OIL PRICE SHOCKS AND THE BUSINESS CYCLE: IS THE 2008 FINANCIAL CRISIS DIFFERENT?

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Abstract

In this paper, the effect of an oil price shock upon the business cycle is revisited. Not long time ago, many researchers maintained that volatility in output growth have reached an end, and that economic stability would be something characteristic of modern societies. However, 2008 economic downturn has brought the question of cyclical crisis and their causes back to the stage. Granger causality tests were applied to quarterly data of Spanish economy since 1970, in order to disentangle the effects of variations in the price of crude oil upon the economy, taking into account the institutional differences that the aforementioned researchers found in the periods before and after the beginning of the 1980´s.

JEL codes:

Keywords: exogenous shocks, oil price, business cycle, Spanish economy, Granger causality.

1. Introduction

Hamilton's paper (1983) opens an interesting series of works devoted to verify and evaluate empirically the influence of oil prices over economic activity in developed countries in the second half of the twentieth century and early years of the present century. Since this seminal paper, many important contributions were made in this subject by Hamilton and little has changed in his position about the important contribution that oil prices have had on economic recurring crisis. In addition to its primary objective, all these works share the use of the same econometric methodology: Vector Autoregression Models (VAR).

Some papers, such as the aforementioned of Hamilton, that of Fomby and Hirschberg (1989), Kilian (2007) or Melinna (2012), are focused primarily on the US experience. Others such as Burbidge and Harrison (1984), Mork, Mysen and Olsen (1990) or Peersman and Van Robays (2009) offer a more international perspective.

The more recent articles published on the subject emphasise the study of asymmetries in the effects of higher and lower oil prices, and they have also differentiated the effects of the various sources of variation in the price of oil (demand, supply and speculative factors). Some have also deepened in the amplifying effects of monetary policy, Bernanke et alter (1997), or of rigidities in labour markets, Peersman and Van Robays (2009).

Another line of research, Davis and Haltiwanger (2002) and Lee Ni (2002), has focused on the study of the effects of higher oil prices from a sectoral perspective, contributing in this way to disentangle the effects of reallocation of productive resources as a result of a change in relative price of inputs.

In this paper we will address the question in Spain, differentiating two periods: the first period considered goes from 1970 to the signature of the Adhesion Treaty to the European Community, and the second period goes from 1986 to the present day.

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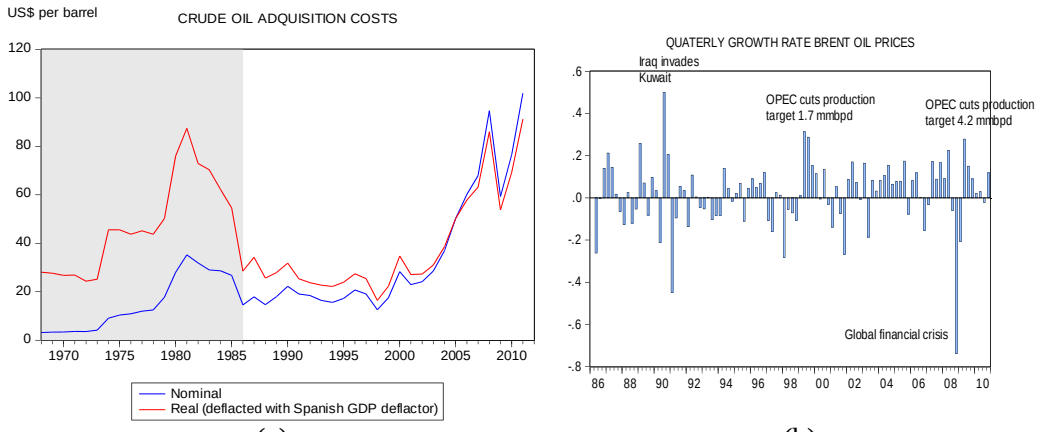
In section 1, we make a short overview of international petroleum market, in which we emphasize the transition from a market guided by political disruptions in oil producing countries to other driven by the growing demand from emerging economies. Section 2 is devoted to explain the way in which oil prices affect the business cycle, considering demand factors and also reallocation costs among branches of activity and within them. In Section 3, we present the results of Granger causality tests applied to the main variables that define an economy in addition to international crude oil prices in order to compare their effects in the two periods previously defined. Finally, we present our main conclusions.

2. The International Oil Market

As we can see in figure 1 (a), oil prices have responded to geopolitical events that disrupt supply or cause uncertainty about future oil supplies. At any time, market participants are assessing the possibility of disruptions and their potential impacts. In this connection, it is important to consider not only the duration and size of the disruption but also the availability of alternative producers and enterprises and governmental stocks. We observe a match between episodes of political instability in 1973, 1979, 1991 and oil prices, which increased strongly and in a very short interval.

Figure 1



(a) (b)

Source: Own elaboration, IEA and AMECO databases

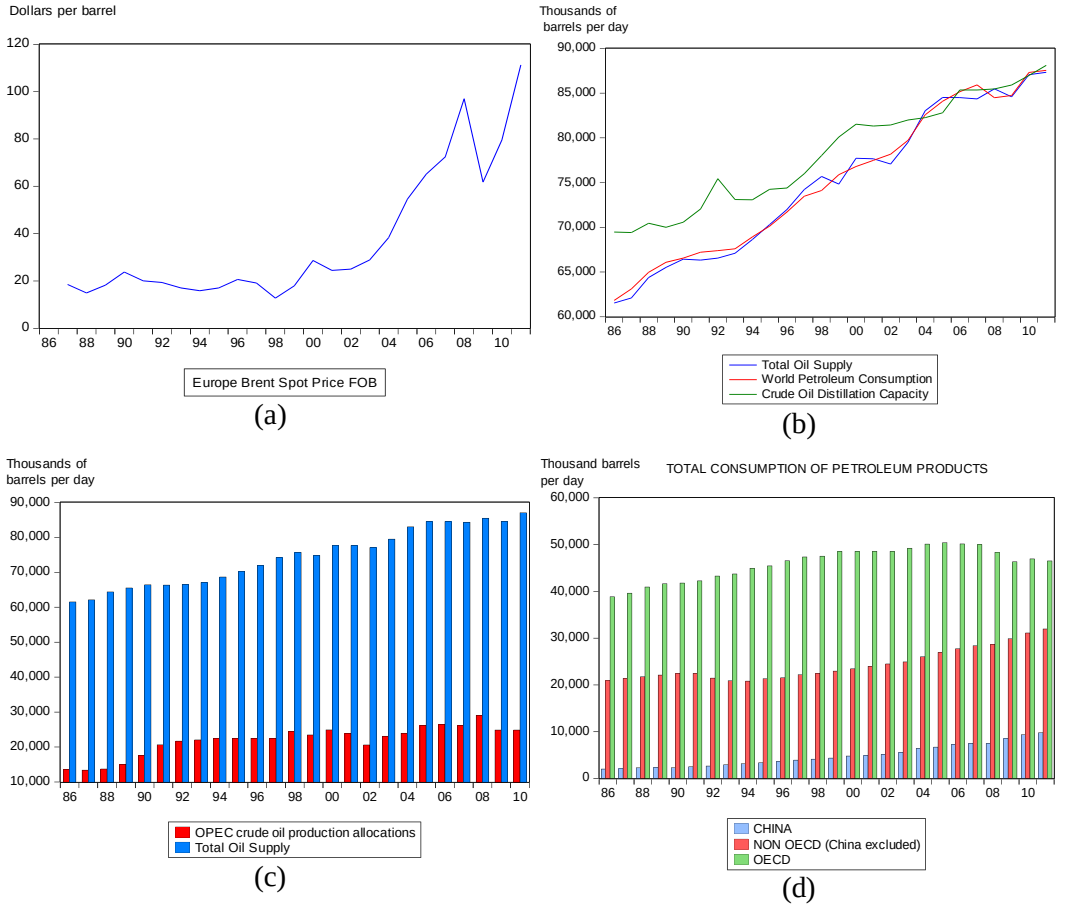
The decade of the seventies and the early eighties were prolific in oil supply disruptions emanating from political events. In October of 1973, the first oil crisis started when the Arab members of the OPEC proclaimed an oil embargo as a result of Yom Kippur war. In 1979, the second oil crisis began as a consequence of the Islamic Revolution. Iran became an Islamic Republic and Ayatollah Khomeini supreme leader of the country. Shortly afterwards, Iran was invaded by Iraq, and the First Gulf War declared, lasting from September 1980 to August 1988.

Conversely, the oil market in the period 1986-2011 was characterized for the presence of only a remarkable exogenous supply shock caused by a political disruption in an oil producer country, the one related to the Iraq-Kuwait War, which began in August 1990, when Iraq launched an invasion of Kuwait, and reached an end in February 1991, when Kuwait was officially liberated from Iraq.

In figure 1 (b) stands out that besides the 1990-91 peak, caused by the invasion of Kuwait, the main trait of oil prices was their continued growth since 2002. The evolution of oil prices after 2000 merit another explanation as far as none of this sort of events may offer any contribution, with the exception of the attacks launched by the Islamic terrorist group al-Qaeda upon New York City and the Washington D.C. in September 11. Although this last episode is related with growing uncertainty at international level but not with any physical disruption in oil supply.

The explanation of the rising oil prices is the strong demand for oil, especially from the non OECD countries, mainly China (Fig 2(d)), and a stagnation of oil supply which reached a level close to its maximum distillation capacity (Fig 2(b)). In the latter argument, it should be taken into account the Saudi Arabia's decision to abandon its role as swing producer in 1985 and the OPEC quotas policy (Fig 2(c)).

Figure 2



Source: Energy International Agency

We estimated a quarterly 12 lags VAR model with data from 1986.2 to 2010.4 for the crude oil market in which we included the following variables: a dummy variable for geopolitical events (DUPE), an index of world demand of crude oil (IND05), the OPEC crude oil production allocations (OPEC), the world oil production (QOIL), the worldwide government-controlled and industry stocks of petroleum to take into account

precautionary demand (OILST) and, finally, the Europe Brent spot price of crude oil (BRENT). All variables are expressed in growth rates. We have chosen 12 lags due to the results obtained making use of lags exclusion tests in the crude oil price equation.

Applying the variance decomposition technique to the oil market prices in the VAR model previously defined, we can conclude that a high percentage of the error of prediction of the growth rate of oil prices is still explained by shocks on this same variable, although there are remarkable influences of demand shocks -ordinary (13.4%) and precautionary (16.5%)- and at a lesser extent of oil production (21%), geopolitical disruptions (10%) and the policy of quotas of the OPEC (12%). Therefore, we can confirm that crude oil prices have been driven at a great extent by the world demand in the period from 1986 to the present.

TABLE 1. VAR Variance decomposition

Period	S.E.	DUPE	D (IND05)	DLOG (QOIL)	DLOG (OPEC)	DLOG (OILST)	DLOG (BRENT)
1	0.193792	7.437818	10.06475	14.20716	0.370005	7.237780	60.68249
2	0.275906	13.11109	8.827504	11.92784	1.081420	5.503813	59.54833
3	0.333890	10.20257	11.48556	16.45465	4.262270	13.28960	44.30535
4	0.370492	9.653711	12.93587	18.60127	5.330574	12.73025	40.74833
5	0.393495	10.23505	11.48130	16.61788	11.86100	14.18989	35.61488
6	0.411499	10.06039	11.00335	15.16720	13.83740	14.98141	34.95024
7	0.423919	9.829673	10.56093	18.26737	13.51150	14.38956	33.44097
8	0.435418	10.55229	11.64493	18.80552	13.74261	13.57041	31.68423
9	0.444343	10.71505	10.98820	22.24191	12.93279	13.06995	30.05209
10	0.457936	9.669616	13.35098	20.74830	12.36901	16.51569	27.34640
Cholesky Ordering: DUPE D(IND05) DLOG(QOIL) DLOG(OPEC) DLOG(OILST) DLOG(BRENT)							

Source: Own elaboration

At this point, due to the revealed pre-eminence of public and private stocks of oil in explaining the path of prices, it may be relevant to assess whether the behaviour of the oil market has been based on its fundamentals or has been guided by a huge inflow of speculative capital to the market for commodities, such as several authors have argued. This question has been settled by Hamilton (2009), there he proves that the ingredients needed to justify the development of the market according to speculation - low price elasticity of demand and the physical inability of supply growth - are also the key elements to explain the behaviour of prices based only on market fundamentals.

2. Macroeconomic consequences of a rise in oil prices

Many papers, such as those of Mork, Mysen and Olsen (1990), Davis and Haltiwanger (2002), Lee & Ni (2002) or Edelstein & Kilian (2007), have made their contribution to shed some light over this point. The geographical distribution of the world reserves of petroleum has determined that after an increase in the oil price, the deterioration of the trade balances of many importing countries will occur, at least in the short term. In the medium term, economic agents will react and adjust their behaviour to the new relative prices trying to avoid the reduction of their income. The intensity of this response would depend, among other things, on their expectations about the future evolution of oil prices.

Focusing on the short and medium term, we can affirm that the influence of a change in oil prices on the business cycle will act both from the supply and the demand sides of the economy.

In order to analyse the supply side effects, we will begin supposing an economy with a single productive sector and three inputs: capital, which is fixed in the short run, labour and energy. Increasing the price of energy would cause a reduction in the use of this input and a decrease in production. Unless energy and labour were very close substitutes, there will also be a decrease in the marginal productivity of labour, as far as workers will have to work with less intensity of fuel. This effect will prevail regardless of labour market flexibility. However, in the case that labour supply was rigid "voluntary" unemployment will occur.

In addition, if we consider an economy with several branches of activity, reallocation of factors of production will happen from the most disadvantaged (refineries and chemical industries) to other less sensitive to energy costs. Given the presence of rigidities and costs of capital and employment reallocation among sectors or even within a sector, the income of consumers is going to be even more affected.

On the demand side, when the rising price of energy is not sufficiently offset by a rise in other prices, there will be a real balance effect, which will impact on economic activity directly through consumer demand or indirectly through money market. On the one hand, increased energy prices and low demand elasticity decreases the income that individuals can devote to consumption. The share of energy products in the total consumption is an important element in this regard. In the other hand, when monetary authorities take action in the presence of an increase in the price of energy, in order to maintain inflation under control, consumption demand will also be eventually affected.

Besides, the uncertainty introduced by the upward trend in oil prices affects the consumption of consumer durables, specially, of durables with maintenance costs linked to energy prices (e.g. cars) and the increase of savings for preventive purposes.

There will be deterioration in the terms of trade which will hurt oil importing countries in the benefit of exporters. In the case that oil exporting countries had a lower marginal propensity to consume would be a contraction in world aggregate demand and international trade.

One controversial issue has been to distinguish which part of the macroeconomic effect of an exogenous shock, such as those suffered by the price of oil, is attributable to its direct impact, and which comes from the implementation of a restrictive monetary policy. Ben Bernanke et alter (1997) concluded that the most important effect comes from the monetary policy applied as a result of the oil price shock. On the contrary, Hamilton and Herrera (2001) in a paper focused in the US economy, consider that the type of reaction that the Federal Reserve should implement to curb the growth effect of oil prices on GDP would be out of reach as far as they attribute a lower effect to the monetary policy.

3. Oil prices and the Spanish economy

In our aim to analyse the role of oil prices in the business cycles in Spain, first of all, we need to undercover whether or not oil prices impact on inflation, monetary authorities policies and, eventually, how the real economy is affected.

We have run bi-variate VAR Granger causality tests in which we have included a variable representing crude oil prices (OILPRICES) and five variables in order to pick up the performance of the Spanish economy: production (GDP), unemployment (U), consumer prices (IPC), salaries (W) and the discount rate (r). The choice of the variable representing oil prices has been made taking into account that in the seventies the

Northern Sea oil production was not relevant and so we needed an indicator for the whole period which should be highly correlated with the spot price of the Brent crude oil from 1986 to the present. All variables have been serially adjusted with the Census Bureau's X12 seasonal adjustment program. The price of oil and the GDP were expressed in growth rates; the unemployment, consumer prices and salaries were only differentiated as far as they were expressed in indices and the discount rate was not transformed. We have included eight lags having in mind the critic of Hamilton & Herrera (2001), in which they point out that the size of the effect that may be attributed to oil is dependent upon the lag length choice and decided to consider at least a lag of two years. The Granger causality tests have been computed as Wald exclusion test. We have also computed the Cholesky orthogonalized impulse - response effect accumulated in ten quarters in order to evaluate the direction of the total effect.

In the period studied, Spanish monetary policy underwent drastic changes not only in terms of its final goal, but also in intermediate targets and policy instruments. In the 1970s and up to 1983 the Bank of Spain followed money supply (M3) intermediate targets. In 1984 it was replaced by the Liquid Assets held by the Public and, afterwards, adopted a monetary policy converging to nominal GDP targets. Finally, in 1995 this was replaced by a strategy of direct inflation control. With regards to the instruments of monetary policy, the Bank of Spain targeted the volume of the Bank System Cash Assets up to the mid-1980s, and after financial liberalisation, this was replaced by controls over short-run interest rates. In spite of all this, we have adopted the discount rate as the variable representing monetary policy because of the comparability, in a period of profound institutional changes, and the availability of data.

In table 2, we observe that oil prices severely impacted the economy in the 1970´s and early 1980´s and to a lesser extent in the period from then to the present crisis. The first of these facts has often been verified in most of the aforementioned papers, but in none of them has been still found empirically so clearly the negative impact of oil prices (without any transformation) upon economic activity in the recent economic crisis. Another relevant fact is that since the accession of Spain to the EU, monetary authorities have implemented their policy influenced by the behaviour of oil prices.

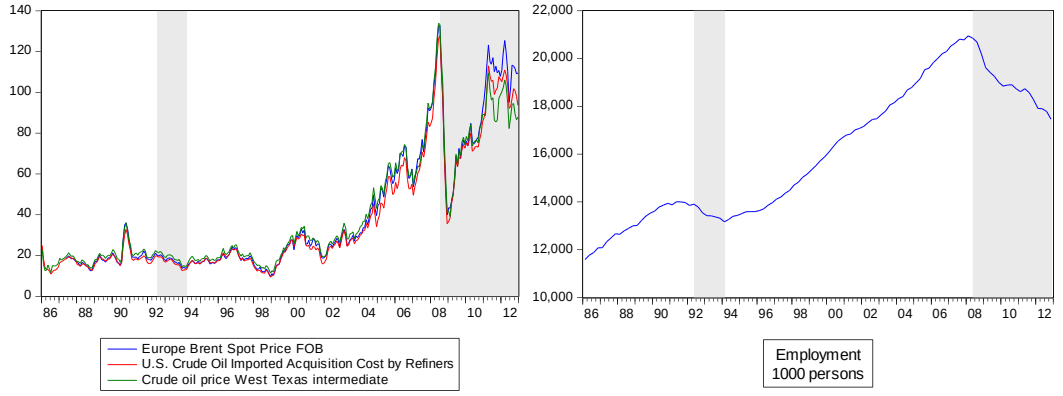
Table 2. Bi-variate VAR Granger Causality/Block Exogeneity Wald Tests (8 lags)

		Excluded variable: DLOG(OILPRICE)	
Sample	Dependent variable	Chi-sq (8 df)	Impulse-response effect accumulated in ten quarters
1972Q2 1985Q4	DLOG(GDP)	24.43710*	-0.004468
	D(U)	3.121537	0.284748
	D(IPC05)	5.140128	0.005369
	D(W)	2.964752	0.177591
	r	1.002459	-3.792322
1986Q1 2013Q1	DLOG(GDP)	18.76009**	-0.001326
	D(U)	10.40635	0.186258
	D(IPC05)	6.657032	0.148282
	D(W)	2.407396	0.037342
	r	16.21863*	1.024792
Level of significance: * 1%, ** 5%, ***10%			

Source: own elaboration

Next figure represents the evolution of oil prices, where we can observe the high correlation among Brent and West Texas spot prices and US crude oil acquisition costs, and employment in Spain.

Figure 3. Oil prices and employment (shadow areas represent recessions in Spain 1986-2012)



Source: EIA and Eurostat NAMQ

There are two remarkable facts in the graphs above:

1. Both crisis were anticipated by a sharp increase in oil prices,
2. From 1994 to 2008, employment and oil prices increased simultaneously.

The later fact is the reason why it was not possible to find a negative relationship between oil prices and economic growth in Spain applying Granger causality tests until 2008 financial crisis and it serves as an explanation about why this relationship is empirically less significative than before.

The presence of asymmetries in the economic impact of oil prices has also been broadly recognized from seminal papers: oil prices rises and decreases have not the same effect on economic activity. That is the reason why in many papers it has been used as explanatory variable a transformation of the oil prices, i.e. the rate of growth of oil prices [dlog(oilprices)] when it was positive and 0, otherwise.

The following table has been made taken into account the hypothesis of asymmetry, and offers quite surprising results. Nothing has changed in relation to the first period of study. Nevertheless, impulse response accumulated effect in ten quarters of an oil price rise is approximately equal in both periods and the effect on unemployment has increased in significance in the second period (probability = 0.0639). Finally, discount rate has ceased of been caused by oil prices which can be explained by the fact that oil prices decreases have been accompanied by a more relaxed monetary policy, i.e. discount rate has decreased when oil prices diminished, but not increased symmetrically when oil prices rose.

The way in which oil prices affect the economy has evolved through time. On the one hand, monetary policy has been more deeply dependent on the effects of oil price and also economic agents have become more conscious of its impact. On the other hand, the evolution of oil prices has recently become more closely related to the world demand of oil than to exogenous disruptions in oil supplies, as we have seen in section I.

Table 3. Bi-variate VAR Granger Causality/Block Exogeneity Wald Tests (8 lags)

		Excluded variable: DLOG(OILPRICE) when > 0, 0 otherwise	
Sample	Dependent variable	Chi-sq (8 df)	Impulse-response effect accumulated in ten quarters
1972Q2 1985Q4	DLOG(GDP)	24.40772*	-0.002949
	D(U)	2.009013	0.236497
	D(IPC05)	3.559926	0.010379
	D(W)	2.243180	0.138133
	r	0.617933	-2.256541
1986Q1 2013Q1	DLOG(GDP)	15.84068**	-0.002401
	D(U)	14.76599***	0.412866
	D(IPC05)	6.029540	-0.037706
	D(W)	3.008998	0.176015
	r	6.316928	0.414104
Level of significance: * 1%, ** 5%, ***10%			

Source: Own elaboration

Table 4, presented below, is devoted to undercover the transmission mechanism through which monetary policy has affected the economy in the periods considered. Discount rate has responded to inflation (consumer prices and salaries) in both, in the first one with more intensity and in the second one mostly when oil prices rose.

Table 4. Bi-variate VAR Granger Causality/Block Exogeneity Wald Tests (8 lags)

Sample	Dependent variable: r		When DLOG(OILPRICE) > 0		Excluded variable
	Chi-sq (8 df)	Impulse-response effect accumulated in ten quarters	Chi-sq (8 df)	Impulse-response effect accumulated in ten quarters	
1972Q2 1985Q4	12.78701	-6.628670	4.377178	-8.999422	DLOG(GDP)
	6.655229	5.607950	26.28374*	-301.8025	D(U)
	38.43030*	7.156796*	144.7727*	-12.58236	D(IPC05)
	11.23983	4.919456**	246.9207	0.891151	D(W)
1986Q1 2013Q1	11.19304	1.602395	4.048010	1.239656	DLOG(GDP)
	7.276097	-2.625431	4.598484	0.496254	D(U)
	8.838602	2.846280	18.12754**	3.423604**	D(IPC05)
	17.19541**	2.935957**	23.35634*	3.343167**	D(W)
Level of significance: * 1%, ** 5%, ***10%					

It is outstanding the reaction of monetary policy to unemployment, and the inverse correlation with the growth of consumer prices, in the former period (although this point must be seen with caution due to the shortage of available observations).

In fact, in the recent period monetary policy has been much more restrictive as far as discount rate increased when oil prices rose in order to maintain prices and salaries under control, this latter conclusion is confirmed with 12 lags (probability: 31.00151* and impulse-response: 3.411535*) and 16 lags (probability: 41.37391* and impulse-response: 3.123554*). Therefore, although monetary policy did not followed oil prices when they rose, it has pursued the evolution of consumer prices when oil prices increased.

The way in which oil prices affect the economy has evolved through time. On the one hand, monetary policy has been more deeply dependent on the effects of oil price and also economic agents have become more conscious of its impact. On the other hand, the evolution of oil prices has recently become more closely related to the world demand of oil than to exogenous disruptions in oil supplies, as we have seen in section I.

The inverse causality, i.e. the consequences of alterations in the discount rate over production, employment, prices and salaries, is presented in Table 5. We have looked for the effects of monetary policy along several time spans, reporting the most relevant facts after 2, 3 and 4 years.

Table 5. Bi-variate VAR Granger Causality/Block Exogeneity Wald Tests (4, 8 and 12 lags)

					Excluded variable: r		
Sample	Dependent variable	Chi-sq			Impulse-response effect accumulated in ten quarters		
		(8 df)	(12 df)	(16 df)	(8 df)	(12 df)	(16 df)
1972 Q2 1985 Q4	DLOG(GDP)	5.2573	11.690	35.962*	0.0190	-0.0029	0.0035
	D(U)	8.6544	12.949	26.785**	0.4558	0.1951	0.2665
	D(IPC05)	5.3242	18.711***	30.375**	-0.0407	-0.1657	-0.4896***
	D(W)	21.304*	59.301*	143.71*	-0.3712**	-0.4197**	-0.3667**
1986 Q1 2013 Q1	DLOG(GDP)	10.069	13.942	42.751*	0.0038	-3.09E-05	-0.0085**
	D(U)	6.2582	9.2376	15.273	0.4365	0.5126	0.8789**
	D(IPC05)	4.9347	6.0390	10.324	0.0648	0.0193	0.0532
	D(W)	14.159***	14.357	16.602	-0.0149	0.1936	0.1379
Level of significance: * 1%, ** 5%, ***10%							

Source: Own elaboration

Table 6. Bi-variate VAR Granger Causality/Block Exogeneity Wald Tests (4, 8 and 12 lags) when DLOG(OILPRICE)>0

		Excluded variable: r					
Sample	Dependent variable	Chi-sq			Impulse-response effect accumulated in ten quarters		
		(8 df)	(12 df)	(16 df)	(8 df)	(12 df)	(16 df)
1986Q1 2013Q1	DLOG(GDP)	17.827**	23.522**	56.146*	0.0011	-0.0031	-0.0047
	D(U)	12.697	33.521*	40.445*	0.4550*	0.8338*	0.763*
	D(IPC05)	5.0537	10.302	14.709	0.1338	0.2292	0.3637
	D(W)	20.851*	22.311**	46.170*	0.0899	0.0984	-0.0899
Level of significance: * 1%, ** 5%, ***10%							

In the period after the accession to the EU, the effect of the discount rate over prices and salaries was more blurred, probably reflecting the opposite causality which was

previously tested. However, the effect of official interest rate over the real part of the economy - output and employment - is reinforced, especially when oil prices rose. Unemployment was significantly affected for the discount rate when oil prices increased, as can be observed in the table below.

In the first period, discount rate has impacted on inflation. The significance of this effect was high for 12 lags, and even more for 16 lags, in the case of prices, and it was also high for 8, 12 or 16 lags in the case of salaries. The accumulated impulse - response after ten quarters of an increase in the discount rate was always negative over the rate of growth of prices and salaries. The effects over the GDP and unemployment growth were only significative with 16 lags and the accumulated impulse-response effect had the expected sign although it was not significative.

4. Main conclusions.

It has been widely assumed that economic crisis in the seventies were caused by a sudden loss of income related to the huge increase in the cost of energy. However, many researchers maintained that since then, economic crisis in Spain have always been caused by the weaknesses of the international trade position of the country. This reason, which may be an explanation for Spanish domestic crisis, cannot explain international crisis, many of which have affected to Spain as did to other countries.

We have shown that the evolution of oil prices directly affected the real part of the Spanish economy in the period from 1986 to the present, almost with the same intensity than previously if we only took into account the time when the oil prices rose. Furthermore, monetary policy also followed oil prices rises in this period and had an additional negative impact on production and employment.

Therefore, we can conclude, as many other authors have made before, that oil prices shocks were responsible of 1970´s world crisis. However, although with the lessons obtained from that experience it was thought, even for some prestigious economists, that economic crisis have been eradicated, the financial crisis of 2008 has lead us again to the reality. Oil price shocks have influenced the present economic downturn in Spain, and probably with the same intensity than before.

In this paper, we addressed the new situation of the crude oil market and made a brief evaluation of its influence in the Spanish economy. These are the main conclusions that we obtained:

1. In last decades, crude oil market has been deeply dependent of the evolution of demand from emerging countries. Variance decomposition shows that a high percentage of the error of prediction of oil prices growth rate is explained by demand shocks (ordinary and precautionary) and at a lesser extent of oil production, geopolitical disruptions and the policy of quotas of the OPEC.

2. As it has been widely proved oil prices severely impacted the economy in the 1970´s and early 1980´s. However, we have also concluded that oil prices have had a significative influence in the present economic downturn.

3. Taking into account the asymmetry between the effects of oil prices increases and decreases, the effect of an oil price rise was approximately equal in both periods and the

effect on unemployment has increased in significance in the second one.

4. It is also noticeable that since the accession to the EU, monetary authorities in Spain have implemented their policy influenced by the behaviour of oil prices. Discount rate has decreased when oil prices diminished, although they have not increased symmetrically when oil prices rose.

5. In fact, in the recent period, when rate of growth of oil prices rose, monetary policy has responded more actively in order to maintain prices and salaries under control.

6. In the seventies, discount rate has had an important impact on inflation. The significance of this effect was high for prices and salaries. However, the effects over the GDP and unemployment growth were blurred.

7. In the period after the accession to the EU, the effect of the discount rate over prices and salaries was ambiguous, probably reflecting the opposite causality. However, the effect of official interest rate over the real part of the economy - output and employment - was reinforced, especially when the rate of growth of oil prices rose.

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APPENDIX

OIL MARKET VAR MODEL VARIABLE LIST	
DUPE	Dummy variable for geopolitical events, its value is 1 for the invasion of Kuwait (1990q3, 1990q4,1991q1) and the September 11th attacks in New York (2001q3, 2001q4)
IND05	Index of crude oil demand (2005 = 100). The summation of each country GDP in millions of 2005 Euros weighted with its share in total crude oil consumption. Own elaboration from Eurostat, UN national accounts and Energy Information Administration - EIA - U.S. Government.
QOIL	Total Oil Supply. Energy Information Administration - EIA - U.S. Government. Thousand Barrels Per Day
OPEC	OPEC crude oil production allocations. OPEC Annual Statistical Bulletin 2012 Thousands Barrels Per Day
OILST	Total petroleum stocks (Government-Controlled & Industry), end of the period. Energy Information Administration - EIA - U.S. Government. Millions of barrels
BRENT	Europe Brent Spot Price FOB. Energy Information Administration - EIA - U.S. Government. (Dollars Per Barrel)
SPANISH ECONOMY VARIABLE LIST	
OILPRICE	Spot Oil Price: West Texas Intermediate. Wall Street Journal (F.R. Bank of St. Louis). (Dollars Per Barrel)
GDP	GDP Spain. INE. CTRE Several bases. Million of 2005 Euros
U	Unemployment rate. INE. Encuesta de población activa. Percentage
IPC	Indice de Precios al Consumo, INE. Index base 2005 = 100
W	Unit Labour Costs. Index base 2005 = 100. Index OECD base year (2005=100), trend-cycle.
r	Interest Rates. Discount Rate for Spain until 1999 and for the Euro Area afterwards. Federal Reserve Bank of St. Louis database. Percent per Annum, Not Seasonally Adjusted