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The Dynamics of the Housing Market Prices and the Business Cycle: A VAR Analysis for the European Monetary Union

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The Dynamics of the Housing Market Prices and the Business Cycle: A VAR Analysis for the European Monetary Union.

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1. Introduction.

For a long time, analysis of the wealth effect on the economic cycle has focused on the impact of changes in asset prices, financial and real (especially housing) on the marginal propensity to consume. This approach has, therefore, preferred to focus on the impact of the "wealth effect" on the demand side of the economy. However, the channels of transmission of changes in asset prices growth in the economy are multiple. They also depend on the kind of activity that we consider, the transaction costs, the framework and liquidity of the trading market for such goods, the access to financing for investments in certain assets, the average level of interest rates on loans to medium-long term, the tax system and tax subsidies and efficiency of the rental market. All these factors undoubtedly have an impact on the marginal propensity to consume of households, PMC, but they appear diversified strength by country in an international comparison and, in fact, the estimates (see Guo S. and U. Unal, 2011, and C Kerdrain ., 2011, for an international exhibition) show a considerable diversification in the level of the coefficients between the Western countries. The different framework of the financial system, countries with bank-oriented as opposed to those market-oriented, and the presence or absence of fiscal incentives holding and purchase of assets are among the crucial factors of directed economic research to find explanations differentiation in the international wealth effect on the economic cycle. Another avenue of study, also very recent (ECB, 2003, and K. Tsatsaronis and H. Zhu, 2004), focused on the analysis of the wealth effect not only on the demand side but also on the supply side. For instance, the rigidity of the rental market for housing may create restrictions on the mobility of labor supply between different areas (Cannari L., F. Nucci and P. Sestito, 2000) and, therefore, worsen the effects of negative economic shocks due to restricted movement of workers towards regions with better economic conditions therefore the rate of unemployment increases (D. Andrews, A. Caldera Sánchez and Å. Johansson, 2011).

This work presents in section 2 a detailed review of recent literature on the transmission channels of the wealth effect on the economic cycle, in particular on the effect of fluctuations in the price of houses. The econometric estimation of a VAR model with two variables including the rate of growth of house prices and that of employees for the Euro Zone (with quarterly data for the period 1981:2010) in an approach to supply-side analysis is shown in Section 3 in order to assess the effect of variation in the housing market prices on employment and on business cycle. Conclusions follow in the last paragraph.

2. The Housing market drivers

The determinants of the housing market cycle has been extensively studied in recent years, especially in light of the depressing effects on the economic cycle stemming from the bursting of the housing bubble in the U.S. due to subprime mortgage defaults. On the demand side the asset – pricing model by Poterba, 1984, proposed in an international comparison by C. Andre, 2010, is a valuable tool for analysis of the theoretical value of the rents of housing as a function of the nominal price of housing, in turn driven by so-called fundamentals: the nominal interest rate on bank loans (+), the tax rate of first home ownership of the house (+), the cost of detention related to the amortization of the building and maintenance (+), earnings and capital losses expected on housing (-). These drivers synthesize one of the main determinants of the price of housing from the demand side, the user cost of housing, which can be combined demographic factors such as population growth and the reduction of the average size of households (in most Western countries by increasing the share of lone-parent families has increased the demand for housing), and growth in disposable income, real and nominal. Recent studies however showed the growing importance of credit channels as a crucial factor in the development of housing demand: not only a low average

level of interest rates over the last twenty years than the previous two decades, but also easier access to credit to finance home purchases for the low-middle income segment of the population, whereas in previous decades the use of mortgages was a feature of middle-high income families.

Extending the average life of mortgages (even in some cases has reached 50 years), the average increase in Loan-to-Value, LTV, i.e. the share on the price of sale financed by bank loan backed by collateral on the property (Tsatsaronis K. and H. Zhu, 2004), the development of the securitization market credit products, the increasingly frequent practice of home equity extraction in which the owners have obtained liquidity by intermediaries with bank loans secured by real estate, are all factors that have favored in the recent past the growth of housing demand with significant fluctuations in the price dynamics.

The high financial innovation and easier access to credit were, in fact, accompanied by some distortions in the allocation of credit risks inherent in new products offered to customers; in particular many low-income families have found themselves facing financial risks unsustainable compared to their spending power. Just think of the spread of floating rate depreciation schedules for long-term loans for the purchase of first homes that left the families without hedging to the risk of increases in interest rate.

Such distortions in the allocation of risks have made even more volatile changes in house prices following the bursting of the housing bubble, as with higher odds of repayment of loans because of higher interest rates the low-middle income households, no longer able to repay the debt service, have tried to sell the property or, in more and more cases are been forced to transfer the property to the bank. The consequence was an increase in supply of used dwellings that expanded the collapse of prices already down due to reduced demand for credit conditions more restrictive (higher interest rates).

On the other hand, there are other factors that have impacted on the dynamics of housing market,

such as high transaction costs in the housing market, stiffness in the rental market and tax incentives to purchase their first home.

The components of transaction costs are many and differ from country to country, among them we highlight the transfer taxes that relate to the time of transfer of ownership of the property (i.e. the stamp duty), the registration fees of the registration of transfer in a cadastral property register, the costs due to a notary in those countries where it is required the presence of a notarial deed of sale of a property, other legal fees of various nature, commissions paid to intermediaries in the negotiations. In theory, transaction costs reduce the transaction (ECB 2003) with a subsequent negative impact on liquidity and allocative efficiency of the housing market and resulting constraints on the residential and labor mobility (C. Andre, 2010). Restrictions on labor mobility imply that, in the case of the outbreak of bubbles in asset markets, the negative effects on the economic cycle is made worse by the inability of workers to move to regions where there are better economic conditions.

A highly regulated rental market, the presence of subsidies / tax incentives to the tenant and to the buyer of dwelling are other factors that reduce the regional mobility of households (D. Andrews, A. Caldera Sánchez and Å. Johansson, 2011).

Fluctuations in house prices in response to changes in demand for dwellings depend on the housing supply. The determinants of this supply are first, availability of land for building and the existence of transport infrastructure and, secondly, to the type of building regulation (C. Andre, 2010). The regions are characterized by limited availability of building land, have high rigidity of housing supply and, consequently, a constant pressure on the demand for housing can result in upward pressure on short-term prices and on long-term price expectations. The persistence of such pressures would result in the formation of bubbles destined to burst sooner or later (Glaeser et al., 2008). The different supply elasticity of housing supply seems crucial in the determination of long-term prices

in the housing market ((D. Andrews, A. Caldera Sánchez and Å. Johansson, 2011, Meen, 2002, Di Pasquale and Wheaton, 1994).

3. The model, the data and the estimates.

In this paper, we analyze the relationship between the dynamics of house prices and the business cycle in the European Monetary Union on the supply side, unlike most studies in the literature that verifies the presence of a wealth effect that moves on economic growth through changes in the Marginal Propensity to Consume[1]. In particular, notes the economic restrictions[2] on the mobility of workers between the different European regions, it is evident that the changes in house prices produce persistent effects on employment growth, particularly when the housing market goes downward, the unemployment rate increases permanently after a few quarters.

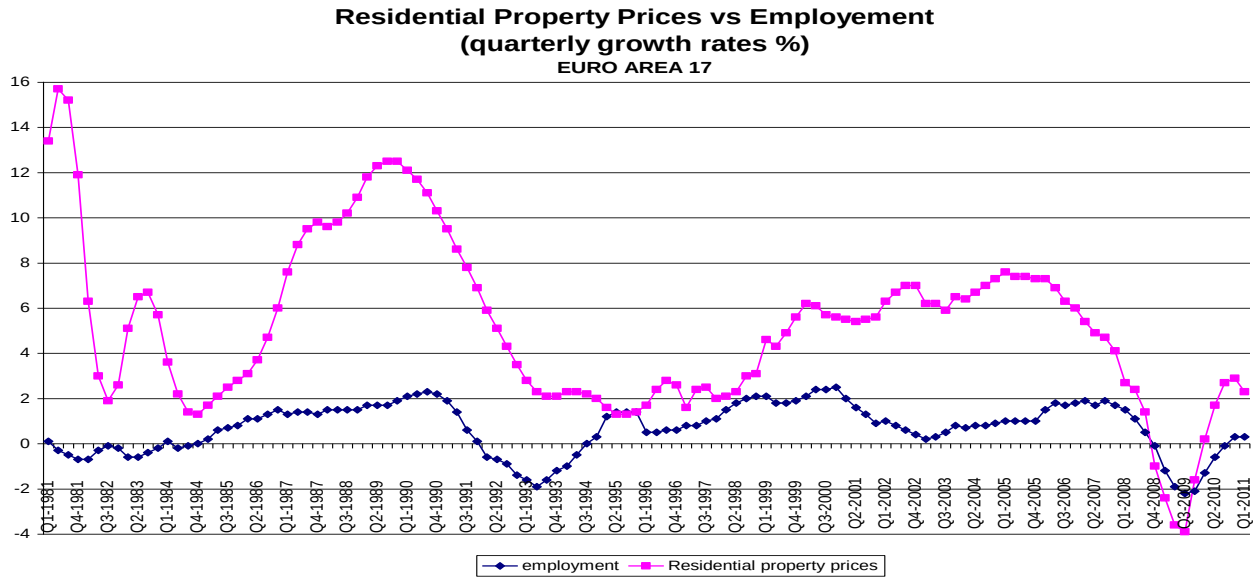
Considering the rate of change in house prices and the one of the EMU workers from 1981 to 2010 (quarterly data source ECB, see Appendix), a test of Granger causality has been implemented on the presence or absence of a unique relationship between these variables. The test was conducted on 12 lags time, quarters, and it seems to confirm that over the medium term there is a cause-effect relationship between the price fluctuations in the housing market and the dynamics of employment. In particular, the rate of change in employment seems significantly impacted by changes in house prices with a period ranging from 5th to 8th following quarter.

However the test is confirmed by the graphic of the growth rates of the two variables and it is evident from Figure 1 that the peak in house prices are almost always followed by decreasing employment after two years or so.

[1] see Guo S. and Unal U., 2011, e Kerdrain C., 2011.

[2] On the other hand, it is recalled that there are institutional constraints on the movement of European workers in the European Union.

Figure 1.



Source: Our elaborations on ECB data.

Confirmed the negative functional relationship between the rate of change in employment at the rate of growth in house prices, is a vector autoregressive model with only two of these variable in order to estimate the relational coefficients and impulse response functions.

Therefore in a VAR model there are two endogenous variables ($i=1,2$) with only two lags ($j=1,2$)

[1a] $H\_PRICES_{\,t} = \beta_{1,t}\, H\_PRICES_{\,t-j} + \delta_{1,t}\, EMPLOY_{\,t-j} + \alpha_1 + \varepsilon_{1,\,t}$

[1b] $EMPLOY_{\,t} = \beta_{2,t}\, H\_PRICES_{\,t-j} + \delta_{2,t}\, EMPLOY_{\,t-j} + \alpha_2 + \varepsilon_{2\,t}$

where

$H\_PRICES_{\,t}$: the growth rate of housing prices for t = 1,2, …,T;

$EMPLOY_{\,t}$: the growth rate of employment for t = 1,2, …,T;

α_1 , α_2 : the exogenous variables (intercepts);

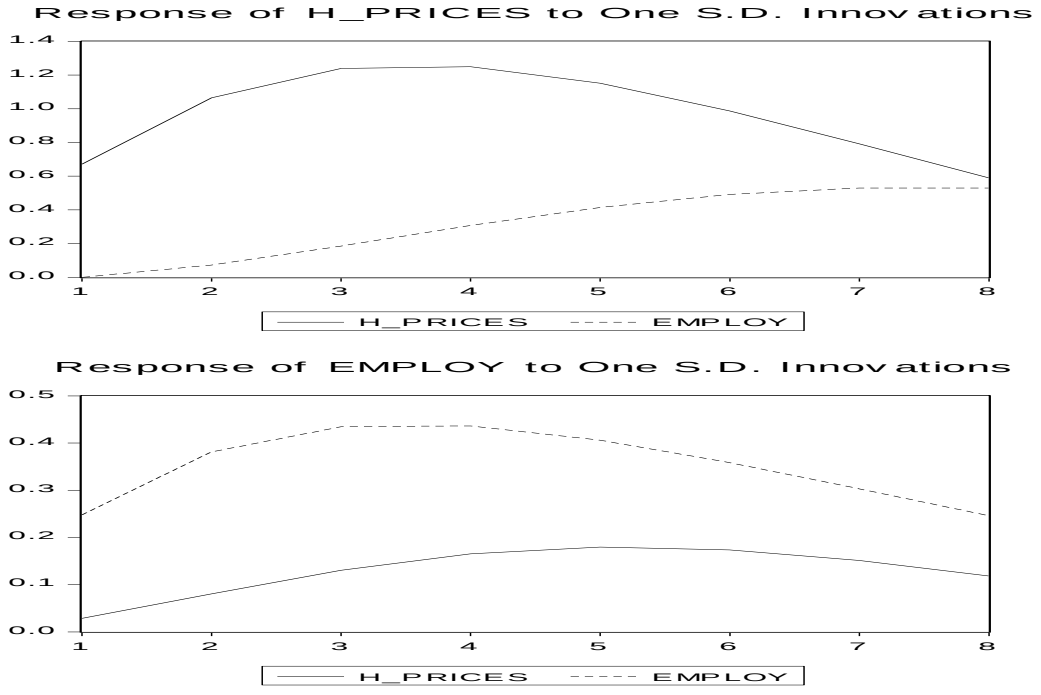
$\beta_{i,t}$, $\delta_{i,t}$: the coefficients of the two lagged endogenous variables;

$\varepsilon_{i,t}$: the stochastique innovations.

The assumptions of the innovations are that they may be contemporaneously correlated with each other but they are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables respectively in the equations [1a] and [1b]. The estimation of VAR equations [1a] and [1b] with EMPLOY quarterly series with two lags for the period 1981:Q1-2010:Q4 confirms that the information embedded in H_PRICES is useful to forecast prior to the down turning of the business cycle. The impulse response function of EMPLOY $_t$ to innovations in H_PRICES $_t$ points out that the changes in the housing market prices are impacting on the business cycle with a persistence from the 5th up to the 8th quarter later (Figure 2).

Figure 2 - IMPULSE RESPONSE FUNCTIONS FOR *EMPLOY* IN VAR MODEL

(Euro Area)



Source: Our elaborations on ECB data.

The sum of β_{11} and β_{12} coefficients in equation [1b] is positive and equal to 0.006 (the sum of δ_{11} and δ_{12} coefficients is 0.91) confirming the theoretical predictions; their t-students statistics are

rejecting the null hypothesis for each parameter ($H_0 : \beta_{11} = \beta_{12} = \delta_{11} = \delta_{12} = 0$) (see Appendix, Table 2).

The Augmented Dickey-Fuller Tests for EMPLOY and for H_PRICES point out that the two variables have unit roots (see Appendix, Table 3) and this is the reason why a Vectorial Co-integrated Model is presented.

In our analysis the VEC model have no trend and the co-integrating equations have an intercept. Considering just one lag we can write this simple model:

$$\Delta_{t-1}\ \text{H\_PRICES}_t = \gamma_1\ (\text{EMPLOY}_{t-1} - \mu + \beta_{1t}\ \text{H\_PRICES}_{t-1}) + \varepsilon_{1t} \qquad [2a]$$

$$\Delta_{t-1}\ \text{EMPLOY}_t = \gamma_2\ (\text{H\_PRICES}_{t-1} - \mu + \beta_{2t}\ \text{EMPLOY}_{t-1}) + \varepsilon_{2t} \qquad [2b]$$

where:

$\Delta_{t-1}\ \text{H\_PRICES}_t$: the first difference in logs of the H_PRICES for t = 1,2, ……. T ,

$\Delta_{t-1}\ \text{EMPLOY}_t$: the first difference in logs of the output gap for t = 1,2, ……. T ,

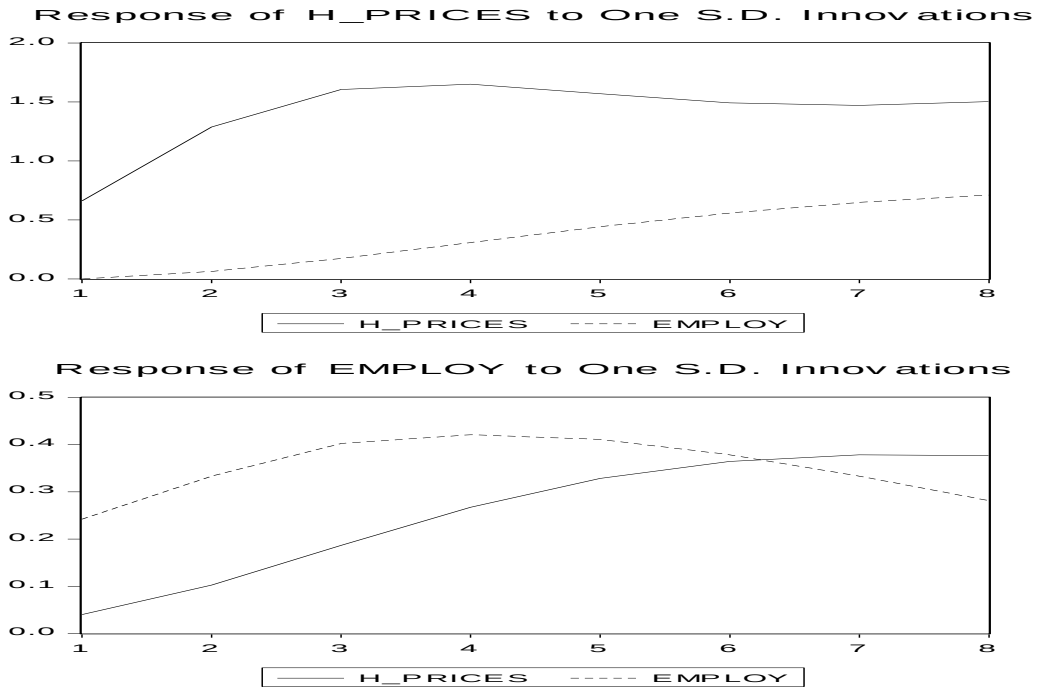
γ_1, γ_2 : the adjustment coefficients to the equilibrium;

$\varepsilon_{i,t}$: the stochastique innovations.

The impulse response functions for [2a] and [2b] with two lags confirms that the response of EMPLOY to H_PRICES innovations is persistent from the 6th quarter.

Figure 3 - IMPULSE RESPONSE FUNCTIONS FOR *EMPLOY* IN VEC MODEL

(Euro Area)



Source: Our elaborations on ECB data.

4. Conclusions

The role of wealth as a determinant of household consumption choices has been thoroughly analysed by economic theory both from macro and micro perspectives; for example, the permanent life-cycle theory links long-run consumption not only to disposable income but also to the net wealth owned by each consumer over his entire life. The components of each consumer's wealth are real and financial assets: the latter ones are diversified in deposits, securities, equities and investment funds shares according the different risk profile of each economic agent, while the first

ones mainly consist of dwellings. In the short run the prices of financial assets are generally more volatile than those of the dwellings, since financial markets, according the efficiency market theory, (see Fama, 1970), absorb very quickly all the information affecting the value of a given asset. But in the long-run housing prices also present huge upward and downward shifts; such dynamics reflect the different information which have been imbedded in the housing market in the long-term. The high volatility of the dwellings' prices in the long-run can create bubbles in the housing market, and when they burst they can potentially cause huge losses to each household in terms of their net wealth, with negative consequences both on their consumption planning and investment choices. In a macroeconomic framework these combined effects negatively impact on aggregate demand with a multiplied shock on Gross Domestic Product (GDP) and on the business cycle of a country, increasing unemployment. Moreover, if the labor mobility by region is low and the correlation among the financial markets of each world area is high, the final impact on the employment can be grater. We point out that not only the demand side is relevant in the transmission of housing market fluctuations on the business cycle, but also the supply side is a crucial channel to shift the dynamics of dwelling's prices on the economic growth. The restrictions in the residential and labor mobility in the Euro Area seem to be the main factors on the supply side amplifying the consequences of negative shocks on business cycle stemming from the housing markets.

In this paper we focus on the literature that studies the relationship between the housing market prices and the business cycle and a relationship cause-and-effect seems to be confirmed between the growth of dwellings' prices and the one of employment in the Euro Area according to Granger Causality test implemented at different lags for the period 1981:Q1 – 2010:Q4.

A Vector Autoregressive model (VAR) and a Vector Error Correction model (VEC) have been estimated with two lags for the two variables considered and the impulse response function according the Cholesky factorized decomposition points out that the response to an innovation in

the quarterly growth rate of the Employment is persistent for the quarterly growth rate of the Residential Property Prices. In particular in the VEC model the response of the Employment to the shock in Residential Property Prices becomes persistent after six quarters. This last outcome shows that huge upward or downward movements in the housing market prices affect the business cycle on supply side, in particular a decline or a rapid increase in the value of the dwellings determine a multiplied effect in the same direction on the employment in the Euro Area.

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Appendix

Variables

EMPLOY :

Total employment, domestic, Non monetary, Persons, Working day and seasonally adjusted,

Quarterly growth rate (year on year)

H_PRICES:

Residential property prices, New and existing dwellings; Residential property in good & poor condition; Whole country; Neither seasonally nor working day adjusted; ECB

Quarterly growth rate (year on year)

Table 1

Pairwise Granger Causality Tests

Lags		Null Hypothesis: EMPLOY does not Granger Cause H_PRICES	Null Hypothesis: H_PRICES does not Granger Cause EMPLOY
	Obs	119	
1	F-Statistic	4.17795	0.17407
	Probability	0.04322	0.67729
	Obs	118	
2	F-Statistic	2.95071	2.54637
	Probability	0.05635	0.08286
	Obs	117	
3	F-Statistic	1.46832	2.1747
	Probability	0.22715	0.09508
	Obs	116	
4	F-Statistic	0.98067	2.49857
	Probability	0.42135	0.04689
	Obs	115	
5	F-Statistic	0.60413	3.23795
	Probability	0.69686	0.00931
	Obs	114	
6	F-Statistic	0.64579	3.32092
	Probability	0.69334	0.00502
	Obs	113	
7	F-Statistic	0.6994	3.10308
	Probability	0.67242	0.00534
	Obs	112	
8	F-Statistic	0.84135	2.74114
	Probability	0.56872	0.00913
	Obs	111	
9	F-Statistic	0.77056	2.39107
	Probability	0.64373	0.01759
	Obs	110	
10	F-Statistic	0.98692	2.28257
	Probability	0.46074	0.01971
	Obs	109	
11	F-Statistic	1.21601	1.98758
	Probability	0.28894	0.03932
	Obs	108	
12	F-Statistic	1.29737	1.76039
	Probability	0.23578	0.06866

Source: Our elaborations on ECB data.

Table 2

VAR model of [1a] and 1 [1b]

*

	H_PRICES	EMPLOY
H_PRICES(-1)	1.574333	0.054300
	(0.06458)	(0.02398)
	[24.3797]	[2.26420]
H_PRICES(-2)	-0.680925	-0.049149
	(0.06265)	(0.02327)
	[-10.8681]	[-2.11229]
EMPLOY(-1)	0.292296	1.538305
	(0.20509)	(0.07617)
	[1.42522]	[20.1970]
EMPLOY(-2)	-0.162646	-0.627183
	(0.21002)	(0.07800)
	[-0.77444]	[-8.04128]
C	0.420132	0.048761
	(0.11166)	(0.04147)
	[3.76269]	[1.17590]
R-squared	0.965795	0.952182
Adj. R-squared	0.964552	0.950444
Sum sq. resids	49.55811	6.835081
S.E. equation	0.671214	0.249273
F-statistic	776.4842	547.6027
Log likelihood	-114.7752	-0.863263
Akaike AIC	2.083047	0.101970
Schwarz SC	2.202392	0.221315
Mean dependent	5.113043	0.734783
S.D. dependent	3.565023	1.119762

* Standard errors in ( ) & t-statistics in [ ]

Source: Our elaborations on ECB data.

Table 3

VEC model of [2a] and 1 [2b]

*

Cointegrating Eq:	CointEq1	
H_PRICES(-1)	1.000000	
EMPLOY(-1)	-6.236714	
	(1.10751)	
	[-5.63127]	
C	-0.462193	
Error Correction:	D(H_PRICES)	D(EMPLOY)
CointEq1	-0.021429	0.018352
	(0.01126)	(0.00417)
	[-1.90264]	[4.39639]
D(H_PRICES(-1))	0.952414	0.053282
	(0.08395)	(0.03111)
	[11.3457]	[1.71257]
D(H_PRICES(-2))	-0.411598	-0.001701
	(0.08251)	(0.03058)
	[-4.98836]	[-0.05563]
D(EMPLOY(-1))	0.128141	0.492045
	(0.24615)	(0.09123)
	[0.52057]	[5.39341]
D(EMPLOY(-2))	-0.023081	0.238440
	(0.26015)	(0.09642)
	[-0.08872]	[2.47295]
C	-0.047950	0.013390
	(0.06291)	(0.02332)
	[-0.76215]	[0.57424]
R-squared	0.603673	0.436294
Adj. R-squared	0.585324	0.410196
Sum sq. resids	47.25266	6.490731
S.E. equation	0.661456	0.245152
F-statistic	32.90040	16.71783
Log likelihood	-111.5597	1.592937
Akaike AIC	2.062451	0.077317
Schwarz SC	2.206461	0.221327
Mean dependent	-0.131579	-0.007018
S.D. dependent	1.027181	0.319213

* Standard errors in ( ) & t-statistics in [ ]

Source: Our elaborations on ECB data.