre of the European System of Central Banks. However, the Treaty specifies nothing on the topic. The two traditional functions of a central bank, to guide monetary policy whilst taking care of the banking system health, are not mandated to the European Central Bank. In fact, these are the national central banks which look after the banking system health of their own member state, directly or indirectly[4]. This is recognised as their own prerogative. The European Central Bank assumes no right to counter their choice. Monetary policy decisions are centralised, and at the prudential function is decentralised in the European framework. The principle of subsidiarity prevails, but its organisational structure proves to be inappropriate. Thus the central monetary policy can contradict one or several of its national banking policies. Moreover, situations can arise where the European Central Bank itself must intervene as lender of last resort. Aglietta, Scialom and Sessin (2000) distinguish three situations where the European Central Bank is directly

[4] Except for Luxembourg, capacity for prudential control of the countries of the Euro-zone, is in the hands of the central national bank.

forced to carry out its role as lender of last resort. This is because in its role as the central bank, it is the only supranational institution able to cover the global field of activity which constitutes the Economic and Monetary Union. The first situation comprises a general loss of confidence leading to frenetic selling by shareholders and a massive demand for liquid assets. The second situation is where intervention is equally necessary, is if a large Pan-European bank collapses or an overseas conglomerate pulls out, or even in the case of multiple failures spread over several countries. There would be extensive external consequences because of inter connected channels of payment. This would require the European Central Bank to act as lender of last resort in the fullest sense. The above economists share the argument put by Goodhart and Huang (1999). They claim that if there is the risk of a snowball effect from the start of the crisis, even if there is a moral hazard risk, then the existence of a lender of last resort is necessary and justified. Finally, the third situation corresponds to a collapse in the stock market or in the derivatives market. Such a need for liquidities; as well as the closing down of credit ligns and the devaluation of collaterals, imposes the lender in last resort action. As sovereign lender of last resort the European Central Bank would be forced to intervene rapidly to try to avoid transferring the crisis to the multiple institutions and to the various markets.

The role of lender of last resort for the European Central Bank involves intervention in a crisis. This is needed to maintain confidence in the economic institutions in the Euro area and to confirm the viability and stability of the monetary and financial system. Intervention is exceptional, but needs constant rigorous watch of the financial market.

We now propose to evaluate the reaction function of the European Central Bank to know if it incorporates movement in share prices. This involves to determinate with an econometric method how the rate of interest controlled by the European Central Bank is formed. It involves discerning the economic variables which influence its formation and to what extent. The aim of our study is to show with precision the significance of share prices among these variables.

2. Should the European Central Bank take account of the Movement of Share Prices in it's Reaction Function?

2.1. Method and data

Here we estimate the reaction function of the European Central Bank and try to measure the influence share prices exert on the movement of interest rates in the Euro-zone. Levieuge (2001) already tries to know if asset prices influence the European Central Bank intervention rate.

In order to estimate the European Central Bank reaction function, we use the general method moments. The use of the generalized moments method appears necessary because the explicative variables are non-exogenous one. Moreover, because variance-covariance matrix of the perturbations is not scalar this implies that

the ordinary least square method is biaised and that the instrumental variables method is not symptotic efficient. Therefore one is led to use the generalized moments method which is not biaised if the sample sufficiently large.

It allows us to determine, without bias, the economic variables which influence the formation of the interest rate controlled by the European Central Bank. Following the work of Taylor (1993) and Clarida, Gertler and Gali (1998), the central bank will probably adjust its rate in line with movements in inflation, in output-gap, in prior interest rate, and perhaps in line with the share prices on the stock market.

The estimation carried out here deals with European data[5], extracted from the Eurostat data base, in monthly frequency, from 1999:1-2002:12.

It concerns european data on inflation, daily interest rates and industrial output taken by proxy from the gross domestic droduct, and the stock market index taken monthly[6]. Inflation is measured by the consumer price index, for all the countries within the euro zone, base 100 in 1995. It was, in the manner of Taylor (1993), taken into account on an annual basis so as not to be submitted to erratic variations. The European interest rate corresponds to the European interest rate of the European Central Bank from day to day, that is the "call for money".

Use of the monthly frequency, and then the choice of using industrial production by proxy from the gross domestic product in order to have enough data to proceed with estimation, is du to stock market indices availability. Indeed, we use the Euro Stoxx 600 to descibe the asset prices movements in the Euro-zone. These data are mensualised. They are obtained from Euro Stoxx.

The instruments used are a constant; inflation; output-gap; spread of interest rates 3 month-10 years; the deflator of the gross domestic product; the increase of M3 -monetary aggregate used by the European Central Bank- and the stock market indice. The instruments are expressed in time t-1 for exogenous variables and in t-2 for endogenous variables.

2.2. Share prices in level in the reaction function of the European Central Bank

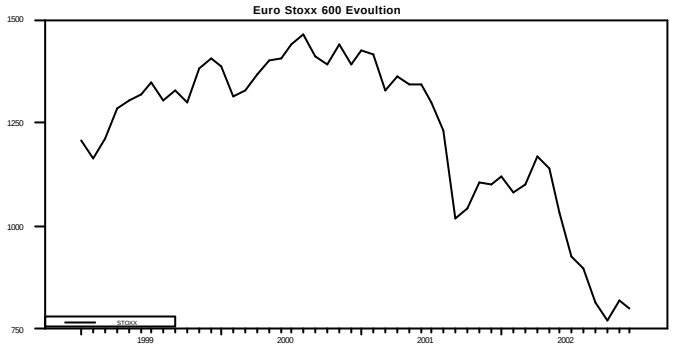
For the period from 1999:1 to 2002:12, we have estimated two reaction functions of the European Central Bank where share prices, using the Euro Stoxx 600 index, are present.

The first reaction function cooresponds with a case where the European Central Bank would only account for inflation and for share prices, taking so account for financial inflation.

The second reaction function estimated corresponds with a Taylor rule plus a shaire prices terme. In this case, the European Central Bank would be sensitive when it determines its interest rate not only to inflation of goods and services, but also to movements in output-gap and to stock market prices.

[5] Eleven then twelve countries in the Euro-zone.
[6] The Dickey-Fuller tests confirm, as in Clarida, Gertler et Gali (1998), that series are stationnary one.

The Euro Stoxx 600 index evolution is :



Stoxx = Euro Stoxx 600

The common expression for the estimated equation[7] is:

- Inflation objective plus a stock market index terme :

r(t)=constant + a p(t-1) + g stoxx(t-1)

- Taylor's rule plus a stock market index :

r(t)=constant + a p(t-1) + by(t-1) + g stoxx(t-1)

with :

r(t) = nominal interest rate controled by monetaries authorities,

y_t=output-gap (quadratic)=difference of gross domestic product from potential gross domestic product, estimated as the byproduct of the regression of thegross domestic product in its quadratic trend, with, here, the industrial production by proxy from the gross domestic product,

p(t-1) = inflation at the prior quarter (in annualized variation),

stoxx = Euro Stoxx 600 index = 600 biggest values of the Stoxx index for the whole Euro-zone market.

The results are then :

- Inflation objective plus a stock market index terme :

r(t)=4,65+ 1,66p(t-1) -0,0031stoxx(t-1)

(1,72) (6,55) (-1,25) (Student statistic)*

$\overline{R}^2 = 0{,}84$ * 1% significativity

- Taylor's rule plus a stock market index :

r(t)=4,61+ 1,65p(t-1) +0,0002y(t-1) - 0,003stoxx(t-1)

(1,26) (4,63) (0,01) (-0,89) (Student statistic)*

$\overline{R}^2 = 0{,}85$ * 1% significativity

[7] The estimations with current or expected variables don't give pertinent resultats.

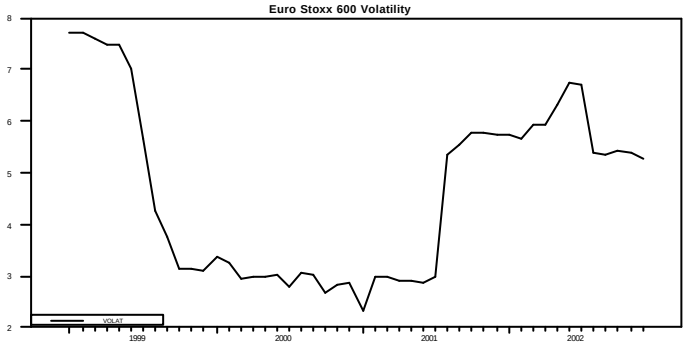
In both cases, the estimated rules in this way give results which do not validate the argument for incorporation of share prices into the reaction function of the European Central Bank. The coefficients attached to the output-gap terme and to the share prices terme are not significant. The central bank would only take into account movement of inflation on goods and services to establish its interest rate. It would not be influenced by either the output or the price share index.

The information content from share prices is weak, and there is no wealth factor in the European situation. In the light of this, the conclusion concerning the significance of the share price index in the rule is hardly surprising. The European Central Bank rejects the strategy to introduce into its monetary policy rule a variable which is a very weak indicator of the future.

On the other hand, we tried to find out the effect the stock market index volatility would have on the European Central Bank for settling its interest rate. In fact the prudential part of the cantral banking function, even if it is not clearly designated for the European Central Bank, warrants that the monetary authorities alert themselves to unusual movements in the stock market share prices. These movements are identified by the extent of volatility in the indices on the financial markets.

2.3. Share prices volatility in the reaction function of the European Central Bank

The share prices index volatility is mesured by its standart deviation. The Euro Stoxx 600 index volatility evolution is :



VOLAT = Euro Stoxx Index = standart deviation.

The two modified rules of monetary policy, which are estimated, are :

- Inflation objective plus a stock market index volatility terme :

$r(t)=constante + a\ p(t-1) + g volat(t-1)$

- Taylor's rule plus a stock market index volatility terme :

r(t)= constante + a p(t-1) +by(t-1) + gvolat(t-1)

with :

volat = stock market index volatility of the Euro Stoxx 600 mesured by its standard-deviation.

The results are then :

- Inflation objective plus a stock market index volatility terme :

r(t)=1,35 +1,37 p(t-1) +0,01. volat(t-1)

(2,21)* (6,88)* (0,16) *(Student statistic)*

$\overline{R}^2 = 0{,}86$ * 1% significativity

- Taylor's rule plus a stock market index volatility terme :

r(t)=4,02 + 0,58p(t-1) +0,04y(t-1) -0,29volat(t-1)

(3,85) (1,92)** (2,86)* (-2,62)* (Student statistic)*

$\overline{R}^2 = 0{,}93$ ** 5% significativity

*1% significativity

The estimations with expected variables don't give pertinent resultats. However, if we re-estimate the augmented Taylor rule with current variables, with a specification as this one :

r(t)= constante + a p(t) +by(t-1) + gvolat(t)

We obtain :

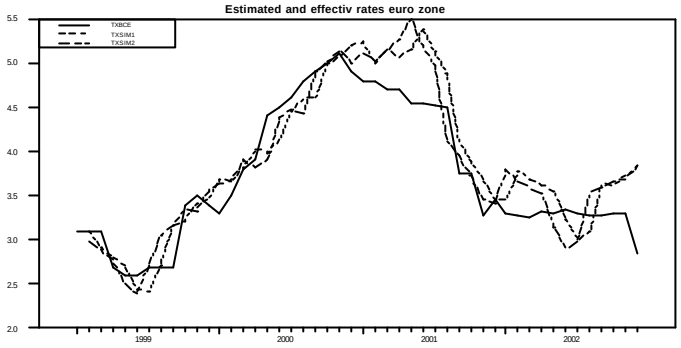
r(t)= 3,77 + 0,67 p(t) +0,04 y(t-1) - 0,29 volat(t)

(3,61)* (2,13)* (3,44)* (-2,55)* *(Student statistic)*

$\overline{R}^2 = 0{,}93$ * 1% significativity

The rule that only contains an inflation target plus a stock market index volatility terme doesn't valid the result, in the Euro-zone, of significance for this volatility terme. On the other hand, the two augmented Taylor's rules, we obtain, are valid.

The comparison of the rates obtained with the two augmented Taylor's rules[8] with the effectiv rates for the euro zone gives this graph :



txsim1= rates obtained with a Taylor's rule augmented of a share prices index volatility term and pastvariables
txsim2= rates obtained with a Taylor's rule augmented of a share prices index volatility term and current variables
txbce = effectiv euro zone interest rates

The European Central Bank would then use its interest rate to respond to inflation movement, to output-gap development, and also to the stock market index volatility in the Euro-zone. This signifies that the European Central Bank will concern itself, beyond its principal objective of prices stability, mesurured by consummer prices index, with real activity evolution, which is itself mesured by the output-gap, and with financcial stability, which is signalled by the stock market index volatility. A negative sign affected by the stock market index volatility terme in the Taylor rule indicates that the European Central Bank would lower its rates when the share prices volatility increases. This does make sense when considering volatility, we know that, after spring of year 2000, the main influence is recorded as a tendency of fall in share prices. In a stock market crisis where share prices fall, becoming volatile, the central bank lowers its rates to sustain the stock market institution. In contrast, when the crisis passes, the price of shares stop falling and volatility is subsequently reduced. The central bank can once more increase its rates at the appropriate moment. As we have shown here, this would appear to be the role of lender of last resort in that it guarantees European liquidity.

Indeed, the study we have carried out came after the attacks on 11 September 2001 in the United States. It also came after the concerted intervention undertaken by the western central banks. These must include the Central Bank of the United States, the European Central Bank, the Central Bank of Canada and those of the United Kingdom, Switzerland and also Sweden. These banks acted simultaneously. Their intervention involved a massive injection of liquidities into the financial markets and a jointly lowering of intervention rates. Clearly, intervention is a matter of urgency for central banks as leader of last resort in order to avoid a crisis on the stock market and a serious economic crisis. This intuition is confirmed by the fact that if we re-estimate the equations of the two Taylor's rules augmented of a share prices volatility term, for the 1999:1-2001:10 period, these rules

[8] The gap between estimated and effectiv rates seems to give advantage at the Taylor's rule which uses current variables.

	Obs	Mean	Std-deviation	Min	Max
Effectiv rates – estimated rates with past variables	47	0,15	0,32	-0,99	0,41
Effectiv rates – estimated rates with current variables	47	0,13	0,32	-0,99	0,48

Moreover, the Schwartz's criterium, is also in favour of the specification with current variables

aren't valid any more. It is then possible that we are detecting, with estimation on the whole period from 1999:1 to 2002:12, the effect of the interventions after 11 September 2001.

3. Conclusion

Our study has been the question of integrating share prices into the rection function of the European Central Bank. Even if it is not clear from this study that the European monetary authorities ought to incorporate share prices as argument in its reaction function, it does seem incontestable that the European Central Bank must follow carefully share price movement, bearing in mind its role as lender of last resort. This role obliges it, as the central bank at the heart of the zone constituted by countries which have adopted the single currency.

In fact there is nothing conclusive for the European Central Bank from the study of debates on the necessity to include share prices at the centre of its reaction function. However, the existence of speculation bubbles in the market and the grave consequences that follow when it bursts, demands that the European Central Bank plays its part. It must intervene on the share markets in order to maintain their viability and to establish stability in the monetary and financial systems.

Concerning the monetary policy of the European Central Bank from 1999:1 to 2002:12, summarised by its reaction function, it appears that this bank did not react at the level of the share prices itself. This conclusion is hardly surprising, considering the weakness of the information content of share prices and the lack of any wealth effect appearing in the case of Europe. The European Central Bank rejects the idea of introducing into its reaction function a variable in which the qualities as an advanced indicator are weak. On the other hand, according to our analyses, the European Central Bank is sensitive towards share prices volatility as an indicator of serious and destabilising events on the financial markets. For the period analysed, our results provide evidence that the role of lender of last resort is incumbent upon the European Central Bank and that it was endorsed by it after the attacks of 11 September 2001.

References

AGLIETTA Michel (1991), *Le risque de système,* Revue d'Economie Financière n°18, pp. 61-89.

AGLIETTA Michel (1998), *Macroéconomie financière,* Collection Repères, Editions La Découverte, pp. 70-118.

AGLIETTA Michel, SCIALOM Laurence et SESSIN Thierry (2000), *Pour une politique prudentielle européenne,* Revue d'Economie Financière, n°5, vol 60, pp. 59-84.

ARTUS Patrick (2001), *L'Euro et la Banque Centrale Européenne, un premier bilan,* Economica, pp. 1-122.

BERNANKE Ben S. and GERTLER Mark (1999), *Politique monétaire et volatilité de prix d'actif,* in New Challenges for Monetary Policy, Federal Reserve Bank of Kansas City, in Economic Review, Fourth quarter, pp. 18-51.

BLANCHARD 0. et WATSON M. (1984), *Bulles, anticipations rationnelles et marchés financiers,* Annales de l'INSEE, n°54, pp. 79-99.

BORIO C., KENNEDY N. et PROWSE (1994), *Exploring Aggregate Asset Price Fluctuations accross Countries,* BIS Economic Papers (40), pp.1-101.

CECCHETTI Stephen G, GENBERG Hans, LIPSKY John and WADHWANI Sushil (2001), *Asset Prices and Central Bank Policy,* International Center for Monetary and Banking Studies, pp. 1-139.

CLARIDA Richard, GALI Jordi and GERTLER Mark (1997), *Monetary Policy Rules in Practice : Some International Evidence,* NBER Working Paper, n° 6254, pp. 1-43.

DORMONT Brigitte (1999), *Introduction à l'économétrie,*
Ch V.3.2. *Estimateur des variables instrumentales* pp.374-388,
Ch V.3.3. *Test d'exogénéité* pp. 388-398,
Ch V.3.4. *Test de validité des instruments* pp. 398-405,
Ch V.4. *Méthode des moments généralisés* pp. 406-410
Ed Montchrétien, coll ECO.

FEVE.P et LANGOT.F (1995), *La méthode des moments généralisés et ses extensions. Théorie et applications en macroéconomie*, Economie et Prévision, n°119, 1995-3, pp. 139-159.

FISCHER Stanley (1999), *On The Need for an International Lender of Last Resort,* FMI, www.imf.org., January, pp. 1-17.

FISHER Irving (1933), *La théorie des grandes dépressions par la dette et la déflation,* Revue Française d'Economie, été 1988, pp. 159-182.

GOODHART Charles and HUANG Haizhou (1999), *A Model of the Lender of Last Resort,* IMF, Working Paper, february, pp. 1-33.

GOODHART Charles (1999), *Time Inflation and Asset Prices*, colloque organisé par Eurostat à Cardiff, juillet, pp.1-27.

JAILLET Pierre (1999), *Les enseignements des premiers mois de la politique monétaire unique*, conférence à l'Université d'Orléans, 9 novembre.

JAILLET Pierre et SICSIC P. (1998), *Prix d'actifs,. relations avec les facteurs de la demande et le crédit : quelques implications pour la politique monétaire*, Bulletin de la Banque de France, n°53, mai, pp. 81-93.

KENNEDY M., PALERM A., PIGOTT C. and TERIBLE F. (1998), *Asset Prices and Monetary Policy*, OECD Working Paper, n° 188, pp. 1-33.

LEVIEUGE G. (2001) ,*Comportement des banques centrales à l'égard des prix d'actifs. Une étude empirique*, Colloque du GDR, XVIIIe Journées Internationales d'Economie Monétaire et Bancaire, 21 et 22 juin, Pau, pp. 1-38.

POTERBA James M. and SAMWICK Andrew A. (1995), *Stock Ownership Patterns, Stock Market Fluctuations, and Consumption, Brookings Papers on economic Activity*, (1995:2), pp. 295-372.

REY Nathalie, (2000), *Instabilité financière : comparaison de trois périodes de crises, 1870-1914, 1927-1935, 1961-1998*, Revue d'Economie Financière, Risques et règles, 25 avril, pp. 7-36.

TAYLOR John B. (1993), *Discretion versus Policy Rules in Practice*, Carnegie Rochester Conference series on Public Policy 39, 1993, North Holland, pp. 195-214.