1. Macro-prudential policy versus asset price bubbles in monetary union member states – The case of Spain

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The paper considers the ability of macro-prudential instruments – top-down regulations applied on the financial system as a whole, aimed at slowing credit growth and decreasing systemic risk – to flatten a growing asset price bubble in a country not having independent monetary policy. This is problem is analyzed from the perspective of Spain – a eurozone member state, for which the common monetary policy turned out to be expansionary, and which introduced a macro-prudential tool, dynamic provisioning, in the previous decade. The paper analyses the factors that influenced the emergence of the bubble of the Spanish real estate market in the previous decade. It takes into account demand and supply factors, as well as discusses the ECB's monetary policy in the context of Spain. Finally, it provides an overview of dynamic provisioning, the Spanish macro-prudential tool.

Keywords: Dynamic provisioning, macroprudential tools, monetary union

1. Introduction

Towards the end of the first decade of the XXI century, Spain, just like many countries around the world went through a severe financial crisis, preceded by a bubble on the real estate market and turmoil on the credit market. The nominal interest rates on new mortgage loans reached as low levels as 3-4% in the years 2003-5, which represented a radical decline from about 15% in early 1990, while the average maturity of mortgage loans in Spain increased from 10 to 28 years between 1990 and 2007 (Garcia-Herrero–de Lis 2008, Garriga 2010). The property prices multiplied by over 2 from the mid-1990s to 2004 and by 3 in the period 1995-2007. These multipliers for the whole euro area altogether are significantly lower: 1.5 and 1.8, respectively – the increase in property prices in Spain was significantly higher than, for example, in the United States.[1] In fact, the cumulative growth of house prices in

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[1] As Garriga (2010) puts it, the housing boom in Spain makes the boom in the United States appear small.

Spain was among the highest in the OECD (Garriga 2010, Salmon 2010). As research shows (Fernandez-Kranz–Hon 2006, Caruana 2005), property prices' increase in Spain was far beyond the long-term equilibrium, which makes it fulfil the criteria for a bubble (Kim–Suh 1993, Gallin 2003).

Figure 1. House prices in Spain, the United Kingdom, and the euro area, 1995=100[2]
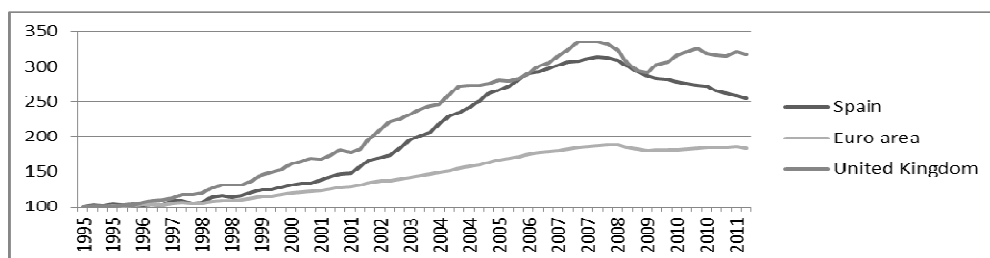
Source: ECB, UK National Statistics

Looking at the severance of the bubble in Spain, it seems necessary to pose a question: what specific factors on the supply, demand, and policy side might have contributed to the situation?

2. Monetary policy

The European Monetary Union has always consisted of separate, independent states, with a different level of development. According to numerous studies from the late 90's. (Flaig–Wollmersgaeuser 2007), mobility of labour in the countries about to form the Eurozone was low, real wages – rigid downward, shocks – distributed asymmetrically among countries, inflation – varied[3], to a level not explainable by

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[2] 1995 was chosen as the starting date of the chart because reference to house prices in 1995 is the most common in literature.

[3] For those reasons, EMU creation was a controversial concept from the economics' perspective since its beginnings. As argued by many, for example Charles Wyplosz (2006), it was led by the political need, rather than well grounded in economic research. The whole process of eurozone creation, traced back by Bień (1988) as far back as to the Treaty of Rome signed in 1957, rested on Germany's willingness to give up the Deutsche Mark (Wyplosz 2006) and, consequently, was strongly influenced by particular political interests at each stage (Bień 1998). On one hand, it can be argued that that the optimal currency area theory was not entirely operational at the time of eurozone creation, and varied creation criteria were favoured by different researchers (e.g. mobility of capital and labour emphasized by Mundell (1961), strong trade within OCA favoured by McKinnon (1963), diversification of the region's economy emphasized by Kenen (1969). However, as argued by Wyplosz (2006), economic

the Balassa-Samuelson effect.[4] These reasons posed significant risks to the introduction of a single monetary policy regime: as suggested by Balcerowicz (2012) it could turn out to be inadequate to a country's fundamentals, either periodically ("temporal aspect", important for countries with business cycles imperfectly synchronized with the "average" business cycle of the euro zone to which the European Central Bank's rate correspond[5]) or structurally ("structural aspect", in countries with a different natural interest rate level[6]). There is broad empirical research which focuses on differences between the ECB's monetary policy and optimal monetary policy from the perspective of respective countries.

One of econometric analyses of inadequacy of the European Central Bank's monetary policy to the needs of euro zone countries is presented in a paper by Flaig and Wollmersgaeuser (2007). As a measure of divergence tendencies in the euro zone they used the stress (Clarida et al. 1998) – difference between the Eurozone's short-term interest rate and the interest rate that would be adopted by each country if it followed the "optimal monetary policy", approximated by its central bank's policy in the pre-euro era. They found that in the case of Germany the stress indicator remained close to zero during the whole period (which implies that the ECB continued the policy of the German Bundesbank for the whole euro area[7]). At the same time, for most euro zone countries interest rates were too low in the period of 1999-2005 by 1-2 percentage points. The ECB monetary policy was especially expansionary for Greece, Spain, Italy, France, and Ireland before 2003 (Figure 2).

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logic was clearly given lower priority than political reasons in this process, as the basic criteria of OCA creation that most researches agree upon, such as strong mobility of production factors and same inflation and output growth rates (Bień 1998, p. 164.), were not fulfilled.

[4] Significant differences in inflation among EU countries could only partially be explained by the Balassa-Samuelson effect (Balassa 1964, Samuelson 1964), that is the process of real convergence of lower income countries within the currency area (significant productivity growth in the tradable sector of these countries translating into higher real wages in both tradable and non-tradable sectors and consequent higher inflation). Recent empirical evidence suggests that the Balassa-Samuelson effect does not suffice as an explanation of persistent inflation in the EMU (Rogers 2007).

[5] There was no wide consensus regarding whether national business cycles would become more synchronized after the union creation (intensification of international trade could synchronize economic activities, so optimality of a currency area could emerge after a monetary union launch in countries that did not form one ex ante; Frankel–Rose 1998) or less synchronized due to higher specialization in the union and impact of sector specific shocks (Krugman 1993).

[6] Wicksell's (1936) concept of an interest rate compatible with output being at its potential and stationary growth.

[7] It is worth to note that this fact can be partly justified by Germany's contribution to the euro area's economy: Germany's GDP has ranged between 28% and 33% of euro area's GDP (calculations based on Eurostat's data).

*Figure 2.* Country-specific stress for Eurozone member countries, 1999-2005
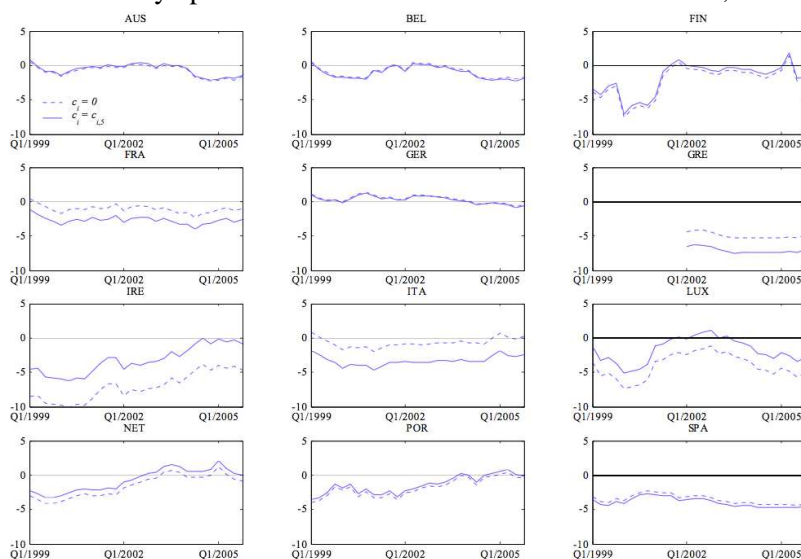
Source: Flaig and Wollmersgaeuser (2007)

A similar analysis devoted exclusively to Spain was performed by Arghyrou and Gadea (2008, Figure 3). They modelled Spanish monetary policy before the euro-accession (1980-1998), then forecasted the interest rates which the Bank of Spain would have set after 1999 if it had been independent, and finally used the differences between the forecast and actual ECB rates as a measure of compatibility between the single monetary policy regime and fundamentals of the Spanish economy. They found that after 1999 the Bank of Spain would have set nominal interest rates twice as high as those set by the European Central Bank.

Arghyrou (2008) published a similar analysis devoted to Greece and found that the ECB's monetary policy also seemed too loose (and "incompatible with the Greek economic conditions"). Hayo and Hofmann's (2006) research suggests that German interest rates would have been similar to those of the ECB under a hypothetical Bundesbank regime after 1999.

Similar conclusions to those mentioned above can be drawn from a comparison of the ECB monetary policy with the level of interest rates suggested for each euro-zone country by the Taylor rule. Caruana (2005) analysed the period of 2004-2005 and found that the ECB's monetary policy was then expansionary for Spain and Greece (Figure 4).

Figure 3. Comparison between nominal interest rate set by the ECB and three models of the Bank of Spain's rate

(a)

(b)
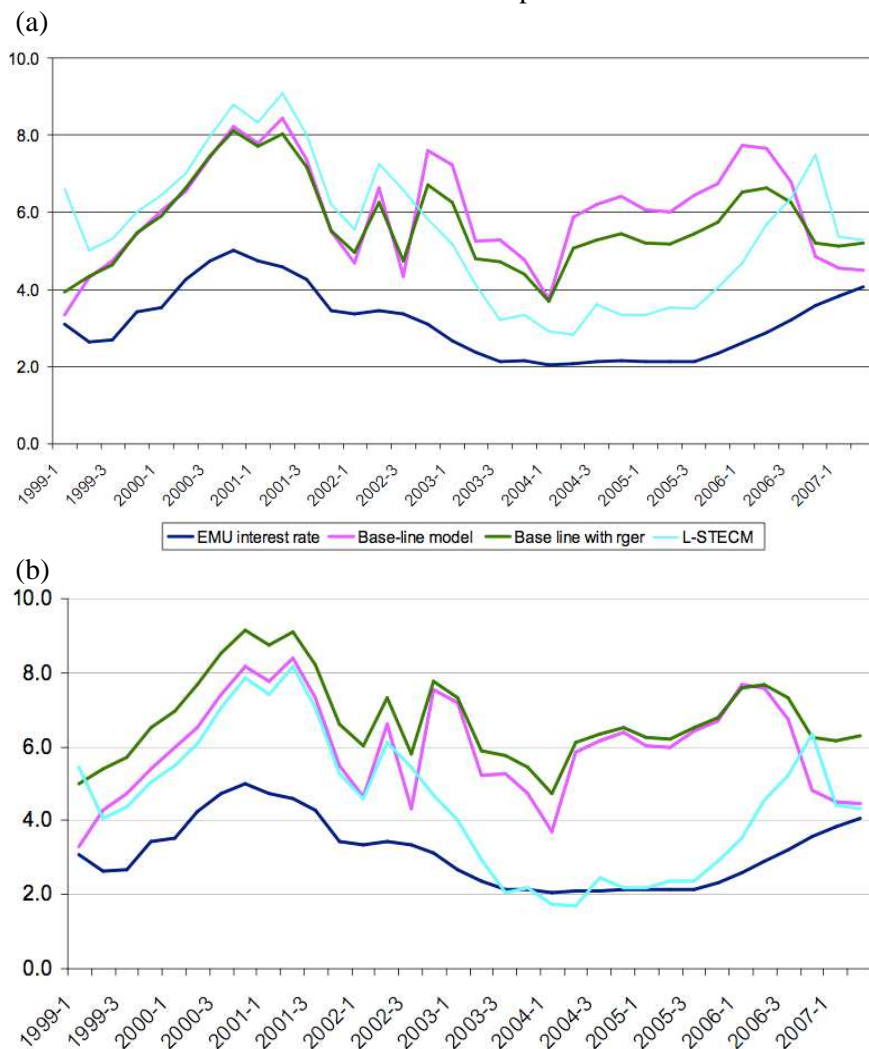
Note: If it had remained autonomous and continued its policy from the period 1980-1998. Two variants: panel (a) not taking into account credibility gains caused by euro zone accession (b) with those included in the model

Source: Arghyrou and Gadea (2008)

Figure 4. Deviations of interest rates in the Eurozone from the Taylor rule in 2004-2005. Weights of 1.5 (inflation's deviation from target) and 0.5 (output gap), natural interest rate of 2%, inflation target of 2%, inflation index excluding energy and unprocessed foods
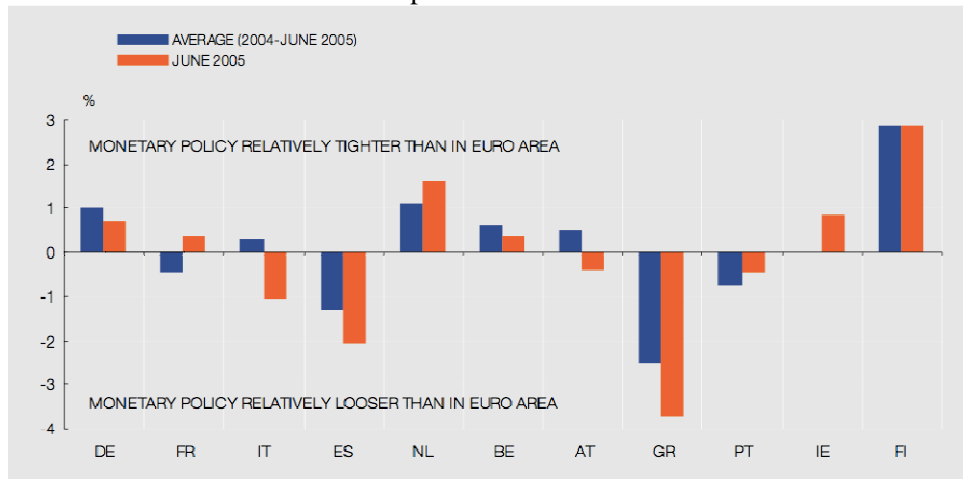
Source: Caruana (2005)

Clearly, therefore, Spain seems to be an example of incompatibility between the single monetary policy regime and a country's macroeconomic fundamentals: from Spain's perspective, the ECB's monetary policy was expansionary. As argued in Karaś (2013) and demonstrated by a number of empirical analyses (e.g. Jarociński–Smets 2008, Taylor 2010, Ahrend et al. 2008), loose monetary policy can contribute to the emergence of an asset price bubble, for example a bubble on a real estate market.

3. Demand factors on the Spanish property market

The factors that drove the demand on the Spanish real estate market in the previous decade can be broadly classified according to two dimensions: the first division separates fundamental demand factors from those related to the ease of financing housing, while the second one separates policy from non-policy factors.

Purely demand, non-policy factors include demography, immigration, and culture. Spain is a high owner-occupation, low private rental country: only about

13% houses in Spain are privately rented[8] (Maclennan 2000). It experienced a giant inflow of immigrants in the last decade: the significant increase in population (over 15% of growth between 2000 and 2011) was largely due to immigration. The net migration in Spain in the period 2002-2007 amounted to 87-102% of total population growth each year, with Eastern Europe, Latin America and North Africa being the most important contributors (Garriga 2010). The share of the foreign-born population in Spain was as of 2011 as high as 14%. The significant growth in population certainly increased demand on the property market, but also affected the supply side (see later).

*Figure 5.* Net migration in Spain as a percentage of total population growth, 2002-2010
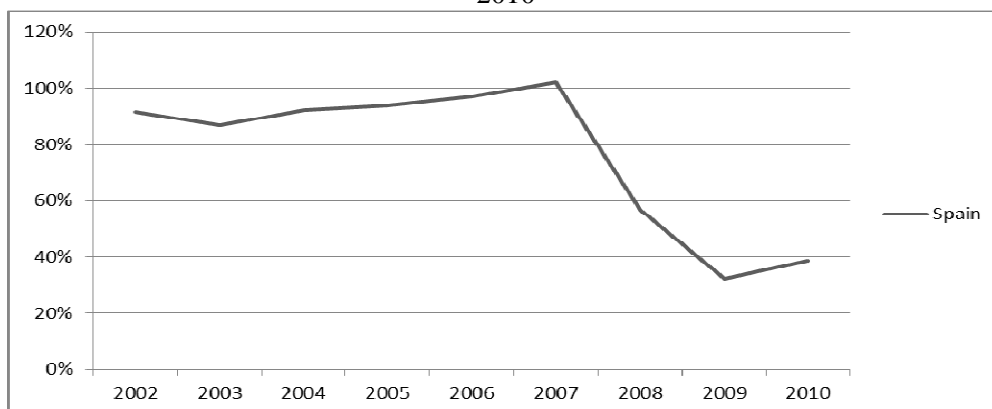
Source: Eurostat

It is worth noting that the inflow of immigrants to Spain was not only driven by the general economic growth of this country, which made it attractive for job-seekers from abroad. An important factor was also the growth of popularity of holiday houses – due to the Mediterranean climate – especially among foreigners, such as retired citizens of the UK and Northern Europe. It can be argued that this way – due to the less favourable climate of the United Kingdom – this country contributed to the Spanish real estate boom (Muellbauer 2007). Holiday homes were also popular among Spanish citizens, simultaneously because of the atmosphere of prosperity in Spain (Garriga 2010) and a wish to compensate for high density apartment living in cities (Salmon 2010).

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[8] According to Maclennan et al. (2000), those countries owe it to their social democratic heritage.

Figure 6. Immigration and emigration for Spain in absolute numbers, 2002-2010
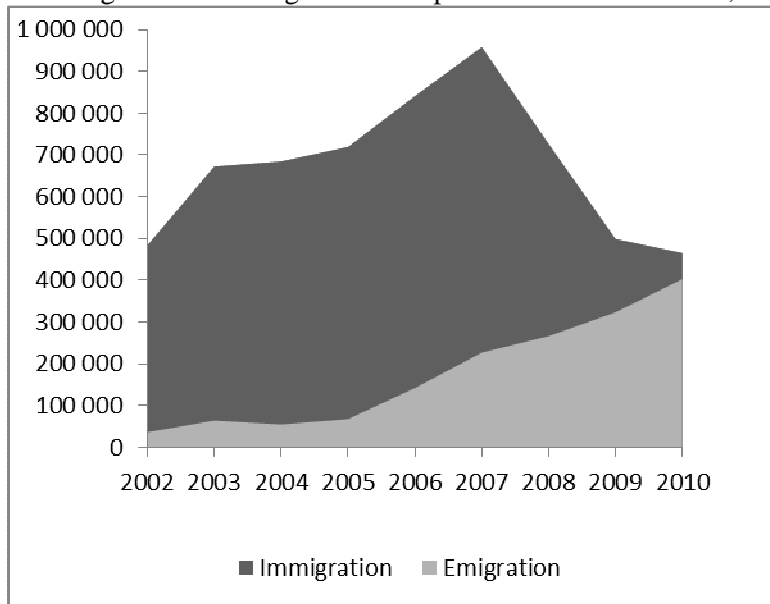
Two more issues related to demography are worth noting. Firstly, Spain – unlike many other countries, e.g. Britain – experienced a baby boom in the 70's. (Figure 7, Caruana 2005, Garcia-Herrero–de Lis 2008), and that generation grew up and started to move out of their parents' homes in the last decade. Secondly, Spanish families' are known for their traditional preference for home ownership (Caruana 2005).

Based on the analysis above it seems that pure demand factors driving the boom, such as demography and immigration, were relatively strong in Spain.

The second group of factors, purely demand policy-related factors, include fiscal policy related to housing. Intuitively, countries where tax treatment favours owner-occupied housing over tenant-occupied (for example tax credits from which, naturally, only house owners can benefit) seem to have a larger proportion of citizens in owner-occupied housing (Garriga 2010).[9] An example if such a country

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[9] Such policy's fairness is disputable, as renters usually are the young and poor households. This is why Beynet et al. (2011) suggest replacing subsidizing ownership with targeted cash-transfers as a housing support for low-income households, especially that then demographic characteristics of the household could be taken into account.

clearly is Spain, which offered its inhabitants tax credits available for 15% of amortization and interest payments on mortgage debt, subject to an annual maximum. By strengthening the incentives of owning property, such a policy seems to have contributed to the boom on the Spanish market: a model by Lopez-Garcia (2004) predicts home prices lower by between 11% and 21%[10] had housing subsidies, implicit in the personal income tax, eliminated.

      The increased popularity of owning real estate among households would not have created the boom without an adequate response from the banking sector. This is why the next issues driving the boom on the real estate market relate to the easy access to financing which Spanish society enjoyed in the previous decade.

*Figure 7.* Total fertility rate in Spain and the UK 1973-2009
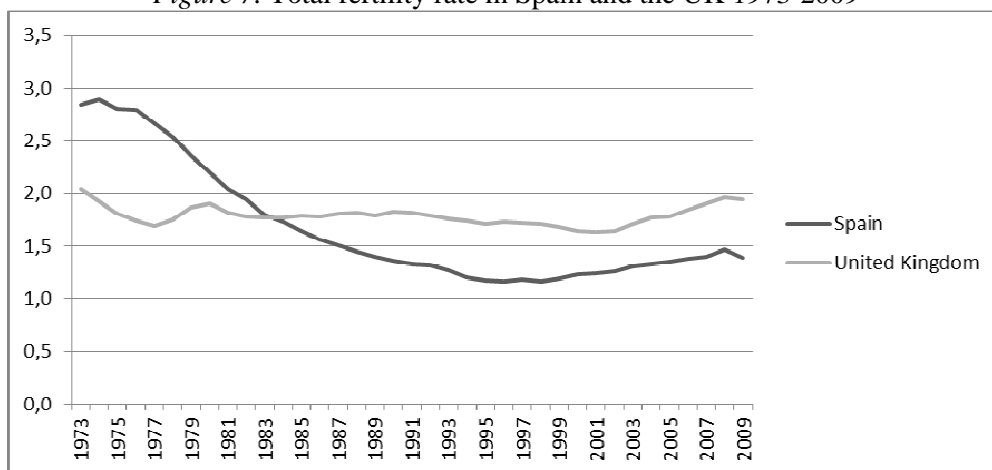
      The first group are policy-related factors related to the ease of receiving credit. The first factor here is the low central banks' interest rate, which has already been mentioned previously. The EMU accession increased the credibility of Spain and other peripheral economies, brought a consequent fall in the country risk premia (spreads between government bond yields of euro area countries narrowed to very low levels; Bini Smaghi 2011) and a sharp decline of real interest rates, which remained below 0 most of the time between 1999 and 2007 (Figures 8 and 9).

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[10] Those numbers come from the version of the model with exogenous land prices. If land prices had also been estimated by the model, the difference would have been higher.

Figure 8. Policy rates set by the ECB in the period 1999-2012
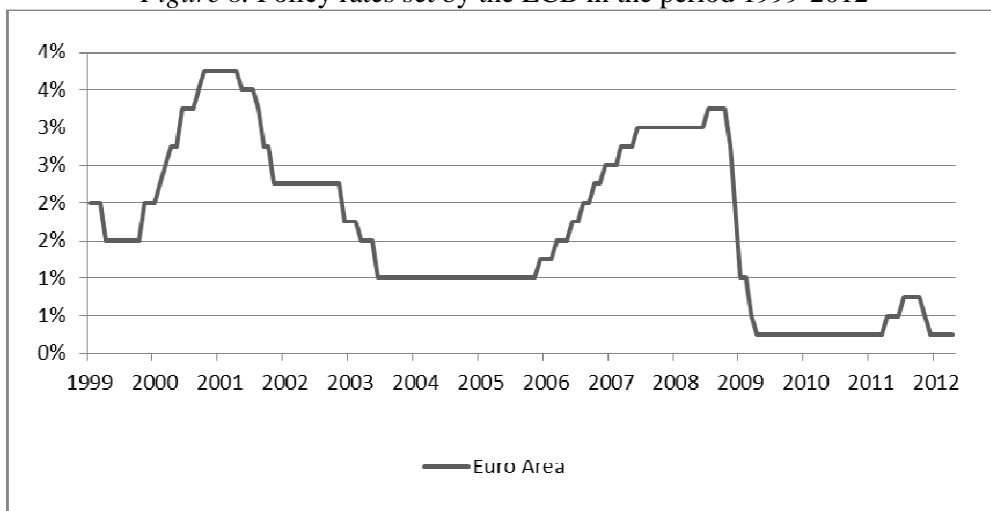
Figure 9. Ex-post real interest rates in Spain

The general confidence in the future deepening of the EU single market, as well as in structural reforms to be adopted in peripheral countries, brought the expectation that their competitiveness and GDP growth should increase. This belief was shared by the financial markets, companies, and households. Financial markets were eager to lend to corporates and companies were eager to borrow, both groups

expecting high ROI. Households were interested in both increased consumption and housing loans, aiming for an increase in their living standards and believing in the appreciation of houses in the future (McQuinn–O'Reilly 2007). Those mechanisms led to a general boom in the Spanish economy. At the same time, the increased credibility of Spain and low short-term interest rates made it easy for banks to obtain financing on wholesale money markets.

Figure 10. Inflation (HICP) in Spain
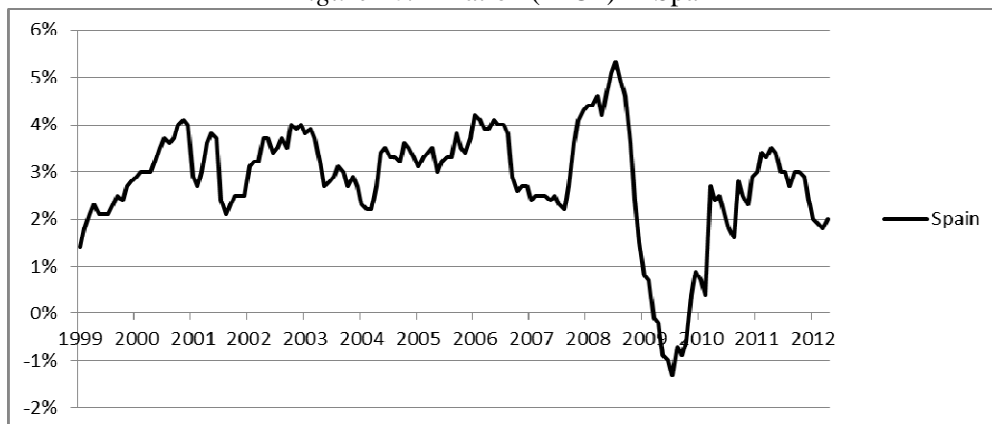
Another factor are the developments of the market of credit instruments themselves. In Spain, no significant number of subprime loans was advanced (Salmon, 2010), and securitization was relatively limited there. The main reason for that was the conservative regulation of banks – ever since 2004, asset-backed securities transferred to SPV de facto still remained on their owners' balance sheets as only the consolidated balance sheets were assessed by supervisors. However, the vast majority (over 80%) of Spanish homeowners used adjustable rate mortgages (ARMs) to finance the purchase of a house[11], which made it easier to transfer the interest rate risk on customers (Figure 11).

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[11] 98% according to Garcia-Herrero and de Lis (2008).

Figure 11. Mortgage product interest variability
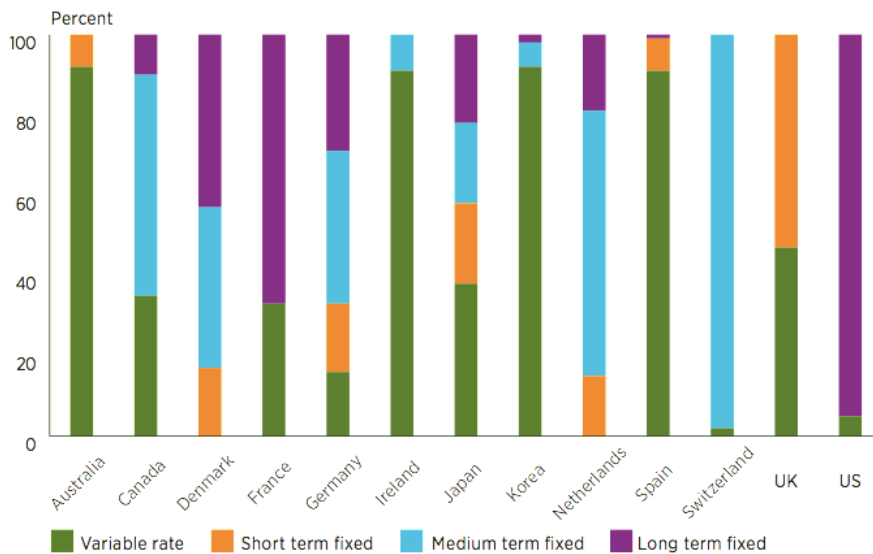
Source: Lea (2010)

A factor affecting the boom which differentiates Spain from a number of different countries is the fact, that – having noticed the lending boom – the Bank of Spain introduced in 2000 the dynamic provisioning system which in practice penalized credit growth and could today be called a macro-prudential tool. It was adopted despite strong criticism from the Spanish banks who described it as worsening their position against foreign competitors (Garcia-Herrero–de Lis 2008). The two objectives of dynamic provisions were (Fernandez de Lis–Garcia-Herrero 2010):

-   to slow down the credit growth by increasing the cost (in terms of provisioning effort) of granting new loans;
-   to protect Spanish banks from future losses which are a natural consequence of the relaxation of lending standards during a boom.

The provisioning system after 2000 was to be based on three types of provisions: specific and generic (both existed before) and statistical (the new component). The first kind depended on current bad loans, the second was equal to 1% of the credit stock, and the third depended on credit growth and was designed to offset specific provisions (pro-cyclical since there are few non-performing loans during a boom; Fernandez de Lis–Garcia-Herrero 2010).

In the new provisioning system, bank assets were classified according to risk categories and assigned parameters, with a standard (with parameters ranking from 0% for public sector debt to 1.5% for credit card lending and current account overdrafts) or internally-developed method (subject to supervisory evaluation). Statistical provisions were then charged on a quarterly basis. They could be either positive or negative, depending on credit growth (with a positive coefficient) and contemporary bad loans (with a negative coefficient). Accumulated statistical provisions generated a fund, with an upper limit of 3 times the adequate coefficient times the exposure (Garcia-Herrero–de Lis 2008).

What is interesting to note is that the dynamic provisioning system was changed in 2004 – for a couple of reasons. The first one was the criticism from standard-setters of international accounting rules. They argued statistic provision was against the "fair value" principles of International Financial Reporting Standards and allowed profit smoothing along the cycle, masking the real situation of the banks. The second one was the significant increase of the sum of statistical provisions as the boom continued. Total provisions reached 2.5% of credit (with specific provisions reaching only 0.5% of credit), and the coverage of provisions over bad debt reached nearly 500% (Fernandez de Lis–Garcia-Herrero 2010). Those numbers were widely considered as too high, especially by the banks which again argued that the statistical provisions posed a disadvantage against competitors from abroad (Garcia-Herrero–de Lis 2008, Fernandez de Lis–Garcia-Herrero 2010).

The Bank of Spain responded to these arguments by merging statistic provisions with the generic provisions. The new generic provisions were counted using the following formula:

generic provision = α Δ credit + β credit – specific provision

where α and β values are presented in the Table 2. The upper limit of the Fund of the new generic provisions was reduced to between 0.33 and 1.25 times α times the exposure (Garcia-Herrero–de Lis 2008).

After the reform (especially as a consequence of the change of the upper limit of provisions) the ratio of provisions to credit decreased, from 2.5% in 2004 to 2.2% in 2007.

It is interesting to note that after the introduction of dynamic provisioning in 2000 the growth of credit stabilized around 15%, and then slightly decreased, which might have been – at least to a certain extent – due to both the provisions and the burst of the dot-com bubble. However, after 2004 – which coincided with the change in the provisioning system – credit accelerated sharply and reached rates of growth above 25% in 2006 (Figure 12).

Table 2. Coefficients applied to dynamic provisioning after the reform in 2004

Type of risk	α	β
No apparent risk	0%	0%
Low risk	0.6%	0.11%
Low-medium risk	1.5%	0.44%
Medium risk	1.8%	0.65%
Medium-high risk	2%	1.1%
High risk	2.5%	1.64%

Source: Fernandez de Lis–Garcia-Herrero (2010)

Figure 12. GDP growth (in light grey) and credit growth (in dark grey) in Spain, 1991-2009
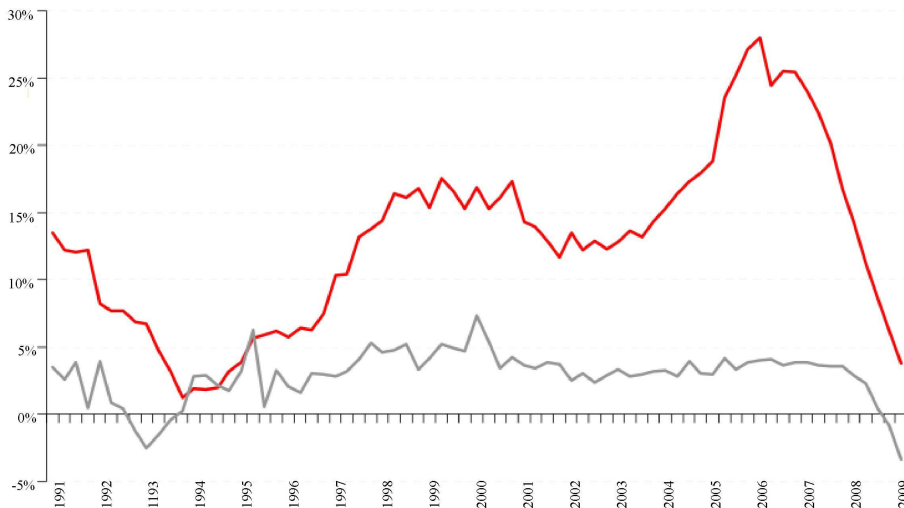
Source: Fernandez de Lis and Garcia-Herrero (2010)

4. Supply's reaction on the Spanish property market

A couple of factors which drove the supply side of the real estate market in Spain should be noted.

The first one was the liberalization of constructible land in 1998 and 2003, which resulted in a 28% increase in the availability of land for construction (Garriga 2010). As before, land which was not zoned for housing could be bought at a fairly

low price. After the liberalization, this land could be easily transformed into constructible land via an administrative process. Already filing the application for the transformation pushed the land prices forward, let alone successful application. This is why it became popular to buy land, apply, and resell it at a substantial profit or develop real estate. This legal opportunity drove land prices[12], and generated profits for land owners, local authorities[13], and corrupted individuals involved in the approval process (Salmon 2010).

The second was the big reservoir of relatively low-cost labour, being both the unemployed (as the level of unemployment in Spain never fell below 8% of the active population; Salmon 2010) and the immigrants, that could be employed by this sector (Garriga 2010). As a result, employment in the construction industry rose from 1.2 million in 1996 (9.2% of the labour force) to 2.7 million (13.3% of the labour force) in 2007. Consequently in 2007 there were almost as many people employed in construction alone (excluding related activities) as there were in the whole industrial sector (Salmon 2010).

It should be emphasized, however, that clearly the Spanish housing boom was demand-driven. Despite the strong reaction on the supply's side, the real estate prices had grown explosively. As a result of increased supply of the two essential production factors, housing supply in Spain was able to grow very fast.

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[12] It might seem that counterintuitive that a liberalization led to a price increase. However, let us consider the following example:
There is a small country with 1000 km^2 of empty land, 500 km^2 constructible and 500 km^2 non-constructible. Constructible land is of higher value because it provides its owner with possibilities of making a high profit, for example via developing a block of flats and selling it. Let us, therefore, assume a price of km^2 of constructible land to be as high as 1000 monetary units, while a km^2 of non-constructible land is worth 200 monetary units. Then the law becomes liberalized and it is possible to transfer non-constructible land into constructible via an administrative process. Some people decide to buy non-constructible land and apply for a change of its properties. In the first round, 100 km^2 is transferred. There is now 600 km^2 of constructible land and 400 km^2 of non-constructible land available. The price of the initial 500 km^2 of constructible land decreases. The price of the left 400 km^2 of non-constructible land increases. The price of the 100 km^2 jumps from 200 units per km^2 to slightly less than 1000 units per km^2. As the two markets (of constructible and non-constructible land) slowly become one, the prices of the first type decrease and of the second type increase until they reach a new equilibrium.
[13] Their sources of income include taxes on property and property development – Property Tax, Tax on Buildings and Building Works, Tax on Increased Urban Land Value. Those together nearly reached 50% of their adjusted income (reduced by transfers and money markets) in 2005.

5. Bust in Spain

Slowdown on the Spanish real estate market started at the beginning of 2007 and intensified after the burst of the asset bubble in the United States in the summer of the same year. Garcia-Herrero and de Lis (2008) mention two important channels of contagion from the US to the rest of the world:
- funding liquidity dry-up and the closure of the wholesale money markets;
- direct exposure to subprime losses (negligible in the case of Spain, where subprime credits were not granted on a large scale and banks had not looked for investment opportunities abroad).

   As a consequence, in February 2007, the number of new house mortgages granted in Spain was down by nearly 4%, in May – by 6%, and in October – by 12%, compared to the previous year. The pace of decline accelerated in 2008, with a 29% drop in May 2008 compared to May 2006, and a 42% decline in October 2008 compared to October 2006. In January 2009, the sum of mortgages granted fell by 58% from the equivalent number in January 2007 – and then stabilized (Salmon 2010, Figure 13).

Figure 13. Number of new urban house mortgages granted, Spain, 2007-2010
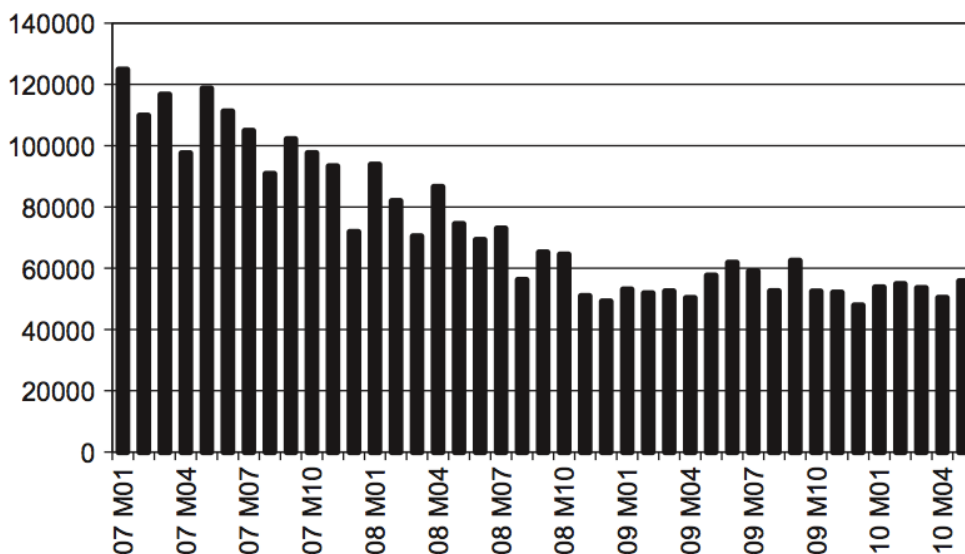
Source: Salmon (2010)

As a consequence of the liquidity crisis, decrease in lending, fall in the value of the banks' assets (both real estate and equity holdings), and increased level of bad debts, the central bank had to intervene to support banks.

In Spain *cajas* ("credit institutions with foundational origins and social objectives" with public representation in their governing bodies; Catalán–Moretti 2006) made up a half of the banking system. As the crisis hit, the Bank of Spain had to support two of them: it provided Caja de Ahorros de Castilla-La Mancha with temporary liquidity support in early 2009 and took into administration the Córdoba based 'CajaSur' in mid-2010. On the other hand, the soundest bank in the EU according to stress tests organized by the Committee of European Banking Supervisors (CEBS, now the European Banking Authority) in July 2010 was the Spanish Banca March (CEBS 2010).

6. Conclusions

The bubble which appeared on the Spanish real estate market in the early 2000s was influenced by a number of factors on the demand (demography, immigration, cultural factors, fiscal policy related to housing, credit market structure and regulations), supply (land regulations, immigration), and monetary policy side. In further research the relative strength of each of the factors should be evaluated in detail. In particular, in the light of discussion on macro-prudential tools introduction in developed economies (in the case of the EU introduced in 2014 by the Capital Requirements Directive IV) it is worth verifying how the dynamic provisioning introduction and reform influenced the market.

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