Evidence of relationships between macroeconomics and housing market in France

Laurent Ferrara and Olivier Vigna *
Banque de France
DGEI-DCPM

November 9, 2009

Abstract

In this paper we focus on cycles and trends of some macroeconomic and housing market variables representative of the French economy. We empirically show that cycles in the housing sector are strongly correlated to macroeconomic cycles with a significant lead, suggesting thus that a closely watch of housing fluctuations could bring useful information for macroeconomic forecasting. Moreover, it seems that the long-term trend of the housing sector activity possesses its own dynamics, quite different from the global French economic activity. We review various assumptions suggesting that the recent downturn in the housing sector may be temporary.

Keywords: Economic cycles, Housing market, France.

*laurent.ferrara@banque-france.fr, tel: +33 1 42 92 29 10 and olivier.vigna@banque-france.fr, tel.: +33 1 42 92 29 36. The views expressed herein are those of the authors and do not necessarily reflect those of the Banque de France.

1 Introduction

Strong empirical evidence of relationships between macroeconomics and the housing sector have been recently underlined in many research papers. For example, Mullbauer and Murphy (2008) have surveyed the multiple interactions between housing markets and macroeconomy, with applications on US and UK data, and Goodhart and Hofmann (2008) have shown evidence of a multidirectional link between house prices, monetary variables and the macroeconomy based on data for 17 industrialized countries.

Among these papers, several authors have also focused on dependence among macroeconomic and housing market in term of cycles. In this respect, cyclical analyses often involve the concept of business cycle, see for example Leamer (2007) or Vargas-Silva (2007) for applications on US data. The business cycle refers to the level of the activity and delimitates periods of expansions (basically positive growth rate) from periods of recessions (negative growth rate). When dealing with European industrialized countries, especially France, recessions are less frequent and less intense since the end of World War II in comparison with US recessions. This stylized fact leads us to focus on the concept of deviation cycle (or growth cycle) resulting from the decompostion of variables between a long-term trend and a medium-term cycle.

Recently, in France, both macroeconomic activity and housing markets have been strongly affected by the consequences of the US sub-prime crisis. For example, according to the lastest release of QNAs[1], GDP growth rate in France has been negative from the second quarter of 2008 to the first quarter of 2009, that is four consecutive quarters of negative growth. Almost simultaneously, it turns out that from August 2008 to July 2009, 420 764 building permits have been delivered, that is a drop of 18.7% by comparison with the same period one year before. Regarding house prices, the latest available figures reveal that the quarterly hedonic index for existing dwellings estimated by notaries and the Insee has experienced four consecutive falls since the third quarter of 2008[2]. Our aim is to know whether this synchronised evolution between macroeconomics and housing markets is a stylized fact and has been already observed in the past or it is only short-lived event that will not impact on long-term fluctuations of both sectors.

In this paper we focus on deviation cycles and trends of some macroeconomic and housing market variables representative of the French economy. In a first part, we empirically show that deviation cycles in the housing sector are strongly correlated with macroeconomic cycles with a significant lead, suggesting thus that a closely watch of housing fluctuations could bring useful information for macroeconomic forecasting. In a second part, it seems that long-term trend of the housing sector activity possesses

[1] Release the 15 of August, 2009, by the Insee, the French Statistical Institute

[2] *Information Rapide* released by the Insee the 10 September 2009

its own dynamics, quite different from the global French economic activity. We review various assumptions on structural variables suggesting that the recent downturn in the French housing sector may be temporary.

2 Comparison of cycles

In this section, our aim is to compare macroeconomic growth cycles[3] based on French GDP with some housing market variables. Regarding variables related to the housing sector, we first consider real house prices deflated with the HICP [4]. We use the index of existing dwellings as released by the Insee and French notaries (see Gouriéroux and Laferrère, 2009, for the details), which has been internally back-calculated until 1980 Q1. Then we also consider various variables such as sales of new dwellings, household investment, employment in construction, permits, housing starts and IPI in construction. We also integrate into the analysis a survey by housing industrials carried out by the European Commission, especially the Confidence indicator in the building sector. National account data are chain-linked and computed by the Insee. In order to have a common sample size, data are analysed from 1980 Q1 to 2009 Q2 [5]. Note that housing starts and IPI only starts respectively in 1986 and 1990 and the EC survey starts in 1985. Last, we also consider in the analysis long and short interest rates (10-years government bonds and 3-months Euribor[6], respectively).

From a methodological point of view, when dealing with growth cycles, the question that arises is how to extract them from macroeconomic variables, knowing that diverse methods can lead to various estimated cycles (Canova, 1998). Several statistical approaches have been put forward in the literature to decompose a macroeconomic time series between trend and cycle. In this paper, we use the 2-step version of the Hodrick-Precott (HP) filter that considers that the HP filter can be designed as a low-pass filter with a cut-off frequency ω_0 and therefore enables to apply a band-pass filter by difference of two low-pass filters. This approach is described in details in the paper of Artis, Marcellino and Proietti (2004). This version of the filter avoids a too noisy growth cycle, but there is still the issue of the choice of the tuning parameter λ in the filter. According to Artis, Marcellino and Proietti (2004), the relationship between the cut-off frequency ω_0 of the HP low-pass filter and the parameter λ is given by :

$$\lambda = \left[4(1-\cos(\omega_0))^2\right]^{-1} \tag{1}$$

For example, when dealing with quarterly data, $\lambda = 1600$ corresponds to a 10-years cycle, $\lambda = 677$ corresponds to a 8-years cycle, $\lambda = 215$ corresponds to a 6-years cycle

[3] In this paper, the terms 'growth cycles' and 'deviation cycles' will be used interchangeably.

[4] The HICP is seasonally adjusted and back-calculated by the ECB.

[5] At the time the paper was written, only Q1 09 was available for prices and housing starts

[6] source OECD

and $\lambda = 1$ corresponds to a 1.5-year cycle. Thus a band-pass filter with a bandwidth 1.5-8 years is specified as the difference of two HP filters estimated with $\lambda = 677$ and $\lambda = 1$.

Preliminary results on French data have shown that Hodrick-Prescott, Christiano-Fitzgerald and Baxter-King filters provide basically the same set of turning points. We refer also to the paper of Alvarez and Cabrero (2009) for a comparison of filtering methods on this kind of data. Thus, we focus only on the 2-step version of the HP filter with a window between 1.5 and 8 years. From a practical perspective, all series are taken in logs before filtering and are expressed in percentage (see Figures 5, 6 and 7). Estimations are carried out using RATS sofware. We carry out the analysis until 2009 Q2, knowing that the last estimated points are subject to revision because of end-point effects inherent to filtering techniques.

In this empirical analysis, we are looking for relationships between economic cycles and housing market cycles. In this respect, we provide two types of analysis, first in terms of correlation coefficients, second in terms of cyclical turning points based on concordance indexes.

2.1 Correlation analysis

In this part, we aim at pointing out eventual correlation between economic and housing cycles. First we focus on contemporaneous correlation coefficients between the various variables, presented in the upper diagonal of Table 1. In the first row of Table 1, we note that GDP is highly correlated with household investment (0.80) what is an expected result insofar as it is an element of GDP, but also with employment in construction (0.72). IPI in construction and short-term interest rate present also a significant correlation with GDP. A more detailed analysis of this contemporaneaous positive correlation between GDP and short-term interest rates cycles is given below. Rather high correlation coefficients can also been observed between prices and household investment (0.60), housing starts (0.62) and permits (0.61), suggesting that housing activity in volume and house prices share common medium-term fluctuations. We note also negative correlation between housing sales and rates cycles (short and long interest rates cycles are mutually positively correlated), which is in line with economic theory. Overall, those contemporaneous correlation measures appear quite small in comparison of what could be expected. In this respect, we focus now on cross-correlation coefficients.

In order to take leads and lags into account, we compute cross-correlations among all the deviation cycles. The various cross-correlations with GDP are presented in Figure 8. High correlation coefficients for negative values on the x axis indicate that the series is leading the business cycle, and conversely. From these graphs, it turns out that variables reflecting the housing cycle (prices, sales, household investment, permits, starts)

lead the GDP growth cycle with a varying advance. For example, it seems that sales possess a larger advance than prices and household investment. Housing prices cycle is certainly a bit more resilient than housing sales cycle. Concerning the two variables related to production in volumes (permits and starts), we note that, due to administrative delays, permits cycle obviously leads the housing starts cycle. Last we notice that IPI in construction and employment in construction are coincident with the economic activity.

Turning to financial variables, it appears that long term interest rates movements and GDP growth cycle are quite coincident, while short term interest rates seem slightly delayed with GDP growth cycle. Moreover, the correlation coefficient between long term interest rates and GDP growth cycle posts a negative sign, when considering eight quarters earlier: as the cross-correlation is the highest at this time in the negative area under review, it comes out that the lower long term interest rates are, the higher GDP growth rate should be two years later. But an essential finding is that, all in all, variables describing the housing market activity tend to lead the economic cycle.

For a more specific interpretation, the highest cross-correlations and their corresponding leads-lags (in quarters) are presented in Table 2. Maximum correlation coefficients are on the upper diagonal while their corresponding lags are on the lower diagonal. A negative value in the lower diagonal indicates that the variable in row leads the variable in column with an advance equal to this figure, and, conversely, a positive value indicates that the variable in row lags the one in column. For example, the correlation between GDP and housing prices is of 0.64, this latter variable being leading with 2 quarters.

First, we note that values are larger than previously when we focused only on con-

	GDP	Prices	Sales	Invest.	Employ.	Survey	Short	Long	Permits	Starts	IPI
GDP	1	0.44	0.01	0.80	0.72	0.57	0.68	0.53	0.32	0.45	0.60
Prices	0.72	1	0.20	0.60	0.54	0.48	0.18	0.19	0.61	0.62	0.26
Sales	0.64	0.56	1	0.23	0.21	0.10	-0.37	-0.42	0.38	0.40	-0.40
Invest.	0.75	0.81	0.53	1	0.65	0.53	0.46	0.39	0.40	0.57	0.39
Employ.	0.79	0.75	0.54	0.79	1	0.46	0.56	0.64	0.17	0.22	0.57
Survey	0.80	0.80	0.67	0.81	0.71	1	0.28	0.21	0.39	0.40	0.31
Short	0.77	0.58	0.54	0.65	0.66	0.66	1	0.57	0.10	0.09	0.60
Long	0.74	0.73	0.44	0.69	0.69	0.59	0.66	1	-0.13	0.05	0.54
Permits	0.70	0.72	0.66	0.70	0.63	0.82	0.54	0.59	1	0.67	0.13
Starts	0.80	0.82	0.69	0.87	0.71	0.84	0.64	0.67	0.86	1	0.31
IPI	0.81	0.64	0.40	0.72	0.85	0.72	0.74	0.65	0.56	0.63	1

Table 1: Concordance indexes for contemporaneous variables (lower diagonal) and contemporaneous correlation (upper diagonal) from 1980 Q1 to 2009 Q2. 'Short' and 'Long' refer to short term (3 months) and long term (10 years) interest rates, respectively.

temporaneous correlations, implying thus that taking dynamics into account leads to a richer analysis. In particular, correlation coefficients are noteworthy between employment in construction and prices (0.71), GDP (0.72) and investment (0.69). It is indeed noticeable that employment is coincident with GDP but lags residential investment with 1 quarter and prices with 2. High correlation coefficients also appear for the housing starts with residential investment and with permits (0.70 and 0.69 respectively). We note that the chronology is respected in the sense that permits leads housing starts with a lag of one quarter. Cyclical relationship between residential investment and housing prices is also strong and positive (coefficient equal to 0.70), prices being leading with one quarter. This observation suggests that rising prices could be a determinant of housing investment. The highest cross-correlation is posted by GDP and residential investment (0.80), the link being contemporaneous.

2.2 Turning point analysis

Starting from the previously extracted growth cycles, we estimate the dates of peaks and troughs by using a quarterly version of the Bry-Boschan algorithm (BBQ algorithm by Harding and Pagan, 2002). In fact, as the series are extremly smooth, peaks and troughs can be detected very easily. We carry out the analysis until Q2 2009, but the last turning points are subject to revision and therefore the analysis over the recent past has to be taken with caution. Estimated dates of peaks and troughs are presented in Table 4 in which leads and lags of the turning points of each variable are also presented in comparison with turning points in the GDP growth cycle. In this part, we use the GDP for the reference cycle and we will compare other variables to it.

From Table 4, we first observe that turning points of the GDP growth cycle are shared

	GDP	Prices	Sales	Invest.	Employ.	Survey	Short	Long	Permits	Starts	IPI
GDP		0.64	0.48	0.80	0.72	0.58	0.68	-0.52	0.58	0.62	0.60
Prices	-2		0.36	0.70	0.71	0.50	0.54	0.44	0.61	0.62	0.43
Sales	-3	-2		0.60	0.27	0.35	-0.37	-0.49	0.44	0.61	-0.49
Investment	0	+1	+3		0.69	0.53	0.50	0.54	0.63	0.70	0.39
Employment	0	+2	+7	+1		0.55	0.56	0.64	0.52	0.47	0.57
Survey	-1	+1	+3	0	-2		0.37	-0.41	0.42	0.44	0.38
Short rate	0	+3	0	+1	0	+2		0.59	0.44	0.43	0.62
Long rate	-8	+3	-1	+3	0	-7	-1		-0.48	-0.47	-0.52
Permits	-4	0	+1	-3	-4	-2	-5	+6		0.69	0.58
Starts	-1	0	+2	-1	-4	-1	-4	+5	+1		0.54
IPI	0	+2	-2	0	0	+2	-1	+8	+4	+3	

Table 2: Highest cross-correlation coefficients among all leads and lags (upper diagonal, lags in parenthesis) and leads/leags (lower diagonal), from 1980 Q1 to 2009 Q2. A negative number indicates that the series in row leads the series in column with an advance equal to this number, and conversely.

by the other considered variables[7]. In this sense, we point out the existence of a growth cycle common to all the variables. The difference lies in the fact that sometimes the other variables may present some idiosynchratic extra-cycles not visible in GDP. For example, the short-term and long-term interest rates present two supplementary cycles (in 1991-92 and 1998-99 and in 1987-89 and 2004-05, respectively).

A striking feature in Table 4 is that, on the average, almost all the turning points in variables related to the housing sector lead turning points in the macroeconomic cycle. Indeed, we observe that housing prices, sales, housing starts and permits are leading the GDP growth cycle. The advance ranges between 4 quarters, for permits, and 2 quarters, for other housing-related variables. It is noteworthy that the advance of prices, sales, residential investment and housing starts is similar, close to two quarters. Moreover, the business survey in construction also possesses a lead of around one quarter over the macroeconomic cycle, with a reduced standard error of 1.4. This result means that this survey could be of great interest to economists for the monitoring and forecasting of short-term economic fluctuations.

Employment and IPI in construction are rather lagged over the GDP growth cycle (around one quarter). In fact, IPI is coincident for all turning points, the positive lag is only due to the trough in 2004 Q4, strongly lagged (6 quarters). Thus, IPI in construction should be reasonably caracterized as a contemporaneous variable.

Last, short-term and long-term interest rates are the variables among the selected ones whose turning points are on average the most accurately closed to the GDP growth cycle turning points, with a coincidence for both interest rates. However, in addition to the relatively higher volatility for such financial variables compared with real variables, the role of both variables is ambiguous because they can have also a counter-cyclical property as suggested in the previous section.

In order to assess synchronization among the variables, the concordance index allows to estimate the fraction of time that cycles are in the same phase (ascending or descending)[8]. Let $(S_{it})_t$ denotes the binary variable that represents the phase of the cycle (ascending: $S_{it} = 0$, descending: $S_{it} = 1$) for a given country i. In the bivariate case, for two variables i and j, the concordance index CI can be expressed in this way:

$$CI = \frac{1}{T} \sum_{t=1}^{T} I_t, \tag{2}$$

where

$$I_t = S_{it} S_{jt} + (1 - S_{it})(1 - S_{jt}). \tag{3}$$

[7] Recall that IPI series only starts in 1990.

[8] See Artis et al. (1997), Artis et al. (2004) and Harding and Pagan (2006) for others measures of synchronization.

At each date t, for all $(S_{it}, S_{jt}) \in \{0,1\}$, I_t is equal to 1 when $S_{it} = S_{jt}$ and equal to 0 when $S_{it} = (1 - S_{jt})$. This tool is very interesting in empirical studies to assess the synchronization between two cycles, although it possesses some shortcomings pointed out by Harding and Pagan (2002).

Concordance indices are presented in the lower diagonal of Table 1. We note that the GDP growth cycle is well synchronized ($CI \geq 0.80$) with housing starts and IPI in construction, as well as with the survey by industrials of the housing sector. High concordance indexes also appear between GDP and residential investment, employment and interest rates. Strong synchronization also appear among variables of the housing sector such as housing starts and residential investment or permits.

As in the correlation analysis, we compute cross-concordance indexes with GDP cycle in order to identify optimal leads and lags. That is we compute concordance index as defined in equation (2) between $S_{i,t}$ and $S_{j,t-k}$ for various lags k, positive and negative. Among all lags k, the maximum cross-concordance index is retained and presented in Table 3. First, we note that the values of the cross-concordance indexes have been improved when including a dynamic relationship, in comparison with first column of Table 1. The results presented in Table 3 confirm the advance of the housing sector over the economic cycle, with a lead ranging from 1 (residential investment and housing starts) to 4 quarters (sales).

In order to get statistical evidence of the relationship between economic and housing cycles, we carry out the synchronisation test based on concordance index proposed by Harding and Pagan (2006). In this respect, we test the hypothesis that cycles are strongly non-synchronized (SNS) based on the statistic $\hat{\rho}_S$, namely the estimated correlation coefficient between $(S_{i,t})_t$ and $(S_{j,t-k})_t$ (see Darné and Ferrara, 2009, for an application). Regarding the choice of the lag k in the SNS test, we do not consider all k but only the lag that corresponds to the highest cross-concordance value. We use a heteroscedastic and autocorrelation consistent (HACC) standard error version of the test. The results presented in the third column of Table 3 enable to reject strongly the null of non-synchronisation showing thus evidence of concordance among the turning points.

In conclusion, the turning point analysis points out that variables reflecting the housing market are strongly related to the economic cycle and possess a significant lead. This latter result is robust to the various approaches considered in this section.

	Concordance	Lead (-) / Lag (+)	*t*-stat Harding-Pagan
Prices	0.77	-2	4.10
Sales	0.71	-4	3.04
Invest.	0.77	-1	4.48
Employ.	0.83	+1	5.69
Survey	0.85	-2	6.58
Short	0.77	0	4.94
Long	0.74	0	5.26
Permits	0.77	-3	4.50
Starts	0.84	-1	5.52
IPI	0.81	0	3.60

Table 3: Maximum cross-Concordance indexes for variables with GDP cycle, optimal leads and lags and *t*-stat of the Harding-Pagan test of non-synchronisation (H0 = Strong No-Synchronisation), from 1980 Q1 to 2009 Q2.

3 Long-term trends in the housing market

In this section, we complete the previous comparative analysis between housing market and macroeconomic cycles by investigating whether some structural variables are playing a significant role in hampering housing cycles to expand without any constraint.

When focusing on euro area countries since 1980, and France in particular, empirical studies identify only two recession phases, in addition to the last 2008 recession, namely the second oil shock double-dip (1980-81 and 1982) and a phase in 1992-93 following the US recession in 1991. We refer to the CEPR Dating Committee (2009) or to Eurostat (Anas et al., 2007, Anas et al., 2008) for recession dating chronologies. When looking at real housing prices fluctuations in France (deflated with the HICP, see Figure 1), we observe two complete phases of negative growth : from 1981 Q1 to 1984 Q4 and from 1991 Q2 to 1997 Q1. Those two phases of negative growth roughly correspond to recession periods, except that troughs of the housing cycle are strongly lagged behind the economic business cycle (around 2 years and 4 years for the first and the second recession, respectively). Regarding the last 2008 recession, the peak in housing prices occurs in 2008 Q1, as the peak in GDP, but the trough cannot not yet been recognized with the data available for 2009 Q2. Consequently, it seems that long-term dynamics in French housing prices are quite different from those in GDP

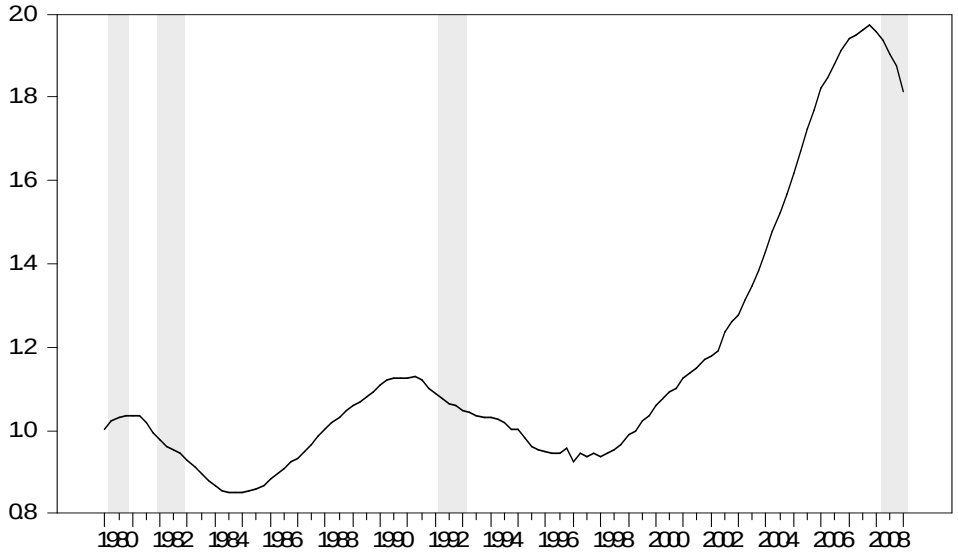


Figure 1: Housing prices (HICP deflated) 1980Q1 - 2009Q2 and the euro area recession phases (shaded).

and are more persistent. This fact has been also pointed out in Ferrara and Koopman (2009).

We consider now long-term trends of GDP, housing prices, residential investment and sales estimated by a low-pass Hodrick-Prescott filter that enables to drop fluctuations with a period lower than 8 years. We observe in Figure 2 that long-term trends have a quite different pattern for GDP and the three other housing market variables. Common fluctuations are present in the three housing variables, although the recent downturn in sales appears more severe, reflecting global housing market evolutions.

The fact that long-term trends in housing market and in macroeconomics may have different dynamics leads us to turn more specifically to the determinants of housing market fluctuations in the long-term. Economic and non-economic factors have an impact on long-term evolutions of the French housing market, then impeding housing cycles to develop without limit in particular, from 1965 to 2000, the index of housing prices divided by the revenue per household was astonishingly stable and equal to 1.

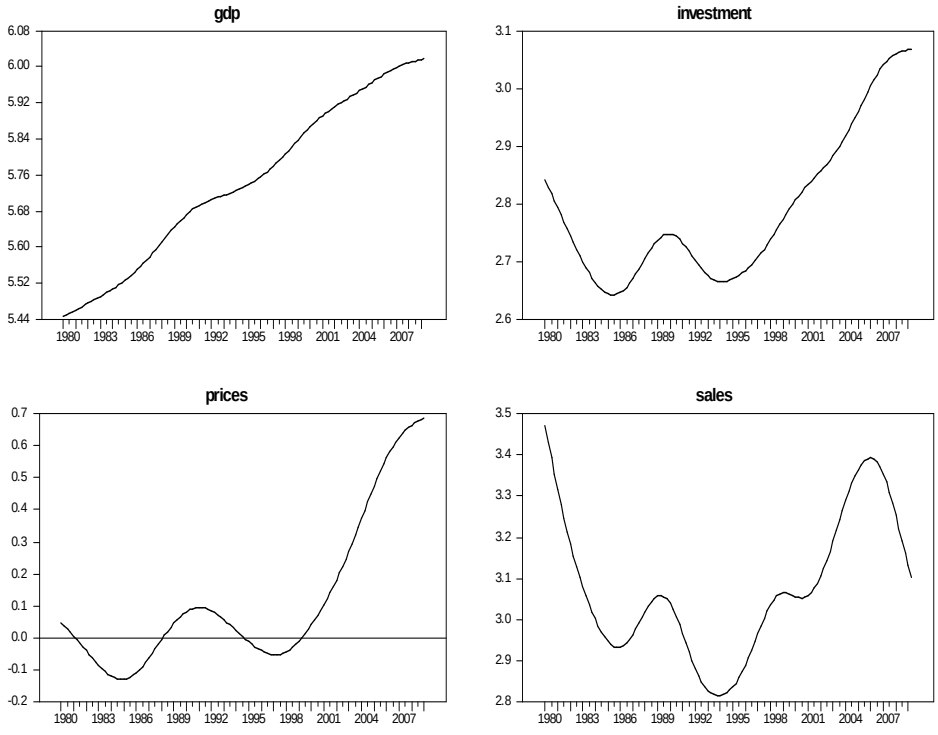
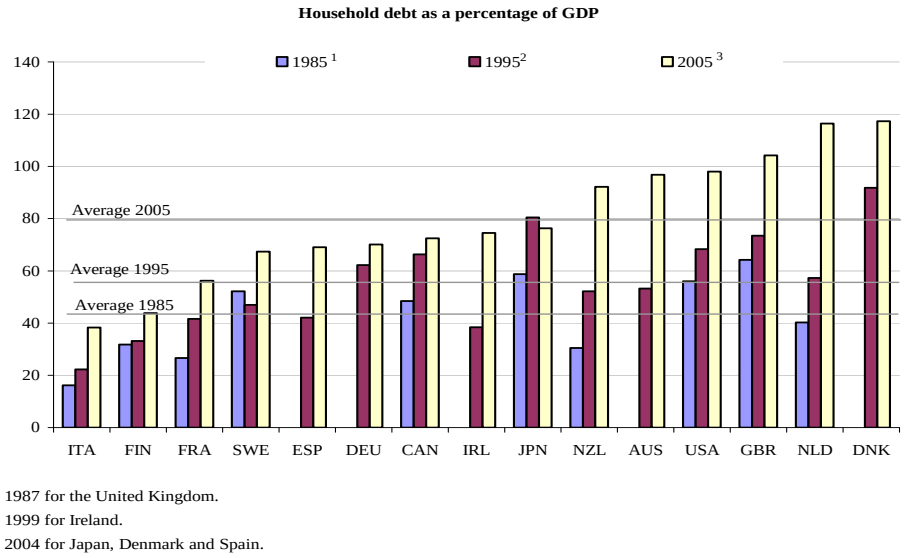


Figure 2: Long-term trends estimated by a low-pass HP filter (1980 Q1 - 2009 Q2).

Seven considerations are indeed to be taken into account in order to assess to what extent structural developments in the French housing markets are constrained. Such variables enable to partly explain why housing prices did not collapse in France in the recent period at the same rhythm as they did in other economies like Spain, Ireland or the United Kingdom for example.

1. Among the main euro area countries, France posted the lowest share of new housing loans to households whose rate is adjustable. In fact, flexible rates represent in France less than 10% of the new housing loans, while this share approximates 15% in Germany on recent years, 40% in the Euro zone as a whole and has exceeded the 50% threshold in early 2009. The highest share amongst the main European economies is observed in Spain, where only 10% of the new housing loans to households are at fixed rates.

2. The type of financial instruments used for housing financing is also important, notably the extent to which mortgage equity withdrawals instruments exist. In fact, in countries where growing housing prices allow households to get new funds from banks to increase their private consumption or their housing investment, the subsequent rise in their leverage ratio may have the opposite effect in a downward-oriented housing market: in such a case, decreasing prices make it quite impossible to extract new financing facilities from an asset whose price is eroding. In France mortgage equity withdrawals have only been introduced in



1. 1987 for the United Kingdom.
2. 1999 for Ireland.
3. 2004 for Japan, Denmark and Spain.

Figure 3: Household debt as percentage of GDP (source OECD).

2006 with a very slow development, although no official data exist so far. On the contrary, in countries like the US or the UK, financial institutions are more willing to increase the amount of the initial housing loan when prices go up, as the market value of the guarantee also appreciates. Such a phenomena contributing to make the private saving ratio smaller, a housing prices decrease compel consumers to make an additional effort to save money, thus potentially amplifying the amplitude of business cycles. Regarding the US, Hatzius (2005), for example, indicates that mortgage equity withdrawals from 1990 to 2004 lowered the personal saving rate from 2 to 5 percentage points. As personal consumption expenditures account for two-thirds of aggregate spending in the US, such an effect would imply an impetus of as much as 0.3 percentage points to average annual real GDP growth over this period. Calza, Monacelli and Stracca (2007) also conclude that the correlation of consumption growth with changes in house prices is higher in economies with more-developed mortgage finance systems.

3. Regarding solvability, French households indebtedness is still quite moderate -despite rapidly increasing on the most recent period- relatively to other industrialized countries. OECD data concerning household debt in percentage of GDP are presented in Figure 3. This means there is some space for further residential investment for French households. Indeed, as a percentage of GDP, household debt in France was quite low in 2005 compared with other developed countries. In terms of growth rate from 1995 to 2005, its evolution was also less rapid than it was in the chartered economies.

4. On the recent period, there is no sign of overinvestment in terms of GDP on the housing market. Indeed, the share of residential investment in total GDP, despite an increase from 4.8% in 2004 to 5.4% at the end of 2007, has then been slightly decreasing and is currently not going back to its long-term average of 5.8% calculated over the longest period - since 1949 - quarterly national accounts are made available by the INSEE. Far from the peak of 8.4% observed in 1974Q1, the present situation is therefore not characterized by a need of a significant correction according to this long term comparison.

5. A growing part of French people would like to become home owner. According to an international comparison (Hilbers et alii, 2008), France posted one of the most rapid increase in the share of home owner over 1980 (+7 points), only Portugal (+15 points), Italy (+9 points) and Belgium (+8 points) displaying a higher rate of progression among the 14 European countries under review. But in spite of this catching up process, the percentage of French people being owner of their home according to Eurostat (2009) is among the lower ones in the European Union, at 58% in 2007 (47% in 1978), that is below the EU average of 65% and the French neighbours figures (83% in Spain, 72% in Italy, 67% in Belgium and 71% in Luxembourg) except the German one (46%). This factor should consequently also help sustain the demand side in the next years.

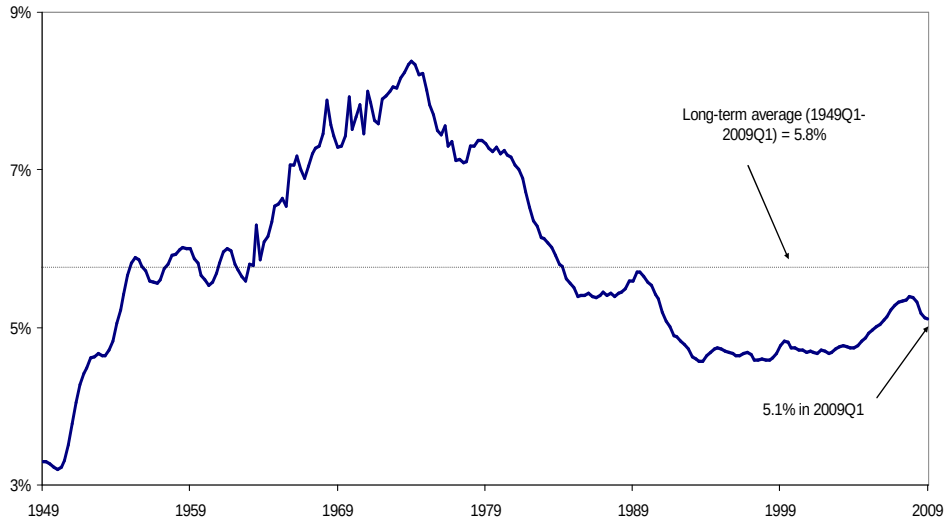


Figure 4: Residential investment in percentage of GDP (source INSEE).

6. From a demographic point of view, both the current situation and the main projections are also supportive for fuelling the need of housing in the future. First, the size of French households has diminished: according to INSEE data, the share of housings occupied by one people grew from 19.1% in 1954 to 32.5% in 2005, whereas the share of housings occupied by at least six people diminished from 9.9% to 1.9% on the same period. The INSEE forecasts the share of households with one people to represent in 2030 between 43.2% and 46.0% of the total number of households depending on the type of scenario (see Jacquot, 2006). In addition, the number of people included per household may get smaller from 2.31 in 2005 (2.57 in 1990) to a range of 2.04-2.08 in 2030 according to the scenario.

7. Furthermore, housing investment is becoming a crucial element in the strategy dedicated to improve the standard of living in the retirement period. The median age at which French people buy a dwelling (40 years old in Paris in 2007) lost 4 years from 1997 to 2007 as said by notaries data. Fiscal incentives (encouraging rental investment in the new property market, for example the *Loi Scellier*, or enabling grandparents to give higher lump-sum of money to their grandchildren without any tax) and psychological motivations (such as the expectation to get a profit with a higher probability by selling a dwelling rather than a share or a bond on volatile financial markets) also contributed to this development. All in all, housing property (including land) accounted in 2007 for 72% of the net

total value owned by households or the equivalent of 7.5 years of their gross disposable income vs. an average of 4.4 years on the period 1978-1998.

4 Conclusions

The analysis of correlations between housing and GDP cycles in France suggests that the former, as a leading variable, may add a significant information to help assess business outlook. In particular, some key variables in the housing market, contributing to shape real estate developments, are noteworthy for GDP growth cycles. The recent downturn in both real economy and housing sector does not constitute an exception in that perspective. However, various structural factors (financial, demographic, sociological, etc.) may also play a role in France compared to what happens in other advanced economies to help sustain housing market developments in the long run.

As further research, it would be worthy to consider other real and financial variables, such as bonds or stock exchange prices (Friggit, 2009), in their correlation with house prices. Moreover, the development of an econometric model to check the empirical results that we found, for both cyclical and long-term components, would be of interest.

References

[1] Álvarez, L. J. and Cabrero, A. (2009), Does housing really lead the business cycle?, mimeo, Banco de España.

[2] Anas, J., Billio, M., Ferrara, L. and Mazzi G.-L. (2008), A system for dating and detecting turning points in the euro area, *The Manchester School*, 76, 5, 549-577.

[3] Anas, J., Billio, M., Ferrara, L. and LoDuca, M. (2007), A Turning Point Chronology for the Euro-zone Classical and Growth Cycle, in G. L. Mazzi and G. Savio (eds), *Growth and Cycle in the Euro-zone*, New York, Palgrave Macmillan.

[4] Artis, M., Kontolomis, Z.G. and Osborn, D.R. (1997), Business cycles for G7 and European countries, *Journal of Business*, 70, 249-279.

[5] Artis, M., Marcellino, M. and Proietti, T. (2004), Dating business cycles: A methodological contribution with an application to the Euro area, *Oxford Bulletin of Economics and Statistics*, 66, 537-565.

[6] Baxter, M. and King, R.G. (1999), Measuring business cycles: Approximate band-pass filters for economic time series, *Review of Economics and Statistics*, 81, 575-593.

[7] Calza, A., T. Monacelli and L. Stracca (2007), Mortgage Markets, Collateral Constraints, and Monetary Policy: Do Institutional Factors Matter?, Center for Financial Studies, Working Paper Series No. 2007/10.

[8] Canova F. (1998), De-trending and business cycle facts, *Journal of Monetary Economics*, 41,475-512.

[9] CEPR (2003), Press Release, Euro Area Business Dating Committee, 22 September 2003.

[10] Christiano, L. and Fitzgerald, T. (2003), The band pass filter, *International Economic Review*, 44, 2, 435-465.

[11] Darné, O. and Ferrara, L. (2009), Identification of slowdowns and accelerations in the Euro area, Working Paper No. 239, Banque de France, June 2009 and CEPR Discussion Paper No. 7376, July 2009.

[12] Friggit, J. (2009), Le prix des logements sur longue période, *Informations Sociales*, forthcoming.

[13] Gouriéroux, C. and Laferrère, A. (2009), Managing hedonic housing price indexes: The French experience, *Journal of Housing Economics*, forthcoming.

[14] Harding, D., Pagan, A. (2002), Dissecting the cycle: A methodological investigation, *Journal of Monetary Economics*, 49, 365-381.

[15] Harding, D., Pagan, A. (2006), Synchronization of cycles, *Journal of Econometrics*, 132, 59-79.

[16] Hatzius, J. (2005), Housing holds the key to Fed policy, Goldman Sachs Global Economics Paper No. 137, February.

[17] Hilbers P., Hoffmaister, A., Banerji, A. and Shi H. (2008), House price developments in Europe: A comparison, IMF Working Paper, 08/211.

[18] Hodrick, R. and E. Prescott (1997), Postwar U.S. Business Cycles: An Empirical Investigation, *Journal of Money, Credit, and Banking*, 29, 1-16.

[19] Jacquot, A. (2006), Projection de ménages pour la France métropolitaine à l'horizon 2030, Document de Travail, No. F0605, Insee.

[20] Leamer, E. (2007), Housing is the business cycle, Working Paper 13428, NBER.

[21] Mintz, I. (1969), Dating postwar business cycles: Methods and their application to Western Germany, 1950-67, Occasional Paper No. 107, NBER.

[22] Vargas-Silva, C. (2007), Monetary policy and the US housing market: A VAR analysis imposing sign restrictions, *Journal of Macroeconomics*, 30, 997-990.

Appendix

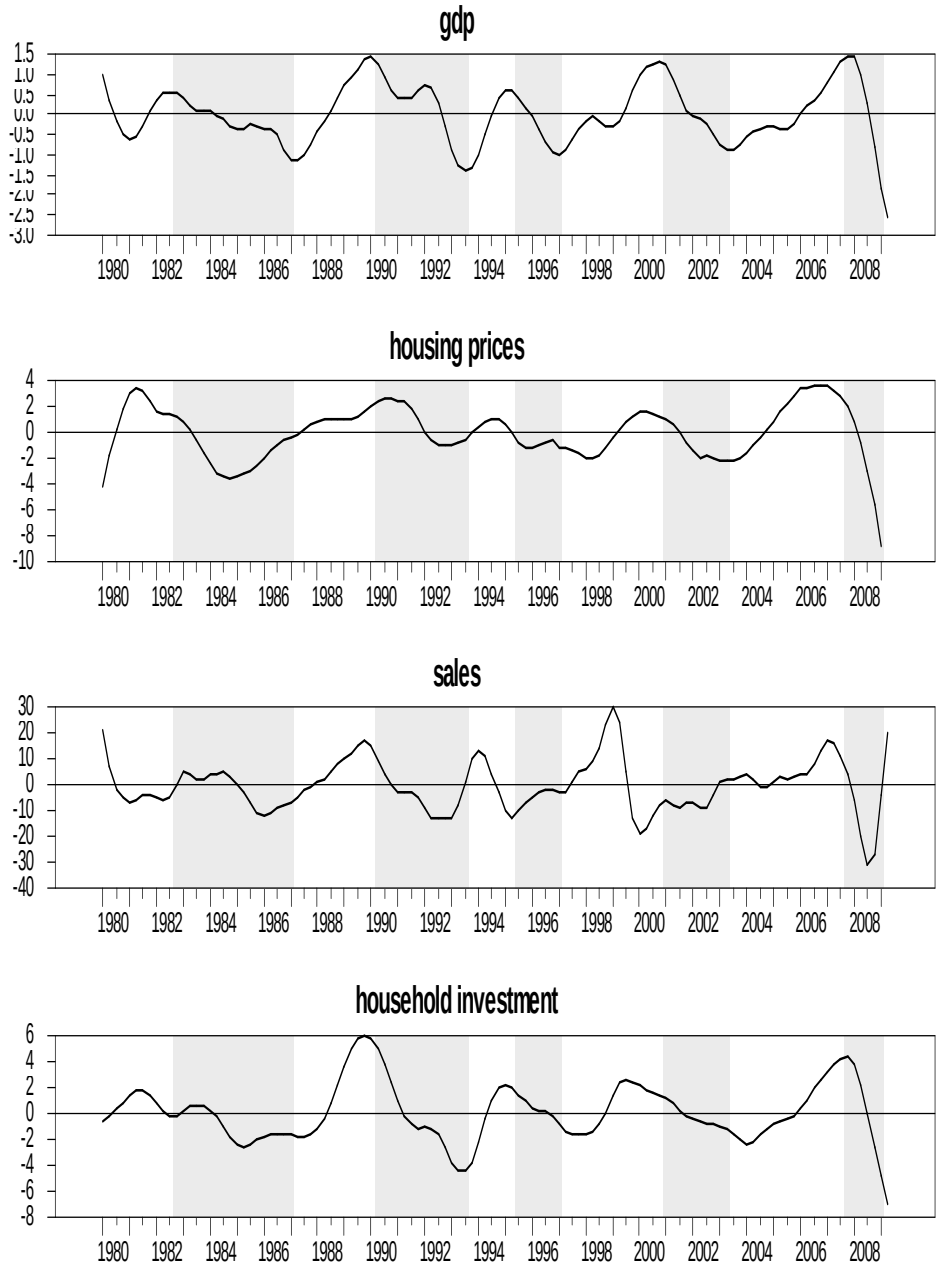


Figure 5: Growth cycles for GDP, for housing prices, for housing sales and for household investment, 1980Q1 - 2009Q2, and GDP growth cycle (shaded area).

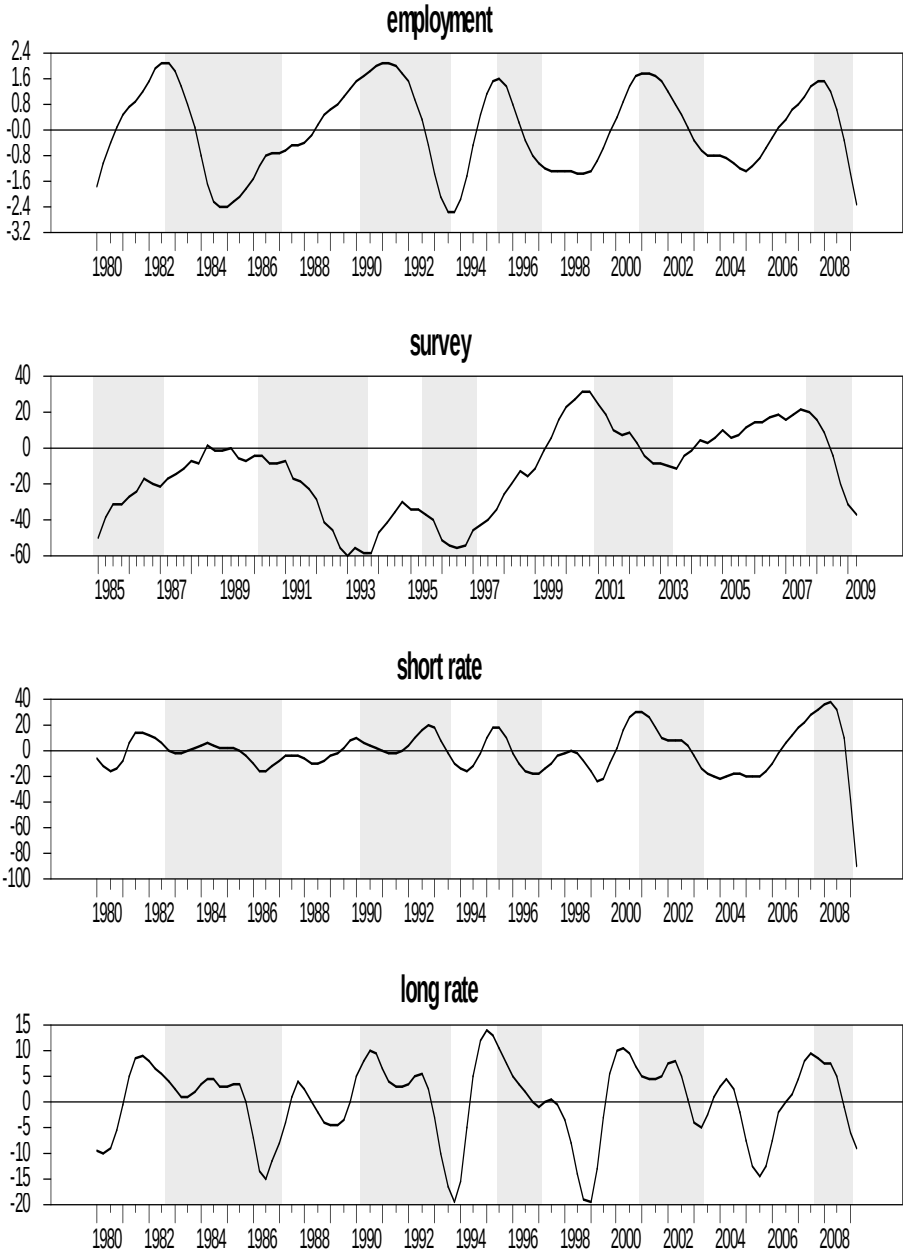


Figure 6: Growth cycles for employment in the housing sector, for short and long rates, and survey in housing, 1980Q1 - 2009Q4, and GDP growth cycle (shaded area).

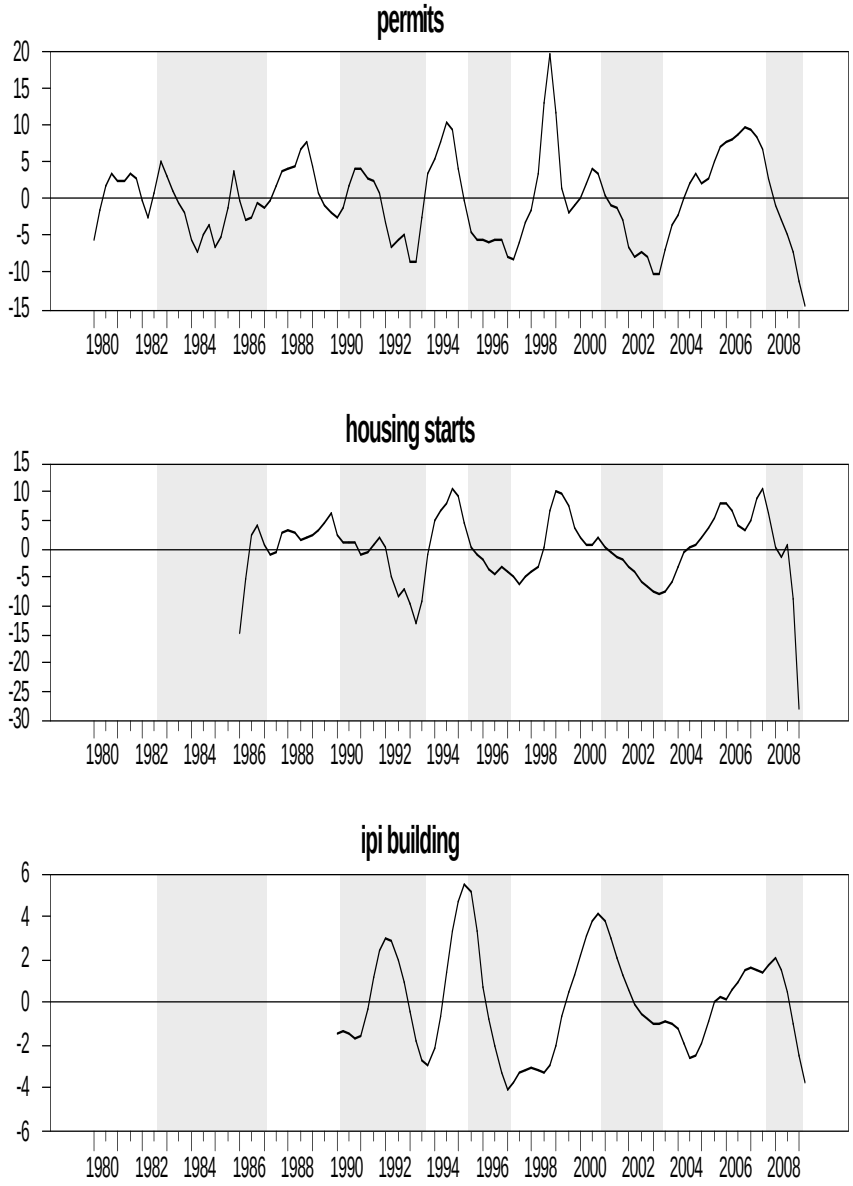


Figure 7: Growth cycles for permits, housing stats and IPI in construction, 1980Q1 - 2009Q2, and GDP growth cycle (shaded area).

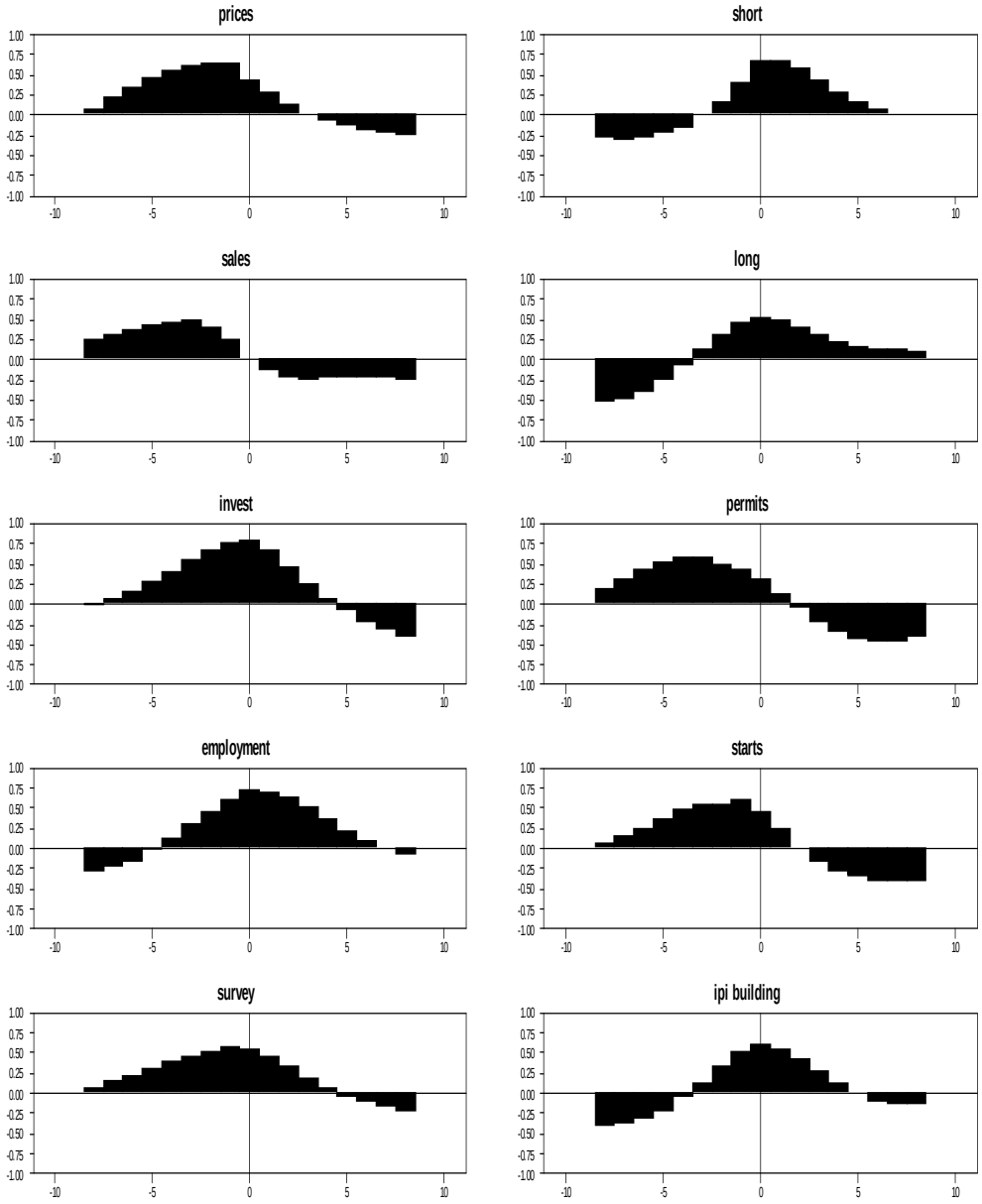


Figure 8: Cross-correlations with GDP growth cycle, 1980Q1 - 2009Q2.

	GDP	Prices	Sales	Invest	Employ	Survey	Short	Long	Permits	Starts	IPI
Trough			81Q1 ( )				80Q3 ( )				
Peak	82Q3	81Q2 (-5)	83Q1 (+2)	80Q4 (-7)	82Q4 (+1)		81Q4 (-3)	81Q4 (-3)	82Q4 (+1)		
Trough	87Q2	84Q4 (-10)	86Q1 (-5)	85Q2 (-8)	85Q1 (-9)		86Q3 (-3)	86Q3 (-3)	84Q2 (-12)		
Peak								87Q4 ( )			
Trough								89Q2 ( )			
Peak	90Q1	90Q4 (+3)	89Q4 (-1)	89Q3 (-2)	91Q2 (+5)	89Q2 (-3)	90Q1 (0)	90Q3 (+2)	88Q4 (-5)	89Q4 (-2)	
Trough							91Q2 ( )				
Peak							92Q4 ( )				92Q1 ( )
Trough	93Q3	93Q1 (-2)	93Q1 (0)	93Q2 (-1)	93Q4 (+1)	93Q1 (-2)	94Q2 (+3)	93Q4 (+1)	93Q1 (-2)	93Q2 (-1)	93Q3 (0)
Peak	95Q2	94Q3 (-3)	94Q1 (-5)	95Q1 (-1)	95Q3 (+1)	94Q4 (-2)	95Q2 (0)	95Q1 (-1)	94Q3 (-3)	94Q4 (-2)	95Q2 (0)
Trough	97Q1	98Q2 (+5)	95Q2 (-7)	98Q1 (+4)	98Q1 (+4)	96Q3 (-2)	96Q4 (-1)	99Q1 (+8)	97Q1 (0)	97Q3 (+2)	97Q1 (0)
Peak			99Q1 ( )				98Q2 ( )				
Trough			00Q1 ( )				99Q2 ( )				
Peak	00Q4	00Q2 (-2)		99Q4 (-4)	01Q1 (+1)	00Q4 (0)	00Q4 (0)	00Q2 (-2)	98Q4 (-8)	99Q1 (-7)	00Q4 (0)
Trough	03Q2	03Q2 (0)		04Q2 (+4)	04Q3 (+5)	03Q3 (+1)	04Q1 (+3)	03Q2 (0)	03Q1 (-1)	03Q2 (0)	04Q4 (+6)
Peak								04Q2 ( )			
Trough								05Q3 ( )			
Peak	07Q4	06Q4 (-4)	07Q1 (-3)	07Q4 (0)	07Q4 (0)	07Q3 (-1)	08Q2 (+2)	07Q3 (-1)	06Q4 (-4)	07Q3 (-1)	08Q1 (+1)
Mean		(-2.0)	(-2.7)	(-1.7)	(1.0)	(-1.3)	(0.1)	(0.1)	(-3.8)	(-1.6)	(1.2)
StdErr		4.4	3.2	4.2	4.2	1.4	2.3	3.4	4.1	2.8	2.4

Table 4: Peaks and troughs dating for growth cycles estimated by using HP2 filter with bandwidth 1.5-8 years. Lead and lags viz the GDP growth cycle turning points are in parenthesis. IPI series only starts in 1990.