The timely overestimation of Spanish GDP in the great recession

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The inefficient institutional design of the Euro allowed guaranteed bank liabilities to be converted into government debt, deepening the Great-Recession in Southern European countries. A recessive feedback process occurred through an increase in sovereign debt risk premiums in a cycle of global risk aversion. However, there was one fact that limited these negative effects. We refer to the overestimation of Spanish gross domestic product (GDP) in the public accounts for the period 2007–2013. We quantified the unexplained overestimation of Spain's GDP for the period 2007–2013 using three different methodologies, which leads us to a similar conclusion: Spain's GDP was overestimated by between 17% and 18%. We demonstrate that this overestimation allowed for significant savings in interest payments through a lower risk premium. This overestimation, unknown to investors, shows that markets are not efficient, and that information is incomplete. It is necessary to understand the role of debt under Hyman Minsky financial instability hypothesis.

Key words: Balance Sheet Recession, Euro Crisis, Financial Accounts, Private and Sovereign Debt, System of National Accounts
JEL classifications: E01, E12, E44

1. Introduction

This paper analyses an unknown effect that occurred during the Great Recession in Spain. It deals with the overestimation of public accounts during the period 2007–2013. We quantify the unexplained overestimation of the Spanish gross domestic product (GDP) for the period 2009–2013 using three different methodologies. Each one corresponds to the different approaches used to estimate GDP. The first approach estimates it from the supply side, the second, from the income side and the last, from the demand side. In all three approaches, we come to the same conclusion – that the Spanish GDP was overestimated by 17–18%.

The overestimation of Spanish GDP has given a more positive image of the Spanish economy than the real one, which has led to significant savings in terms of debt interest payments, through a lower risk premium. We have quantified this saving, which amounts to almost 3,000 million Euros annually. But even more important it has probably avoided a default from being activated. One could speak of a timely overestimation

of Spanish GDP. This situation, which benefits both private and sovereign debtors, and that is apparently unknown to investors, is another example that financial markets are not efficient, and that information is incomplete.

However, this overestimation has also other implications. Spain's debt-to-GDP ratio, as well as its fiscal pressure, would be nominally higher today. And this is the paradox: although the overestimation of GDP reduced debt interest payments, due to a lower risk premium, the Spanish economy, without monetary sovereignty, is vulnerable to a change in the European Central Bank (ECB) monetary policy. The overvaluation of Spain's GDP may have delayed the Minsky moment of the Spanish economy. Therefore, some lessons must be drawn from the perspective of economic policy.

We need to understand the context in which the overestimation took place. The origin of the systemic crisis of the Spanish economy during the period 2008–2014 was private sector over-indebtedness arising out of a real estate bubble, that is to say, the collateral of the debt was the price of housing. From the diagnosis above, the Great Recession in Spain falls within what is technically called a balance-sheet recession (Koo (2003, 2009, 2011, 2012a, 2012b, 2012c, 2013, 2015). Most of this debt was created by the Spanish banking sector, so that when the housing bubble burst Spanish banks faced problems of insolvency. The way in which solvency was re-established, through a bail-out that protected foreign creditors, affected not only the banking sector but also the economy. What began as a private sector debt crisis ended up increasing sovereign debt beyond the automatic stabilizers since a large part of the increase in Spain's sovereign debt was used to finance the private sector, namely the banks and, to a lesser extent, certain oligopolies. This is a contemptuous distortion of fiscal policy. The situation was exacerbated because, while the bail-out of Spanish banks protected their bondholders creditors, from May 2010, the European Union imposed a very restrictive fiscal policy on Spain. This was combined with an internal devaluation that deepened the contraction of the economy because the Spanish economy was already in a private sector balance sheet recession. It is only when the fiscal austerity policy was relaxed from the second half of 2014 and the European Central Bank began to implement its asset purchase program (quantitative easing), that the Spanish economy began to recover. And it was at that stage, amid the recession of private balances, and before the European Central Bank's asset purchase program, that the overestimation of public accounts took place.

The magnitude of Spain's economic contraction in the Great Recession was not anticipated either by academic orthodoxy or by economic authorities. In addition, the insolvency of the Spanish banking system was underestimated. These perspectives on the future of the Spanish economy could perhaps be reflected in GDP aggregates and related indicators, which although negative in magnitude with respect to previous economic crises, may not have been able to capture the depth and intensity of the recession. From the start of the Eurozone crisis, there were more efficient and equitable solutions to the debt problem. These were not especially difficult to set up, at least technically (politics is another issue). There was an alternative path; debt write-off with far less austerity. However, this path was not taken. The debt was used as an excuse to tighten the neoliberal economic order within a conservative federalist framework. The alternative would have helped to preserve the European social model, change the neo-liberal agenda and it would have reduced the opportunity to manipulate the Spanish GDP figures.

Private debt fed by a financial and/or real estate bubble matters. Under the financial instability hypothesis, monetary policy should be preventive, including asset inflation

as a Central Bank target. This would limit subsequent private balance sheet recessions. However, if that does not happen, that is the reason why the private debt dynamic is critical in those periods when after the bursting of a financial or real estate bubble the banking system is rescued at the expense of the taxpayers. In these cases, the private debt problem ended up contaminating the sovereign debt, deepening the Great Recession at a time when the European economic authorities were implementing fiscal austerity. However, the overestimation of Spanish GDP may have delayed the Minsky moment of the Spanish economy.

The rest of the paper is organized into three sections. In order to understand the context in which the overestimation of public accounts occurred, Section 2 provides an analysis of the Spanish economy, both during the real estate bubble of 2002–2007 and throughout the Great Recession of 2008–2014. Subsequently, in Section 3, the overestimation of Spain's GDP is quantified from three different approaches—the demand side, the supply side, and finally, from the income side. Section 4 quantifies the impact of the overvaluation of Spanish GDP on Spanish risk premium. Section 5 presents some lessons to be drawn from economic policy. Finally, Section 6 sums up the main conclusions.

2. Spain; from the housing bubble (2002–2007) to the great recession (2008–2014)

The different economic and financial orthodox schools of thought emphasized on the unforeseen nature of the global economic and financial crisis of 2008. But such a systemic crisis was not inevitable and was predictable in intensity and duration. Most economists tend to associate cyclical instabilities with exogenous factors and are, therefore, 'natural' and unavoidable. However, empirical evidence of the analysis of the economic cycles supports the ideas of disequilibrium and endogenous cycles (Jarsulic, 1989; Ferri and Minsky 1991; Fazzari et al. 2008; Skott and Zipperer 2012, 2014; Lavoie, 2016). The Great Recession was predictable in duration and intensity. It would have been sufficient to take a look at Hyman Minsky's financial instability hypothesis (Minsky, 1984, 1985, 1986, 1992; Keen, 2011, 2012a; Keen et al. 2012), and Irving Fisher's Theory of Debt Deflation (1933).

In this section, we will analyze the dynamics of Spain's total debt, both in the period of the housing bubble (2002–2007) and in the Great Recession (2008–2014) from data published by the Bank of Spain[1] and presented in the statistics section under the heading, 'financial accounts of the Spanish economy', specifically in Chapter 2.

2.1. The debt in the boom period (2002–2007)

The choice of the year 2002 as the beginning of the period of the Spanish real estate bubble is not by chance. It is founded in economics. In order to understand the dynamics of Spanish debt in the period 2002–2007, we refer to a note published by Richard Koo in 2012 under the evocative title 'The entire crisis in Europe started with a big ECB bailout of Germany' (Koo, 2012b).

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[1] See Financial Accounts (ESA 2010) Statistics of Bank of Spain https://www.bde.es/webbde/en/estadis/ccff/ccff2.html

According to Koo, the so-called 'competitiveness problem' of the countries of Southern Europe was the result of the ECBs excessively expansive monetary policy following the burst of the technology bubble in the early 2000s. The latter's ultimate goal was to stimulate the German economy in order to avoid an expansionary fiscal policy. However, the impact on Germany's domestic demand was nil, because it was in a balance-sheet recession. On the contrary, it accelerated and inflated the bubbles in the periphery to an unexpected extent, especially real estate, which boosted German exports, rescuing this country from the fears caused by the outbreak of the technological bubble, from which the Southern Europeans countries scarcely benefited.

Such an expansive monetary policy by the ECB would not have been necessary, and there would therefore have been no reason for the competitiveness gap with the rest of the euro area to be extended to 2008 levels if Germany had used the fiscal stimulus to cope with the balance-sheet recession. In working out this document, the creators of the Treaty of Maastricht did not take into account a recession of this type. The competitiveness problem was only attributable to the fiscal deficit's maximum limit of 3% as set out in the Treaty of Maastricht. That meant unreasonable requirements for the monetary policy of the ECB during this type of recession. The analysis of the data corroborates this approach. See Table 1.

The growth in the volume of Spanish debt during the period of economic expansion 2002–2007, following the burst of the technology bubble, was entirely due to the increase in private debt. During this period, the volume of total debt went from 1.6 trillion Euros (213.1% of GDP) at the end of 2002 to 3.7 trillion euros (338.8% of GDP) at the end of 2007. However, the volume of public debt decreases in absolute terms and in relation to GDP. In 2002, public debt reached 434,876 million Euros (58% of GDP), by 2007 it was reduced to 434,274 million Euros (only 40.2% of GDP).

If we divide the economy into three sectors (private, public and the rest of the world), there is an accounting principle that always holds (Godley 1999; Godley and Lavoie 2007, 2014). The deficits incurred by one or more sectors must be equal to the surpluses incurred by another sector or other sectors. If a sector has a budget surplus, at least one of the sectors has to incur a budget deficit:

Domestic Private Balance + Domestic Public Balance + External Balance = 0

In terms of stock variables, a sector can accumulate net financial assets only if at least one of the sectors increases its indebtedness in the same proportion. It is impossible for all sectors to accumulate net financial assets, to incur financial surpluses. The intense investment of the private sector in 2002–2007 translated into savings for the public sector. Therefore, the debt increase was due to the private sector, whose debt went from almost 1.2 trillion Euros (155.0% of GDP) in 2002 to 3.2 trillion Euros (298.7%) in 2007.

Figure 1 shows the dynamics of the evolution of the debt, as a percentage of GDP, of the resident sectors of Spain for the period 2002–2007.

2.2. The dynamics of Spain's debt during the Great Recession (2008–2014)

When the Great Recession began in Spain, it was the private sector that faced solvency problems. The debt of households, companies, and financial institutions at the end of 2008 was around 306% of GDP at a time when the price of the collateral that supported most of it began to fall. As a result, the private sector entered into a deep economic recession. Households reduced consumption and recovered savings, non-financial companies did not invest, and they destroyed already installed productive capacity and

Table 1. *Spanish resident sectors' debt: 2002–2007 (millions of Euros and % GDP)*

	2002		2003		2004		2005		2006		2007	
	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP
Total Debt Spanish Economy	**1,596,583**	**213%**	**1,811,223**	**225%**	**2,148,935**	**249%**	**2,605,562**	**280%**	**3,164,968**	**314%**	**3,662,314**	**339%**
Government	**434,876**	**58%**	**433,381**	**54%**	**456,870**	**53%**	**465,548**	**50%**	**448,902**	**45%**	**434,274**	**40%**
Central Government	346,402	46%	341,188	42%	360,315	42%	361,970	39%	342,858	34%	325,646	30%
Comunidades Autónomas	48,165	6%	50,665	6%	53,916	6%	59,645	6%	60,203	6%	61,983	6%
Local Government	21,732	3%	18,450	2%	24,316	3%	25,687	3%	27,672	3%	29,476	3%
Social Security	18,577	2%	23,078	3%	18,323	2%	18,246	2%	18,169	2%	17,169	2%
Private Resident Sectors	**1,161,707**	**155%**	**1,377,842**	**171%**	**1,692,065**	**196%**	**2,140,014**	**230%**	**2,716,066**	**269%**	**3,228,040**	**299%**
Non financial Companies	637,342	85%	706,346	88%	802,685	93%	951,525	102%	1,164,161	115%	1,351,413	125%
Financial Sector	144,596	19%	220,348	27%	347,474	40%	535,004	57%	771,160	77%	1,000,003	93%
Households	379,769	51%	451,148	56%	541,906	63%	653,485	70%	780,745	77%	876,624	81%

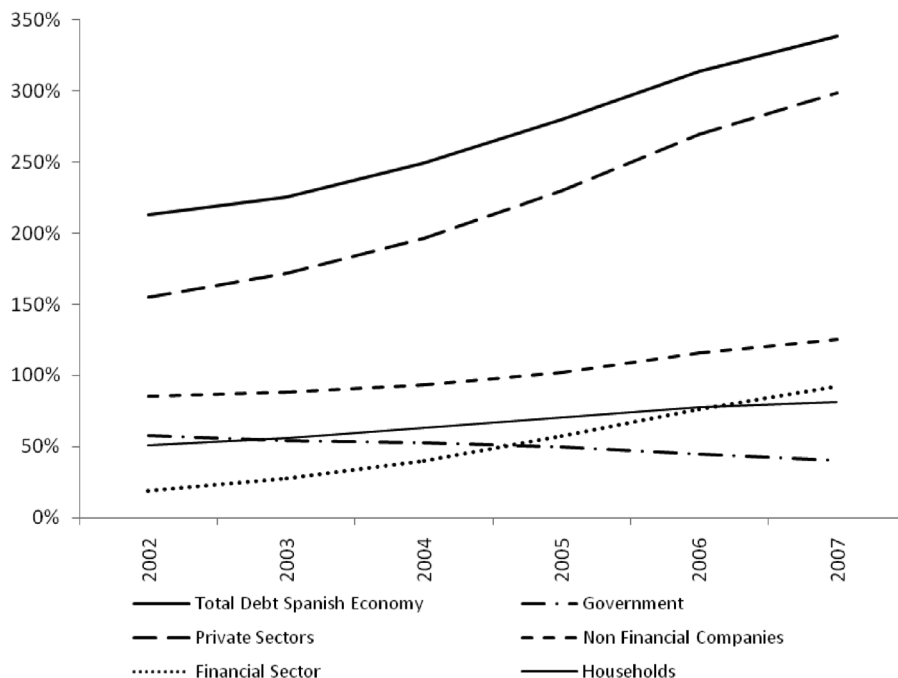*Source*: Bank of Spain and Own Elaboration.

Fig. 1. *Spanish resident sectors' debt: 2002–2007 (% GDP).*
Source: Bank of Spain and Own Elaboration.

dismissed workers. Financial institutions turned off the credit tap, in the context of increasing defaults and tried to recapitalize at the expense of taxpayers. The economy was facing what is technically known as a balance-sheet recession, Koo (2003, 2009, 2011, 2012a, 2012b, 2012c, 2013, 2015). The only objective of the different private sector economic agents was to reduce debt.

Table 2 shows how from 2008 to 2014 private sector debt was reduced by almost 520 billion Euros. However, the distinctive feature is the strong increase in public debt, of almost 916 billion Euros from the beginning of the crisis. This is basically due to two reasons. On the one hand, the bank rescue, which was carried out at the expense of the taxpayers and on the other hand, the intense balance-sheet recession accelerated by the austerity policies implemented from May 2010, which activated the automatic stabilizers. In Spain, therefore, the Great Recession was translated into an intense recession of private balance sheets (private savings) and this was transferred mathematically to public dissaving. The problem is that part of the increase in the debt

[2] The methodology used in Turiel (2012) shows a conceptual framework that includes the link between debt and deficit, the State Administration's accounting methodology, the execution of the budget and the payment of the debt interest. The data is obtained from the reports of the General State Intervention regarding the liquidation of the General State Budget, part of whose data has been dumped into the Public Entities Database (BADESPE) of the Institute of Fiscal Studies, as well as from the Public Debt reports and the data on the balances of such debt. As fieldwork, it examined different items of the General State Budget, the economic reports of the Fund for Orderly Bank Restructuring (FROB), and the Fund for the Acquisition of Financial Assets (FAAF) of the Bank of Spain and the European Central Bank.

Table 2. *Spanish resident sectors' debt: 2008–2014 (millions of Euros and % GDP)*

	2008		2009		2010		2011		2012		2013		2014	
	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP	Millions €	%GDP
Total Debt Spanish Economy	**3,918,090**	**351%**	**4,119,088**	**382%**	**4,191,016**	**388%**	**4,264,719**	**398%**	**4,412,220**	**424%**	**4,285,339**	**418%**	**4,301,247**	**414%**
Government	**513,522**	**46%**	**659,253**	**61%**	**717,736**	**66%**	**819,995**	**77%**	**1,079,752**	**104%**	**1,255,564**	**122%**	**1,418,344**	**137%**
Central Government	389,759	35%	512,825	48%	542,094	50%	623,296	58%	832,786	80%	982,966	96%	1,117,569	108%
Comunidades Autónomas	74,722	7%	94,482	9%	123,082	11%	142,825	13%	185,856	18%	213,227	21%	245,104	24%
Local Government	31,872	3%	34,777	3%	35,391	3%	36,705	3%	43,922	4%	42,184	4%	38,483	4%
Social Security	17,169	2%	17,169	2%	17,169	2%	17,169	2%	17,188	2%	17,187	2%	17,188	2%
Private Resident Sectors	**3,404,568**	**305%**	**3,459,835**	**321%**	**3,473,280**	**321%**	**3,444,724**	**322%**	**3,332,468**	**320%**	**3,029,775**	**295%**	**2,882,903**	**278%**
Non financial Companies	1,422,616	127%	1,406,098	130%	1,429,403	132%	1,415,742	132%	1,309,821	126%	1,230,568	120%	1,179,547	114%
Financial Sector	1,067,970	96%	1,147,502	106%	1,141,411	106%	1,153,819	108%	1,184,458	114%	1,008,616	98%	949,186	91%
Households	913,982	82%	906,235	84%	902,466	83%	875,163	82%	838,189	81%	790,591	77%	754,170	73%

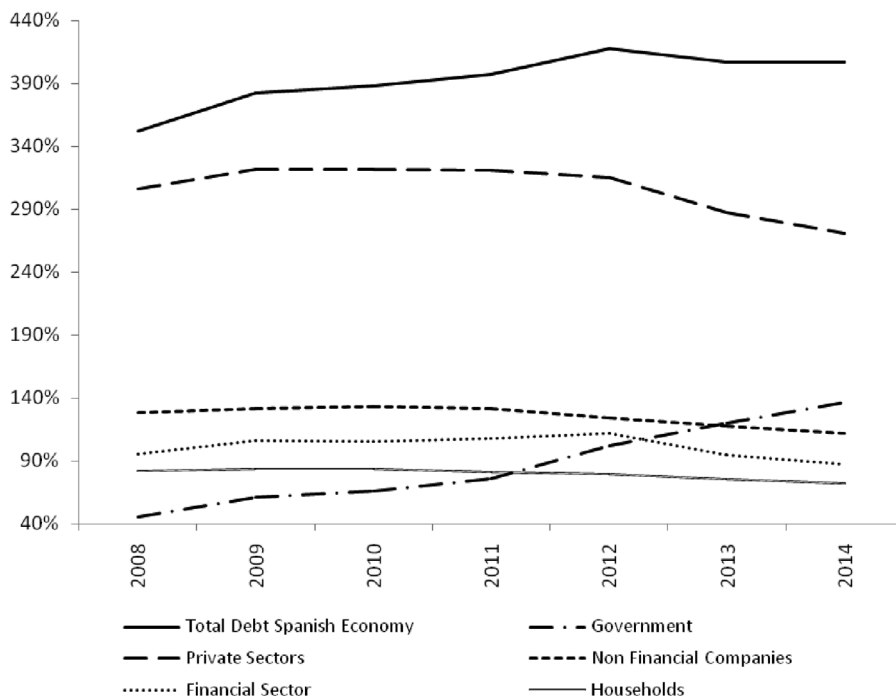*Source*: Bank of Spain and Own Elaboration.

Fig. 2. *Spanish resident sectors' debt: 2008–2014 (% GDP).*
Source: Bank of Spain and Own Elaboration.

of the Central Government is not even explained by the intense private balance-sheet recession undergone by Spain.

Turiel (2014)[2] quantifies for the period 2008–2013 what part of the increase in the stock of public debt issued by the Central State Administration corresponds to funds that are not used to cover current operating expenses or capital but to be again lent to third parties, favouring spurious private interests outside the Spanish citizenship. It is considered 'lent to third parties' all those operations that imply both participation in the equity of these third parties and participation in their liabilities (loans, subscriptions of obligations, bonds, promissory notes...). Of the 597,349 million Euros increase in the amount of debt issued by the Central Administration between 2008 and 2013, 227,091 million Euros, almost half, was to finance third parties, mainly to the Spanish banking system.

Figure 2 shows the dynamics of the evolution of the debt, as a percentage of GDP, of the resident sectors of Spain for the period 2008–2014.

2.3. External debt achieves a historical record in 2014

Table 3 presents two different time periods, the end of 2008 and the end of 2014, which show how Spain's external debt has evolved, analysing its amount and the national sectors that owed these debts to the rest of the world

The debt that the Spanish resident sectors owed to foreign creditors, at the end of 2008, amounted to almost 1.08 trillion Euros, a figure that represented close to 99% of Spanish GDP. This amount represented 27% of the debt of the Spanish economy. The rest was debt among resident sectors.

Table 3. *External debt of Spain at the end of 2008 and 2014 (millions of Euros)*

	1. Total=2 + 3+4 + 5		2. Households		3. Non financial companies		4. Financial sector		5. Government	
	2008	2014	2008	2014	2008	2014	2008	2014	2008	2014
External Debt	**1,077,785**	**1,143,583**	**2,295**	**2,336**	**278,087**	**297,043**	**584,502**	**342,670**	**212,902**	**501,535**
Debt Securities	768,521	741,183	0	0	1,547	8,789	576,420	331,254	190,555	401,140
Loans	309,264	402,400	2,295	2,336	276,540	288,254	8,082	11,416	22,347	100,395
% Total Sector Debt	28%	27%	0%	0%	20%	25%	55%	36%	41%	35%
% Spanish Total Debt	28%	27%	0%	0%	7%	7%	15%	8%	5%	12%
% Spanish External Debt	100%	100%	0%	0%	26%	26%	54%	30%	20%	44%
% GDP	97%	110%	0%	0%	25%	29%	52%	33%	19%	48%

Source: Bank of Spain and Own Elaboration.

The portion of public debt held by foreign creditors represented only 20% of the total external debt of the country (212.9 billion Euros), while the rest of the private sector owed the remaining 80% (864,484 million Euros) of external debt. Financial companies were the main debtors abroad, with 54% of the Spanish external debt (584,102 million Euros), while non-financial companies owed the remaining 26% (278,087 million Euros) and households owed just marginally 0.21%. Thus, according to Bank of Spain data, in 2008 Spanish private actors owed abroad a quantity close to 80% of Spanish GDP.

At the end of 2014, external debt exceeded 1.1 trillion Euros, a figure that represented close to 107% of Spanish GDP. This amount represented 26% of the debt of the Spanish economy. The rest is debt among resident sectors. The figure is very similar to 2008, but the composition changed drastically. 44% of the external debt at the end of 2014 corresponded to the public sector, compared to 20% in 2008. On the contrary, the debts that Spanish financial entities owed abroad represented 'only' 30% of total external debt, compared to 54% in 2008. Meanwhile, the external debt of non-financial companies represented 26% of the total Spanish debt with foreign countries, almost identical to 2008.

What these data confirm is why a policy of austerity was imposed from the outside, with the enthusiastic support of the Spanish banking elites. The aim was to provide public resources to be used to finance third parties, foreign creditors of Spanish private sector activity. The rescue of the Spanish financial system consisted solely of providing resources to the financial system so that it could pay its debts, applying hard internal restructuring processes in order to free resources. It was not a rescue of the Spanish financial system, but the German and French financial systems, keeping the country's banking management in place.

3. Quantifying the overestimation of Spanish GDP

The private debt dynamic we detailed in the section 2 is critical in those periods when after the bursting of a financial or real estate bubble, the banking system, which created the debt, is rescued at the expense of the taxpayers. Therefore, what started as a private debt problem ended up contaminating the public sector debt. That deepened the Great Recession in Spain at a time when the European economic authorities were implementing fiscal austerity. However, there was one fact that limited these negative effects. We are referring to the overestimation of Spanish GDP in the public accounts for the period 2007–2013. The section aims to quantify the overestimation of Spain's GDP using three different approaches: the demand side, the supply side and finally, the income perspective. We use some economic indicators that correlate with the GDP, according to the methodology of the Spanish Economy Ministry (2007).

3.1. Estimating Spanish GPD according to the supply method (activity indicators)

In order to provide an alternative valuation of the Spanish GDP, we have resorted to the following list of activity indicators: services gross value added (GVA), industrial GVA, construction GVA[3], and health[4] & education[5] expenditures plus the total

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[3] See Gross Value Added Statistics of Spanish Statistical Officec:\tmp\mozilla_jc0\ http:\www.ine.es\jaxiT3\Tabla.htm?t=9130&L=0https://www.ine.es/jaxiT3/Tabla.htm?t=29008&L=1

[4] See Public Healthcare Expenditure Statistics of Ministry of Health https://www.mscbs.gob.es/en/estadEstudios/estadisticas/inforRecopilaciones/gastoSanitario2005/home.htm

[5] See Public Expenditure on Education Statistics of Ministry of Education http://www.educacionyfp.gob.es/en/servicios-al-ciudadano/estadisticas/recursos-economicos/gasto-publico/series.html

compensation of public employees[6]. Table 4 shows the GVA of different economic sectors using the National Accounts. In Table 5 we approach these calculations using alternative indicators.

3.1.1. Services sector's GVA

We take as an alternative indicator the evolution of the GVA reported by the companies in the Survey of Business Structure of the services sector. This survey does not include all sectors of activity but excludes the financial sector, health and education. Therefore, we compare the GDP reported in the National Accounts (CN) for the corresponding subsectors. According to the National Accounts, the GVA of this part of the services sector went from 450,078 million Euros in 2007 to 479,272 million Euros in 2013.

However, the Annual Services Survey reports a decrease in this same period of 18%. This inexplicable discrepancy translates into a difference of 110,625 million Euros.

3.1.2. Construction's GVA

For this sector, we use the GVA reported by the companies in the survey of the construction situation (SCS). According to the Spanish National Accounts, the GVA generated by the construction sector decreased from 109,192 million Euros in 2007 to 53,948 million Euros in 2013. However, the SCS reports a decrease of 68.6% during this same period, which translates into a discrepancy of 19,662 million Euros.

3.1.3. The GVA of industry

For this sector, we use the GVA information of the companies in the Survey of Business Structure of the industrial sector. According to the national accounts, the GVA of industry went from 176,905 million Euros in 2007 to 163,944 million in 2013. However, the Industrial Companies Survey reports a decrease of 29.62% during the same period, which translates into a difference of 38,965 million Euros, although this survey twice expanded the base of companies analysed.

3.1.4. Health and education expenditure and the compensation of public employees

According to the Spanish National Accounts, the value of these budget lines grew from 158,626 million Euros to 177,503 million in 2013. Unfortunately, the official figures no longer provide disaggregated data, but we have easily inferred them using, on the one hand, the compensation of public employees and the public expenditure on health and education calculated from the General Intervention of the State Administration and, on the other, the private expenditure on health and education estimated by the Survey of Household Budgets. Using this data, the referred indicators grew by 6.9% in the period and not 11.9%, as indicated in the National Accounts. Briefly, one must take note of the difference of 7,551 million Euros between the Spanish National Accounts and this indicator.

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[6] See Macroeconomic Indicators and Reports Statistics of Ministry of Economy and Digital Transformation http://serviciosede.mineco.gob.es/Indeco/sie/SIEtitulosCodigos.aspx?capitulo=6&cuadro=04&pagina=capituloSieInf.aspx

Table 4. *GVA of services; construction; industry; and government, health and education: quarterly data national accounts*

Quarter	GVA services						GVA construction		GVA industry		GVA government, health and education	
	Commerce, transport, hotel and restaurant	Information and communications	Real State	Professional activities	Artistic, recreational activities and other services	Total annual	Construction	Total annual	Industry	Total annual	Government health and education	Total annual
2007Q1	48,995	10,046	20,105	15,953	8,987		25,009		44,218		35,544	
2007Q2	54,040	10,886	21,707	17,988	8,590		28,683		44,409		40,299	
2007Q3	55,450	10,417	21,640	16,721	8,607		26,326		42,707		38,447	
2007Q4	56,353	11,233	23,249	19,065	10,046	450,078	29,174	109,192	45,571	176,905	44,336	158,626
2008Q1	52,009	10,561	21,934	17,115	9,567		25,778		45,597		38,830	
2008Q2	57,666	11,417	23,382	19,546	9,382		30,154		47,477		44,612	
2008Q3	58,457	10,732	23,081	17,943	9,108		27,444		45,724		41,960	
2008Q4	56,459	11,361	23,571	20,005	10,788	474,084	29,814	113,190	45,072	183,870	48,413	173,815
2009Q1	49,831	10,676	21,435	16,930	9,887		24,821		41,550		40,761	
2009Q2	56,090	11,496	22,417	19,101	9,465		28,476		42,338		47,356	
2009Q3	58,032	10,835	22,635	17,561	9,307		25,596		41,172		44,515	
2009Q4	56,894	11,630	23,414	19,524	11,091	468,251	27,610	106,503	42,405	167,465	50,477	183,109
2010Q1	50,989	10,591	23,588	16,511	10,141		20,573		42,414		41,772	
2010Q2	56,038	11,072	25,356	18,310	9,811		22,817		42,131		48,294	
2010Q3	57,536	10,378	25,356	16,671	9,557		20,775		40,896		44,524	
2010Q4	57,983	11,389	26,189	19,479	11,134	478,079	23,361	87,526	44,537	169,978	50,521	185,111
2011Q1	52,166	10,391	25,420	17,144	10,219		17,530		44,302		41,439	
2011Q2	57,124	10,845	26,968	18,871	9,873		19,823		42,590		48,101	
2011Q3	58,254	10,263	26,980	16,975	9,641		17,308		41,204		44,106	
2011Q4	57,852	11,227	27,451	19,688	11,215	488,567	19,319	73,980	43,555	171,651	50,540	184,186
2012Q1	51,778	10,203	26,326	16,753	10,146		14,903		42,813		40,782	
2012Q2	56,282	10,592	27,866	18,071	9,542		16,847		40,967		46,842	
2012Q3	57,381	10,135	28,035	16,359	9,455		14,960		39,513		43,279	
2012Q4	56,579	11,042	28,439	18,319	10,903	484,206	16,811	63,521	42,275	165,568	45,899	176,802
2013Q1	49,827	9,975	27,126	16,205	9,741		12,322		41,437		40,980	
2013Q2	54,640	10,445	28,713	17,867	9,296		14,163		40,250		45,770	
2013Q3	56,340	9,909	28,587	16,440	9,227		12,876		39,700		43,058	
2013Q4	55,756	10,956	28,803	18,688	10,731	479,272	14,587	53,948	42,557	163,944	47,712	177,520

Source: National Statistical Office; Ministry of Economy; Ministry of Education, Ministry of Health, Consumption and Welfare; and Own Elaboration.

Table 5. *An alternative approach to GDA of services; construction; industry; and government, health and education*

	Services value-added *Services annual survey*	Construction value-added *Survey of the construction situation*	Industry value-added *Industrial companies annual survey*			Public administration and health and education (public+private) value-added *The general intervention of the state administration. survey of family budgets*				
	Value-added at factor costs	Value-added at factor costs	Gross revenues	Employees costs	Total operating costs	Public employees expenditure	Public education expenditure	Public health expenditure	Private education expenditure	Private health expenditure
2007	220,854	101,149	636,398	83,206	591,453	107,445	43,336	61,238	4,806	15,678
2008	205,453	99,270	644,785	85,451	607,035	118,136	47,044	67,292	5,037	17,229
2009	182,391	78,408	511,884	77,094	485,199	125,564	49,692	72,939	4,942	16,622
2010	181,544	62,992	537,034	76,027	514,567	124,884	48,492	71,080	5,377	16,458
2011	187,887	49,404	591,335	74,709	566,867	122,601	47,137	69,240	5,537	16,013
2012	184,968	40,579	584,857	71,108	561,212	113,925	43,307	64,685	6,007	16,223
2013	180,110	31,793	575,605	70,107	549,156	114,711	42,081	63,307	6,568	15,843

Source: National Statistical Office; Ministry of Economy; Ministry of Education, Ministry of Health, Consumption and Welfare; and Own Elaboration.

3.1.5. The GVA of the financial sector

We have undergone major difficulties to carry out an alternative valuation of the GVA evolution for the financial and the primary sectors. However, we cannot rule out additional major deviations in these two sectors given the important collapse of turnover in the financial sector during the period 2007–2013.

To sum up, having taken into consideration the four indicators mentioned above, we estimate that the Spanish GDP is 176,173 million Euros lower than the figures reported by the Spanish Statistical Office, a 17.2% decrease.

3.2. Estimating Spanish GPD according to the income method (remunerations paid)

In order to provide an alternative valuation of the Spanish GDP from this perspective[7], we have used the following indicators. On the one hand, wages and salaries data according to the Labour Cost Survey and the Social Security affiliations. On the other hand, we use the data of the Ministry of Finance related to the gross operating surplus based on corporate tax; taxable bases from the capital and other income, and economic activity based on income tax. Table 6 shows employees' remuneration and gross operating surpluses in National Accounts.

3.2.1. Wages and salaries

Salaries grew in Spain by 9.9% in the period 2007–2013[8]. As employment in the same period decreased by 15.4%[9], we can easily conclude that the total payroll decreased by 7%. According to the Spanish National Accounts, such a decrease amounted to 7.1%, so in this case, we have found no discrepancy with the official figures whatsoever.

3.2.2. Gross operating surpluses

According to the Spanish National Accounts, the g*ross operating surpluses* decreased by 1.2% between 2007 and 2013. However, we witness a 43% decrease in corporate taxable income[10] (from 186,640 to 106,449 million Euros), a 44.8% decline in the case of taxable capital income[11] (from 130,842 to 72,269 million Euros), and a 29.6% decrease in taxable business income (from 31,795 to 22,389 million Euros)[12].

Given that the gross surplus accounted for 43% of national income in 2013, according to the National Accounts, while the Spanish Tax Agency reported a 42.5% decrease in these incomes for the period 2007–2013 (instead of the 1.2% reported by the National Accounts), the expected decrease would have been 184,241 million Euros,

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[7] See Wages, Income and Social Cohesion Statistics of Spanish Statistic Office https://www.ine.es/dynt3/inebase/en/index.htm?padre=2129&capsel=2129

[8] See Macroeconomic Indicators and Reports Statistics of Ministry of Economy and Digital Transformation http://serviciosede.mineco.gob.es/Indeco/sie/SIEtitulosCodigos.aspx?capitulo=3&cuadro=20&pagina=capituloSieInf.aspx

[9] See Macroeconomic Indicators and Reports Statistics of Ministry of Economy and Digital Transformation http://serviciosede.mineco.gob.es/Indeco/sie/SIEtitulosCodigos.aspx?capitulo=3&cuadro=12%20%28A%29&pagina=capituloSieInf.aspx

[10] See Tax Revenue Annual Report Statistics of The Tax Agency http://www.agenciatributaria.es/AEAT.internet/datosabiertos/catalogo/hacienda/Informes_anuales_de_Recaudacion_Tributaria.shtml

[11] See Tax Revenue Annual Report Statistics of The Tax Agency http://www.agenciatributaria.es/AEAT.internet/datosabiertos/catalogo/hacienda/Informes_anuales_de_Recaudacion_Tributaria.shtml

[12] See Tax Revenue Annual Report Statistics of The Tax Agency http://www.agenciatributaria.es/AEAT.internet/datosabiertos/catalogo/hacienda/Estadistica_de_los_declarantes_del_IRPF.shtml

Table 6. *Employees remuneration and gross operating surpluses in national accounts*

Quarter	Employees remuneration in national accounts				Gross operating surpluses in national accounts	
	Employees remuneration	Total annual	Monthly wage costs (€)	Year average	Gross operating surpluses	Total annual
2007Q1	123,508		1,634		101,476	
2007Q2	131,208		1,732		114,339	
2007Q3	127,755		1,636		110,971	
2007Q4	140,085	522,556	1,851	1,713	123,384	450,170
2008Q1	135,422		1,719		104,401	
2008Q2	142,453		1,818		121,502	
2008Q3	136,550		1,722		115,526	
2008Q4	145,352	559,777	1,940	1,800	123,726	465,155
2009Q1	133,527		1,769		101,146	
2009Q2	139,771		1,893		117,338	
2009Q3	133,136		1,777		113,821	
2009Q4	142,739	549,173	1,993	1,858	122,840	455,145
2010Q1	131,039		1,802		100,601	
2010Q2	138,760		1,927		112,033	
2010Q3	131,076		1,779		108,298	
2010Q4	140,600	541,475	1,993	1,875	124,917	445,849
2011Q1	128,814		1,820		102,598	
2011Q2	136,523		1,939		113,005	
2011Q3	128,594		1,801		108,877	
2011Q4	137,055	530,986	2,020	1,895	124,866	449,346
2012Q1	123,644		1,842		100,693	
2012Q2	129,383		1,940		112,182	
2012Q3	121,101		1,806		108,920	
2012Q4	124,662	498,790	1,947	1,884	124,887	446,682
2013Q1	117,366		1,809		99,334	
2013Q2	123,546		1,929		110,992	
2013Q3	118,292		1,801		107,914	
2013Q4	126,111	485,315	1,996	1,884	122,114	440,354

Source: National Statistical Office; Ministry of Economy; Ministry of Education, Ministry of Health, Consumption and Welfare; and Own Elaboration.

much more than reported by the Spanish Statistical Office, a figure which represents an 18% of Spain's GDP.

3.3. *Estimating Spanish GPD according to the demand method (expenditures)*

The third method compares the GDP evolution with that of a series of indicators that historically have presented a high correlation with GDP components. In this regard, we have resorted to a publication from the Spanish Ministry of Economic Affairs itself, entitled 'Methodology of Composite Spanish Economy Indicators'[13].

   From the demand perspective, GDP contains five main expenditure items, as follows: (i) final consumption of households, (ii) government final consumption expenditure,

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[13] See Macroeconomic Indicators and Reports Statistics of Ministry of Economy and Digital Transformation http://serviciosede.mineco.gob.es/Indeco/documentos.aspx

(iii) gross fixed capital formation in construction, (iv) gross fixed capital formation in equipment and (v) the difference between imports and exports.

In Q4 2007, the aforementioned five expenditure items represented 95.3% of the Spanish GDP. For our alternative valuation of GDP, we will accept the figures of the government final consumption expenditure as correct since we have no means to independently verify their validity. An eventual in-depth audit of the Spanish National Accounts carried out by the EU should delve further into this matter.

In our calculations for the period 2007–2013 we use deflated figures, and we also give more weight to the more correlated indicator (proportionale to the correlation itself). Table 7 shows those different indicators that historically have presented a high correlation with GDP components.

3.3.1. Final consumption of households

The Spanish National Accounts report a decrease of 13.7%. This figure is compared with three indicators (in brackets we highlight a decimal number, which is the correlation with the aggregate figures reported in the National Accounts):

√ Indicator 1 – Domestic sales of large companies (correlation = 0.74). We observe a decline of 22.9% in the period, 26.3% when weighted.
√ Indicator 2 – Availability of consumer manufactures (0.61). We observe a decline of 31.1% in the period, 29.5% when weighted.
√ Indicator 3 – Deflated turnover of retail sales (0.58). We observe a decline of 26.5% in the period, 23.9% when weighted.

The weighted average of the three indicators above is −26.6%. As the Spanish National Accounts report that the final consumption of households amounts to 587.6 billion Euros, the figure should be corrected to 499,766 (a difference of 87,834 million Euros for 2013).

3.3.2. Gross fixed capital formation in equipment

The Spanish National Accounts report a decline of 24.6%. Here, the Spanish Ministry of Economic Affairs recommends two highly correlated indicators:

√ Indicator 1 – Availability of capital goods (0.82). We observe a decline of 42.7% in the period, 46.4% when weighted.
√ Indicator 2 – Freight vehicle registrations (0.69). We observe a decline of 74% in the period, 67.6% when weighted.

The weighted average of the two indicators above is −57%. As the Spanish National Accounts report that the gross fixed capital formation in equipment amounts to 60.4 billion Euros, the figure should be corrected to 34,446 (a difference of 25,954 million Euros for 2013).

3.3.3. Gross fixed capital formation in construction

The Spanish National Accounts report a decline of 46.5%. Here, the Spanish Ministry of Economic Affairs recommends three highly correlated indicators:

Table 7. *Different indicators that have presented historically a high correlation with GDP components*

Year	Final consumption of households			Gross fixed capital formation in equipment		Gross fixed capital formation in Construction		
	Domestic sales of large companies (2013 = 100)	Availability of consumer manufactures (2010 = 100)	Deflated turnover of retail sales (2012 = 100)	Availability of capital goods (2010 = 100)	Freight vehicle registrations	Construction affiliation data (in thousands)	Consumption of cement (monthly average in metric Ton)	New construction permits // new area to build (thousands of m²)
2007	147	129	129	133	35,032	2,609	4,666	10,437,470
2008	134	117	122	123	19,744	2,340	3,558	4,997,709
2009	115	99	115	105	11,845	1,800	2,409	2,430,716
2010	114	100	113	100	12,673	1,559	2,038	2,042,284
2011	111	97	107	98	11,832	1,369	1,703	1,663,172
2012	101	90	100	85	8,974	1,136	1,132	1,043,730
2013	100	89	95	82	8,966	997	895	853,597

Source: National Statistical Office; Ministry of Economy; and Own Elaboration.

√ Indicator 1 – Construction affiliation data (0.81). We observe a decline of 64.6% in the period, 81.4% when weighted.

√ Indicator 2 – Cement consumption (0.61). We observe a decline of 80.8% in the period, 76.6% when weighted.

√ Indicator 3 – New construction permits/new area to build (0.51). We observe a decline of 91.8% in the period, 72.8% when weighted.

The weighted average of the three indicators above is −76.9%. As the Spanish National Accounts report that the gross fixed capital formation in construction amounts to 105,800 million Euros, the figure should be corrected to 45,682 million Euros (a difference of 60,118 million Euros for 2013).

3.3.4. Net exports of goods and services

Regarding the balance of services, the Spanish National Accounts report similar figures to those reported by the Bank of Spain. However, we observe a discrepancy between the trade balance of goods reported by the State Secretary for Trade and the one included in the Spanish National Accounts, the former reporting 2,522 million Euros less in Spain's commercial balance.

Based on the demand method, Spain's GDP should decrease by 176,428 million Euros in 2013, which means a reduction of 17.2% in the country's GDP with respect to the official figures.

In summary, using three approaches we obtain a similar conclusion, that is, an over-estimation of the Spanish GDP between 17% and 18%. Figure 3 contains the Total GDP both official and estimated using the three different approaches.
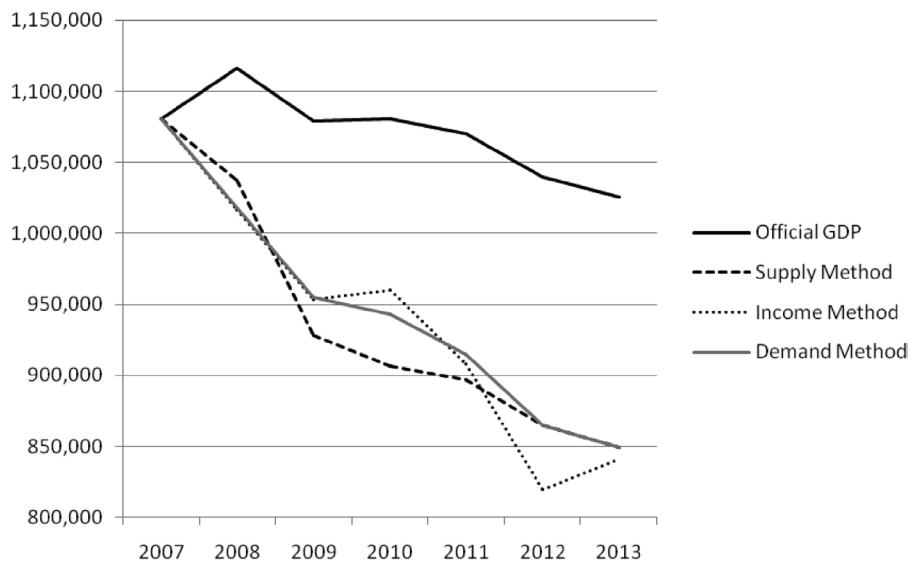

Fig. 3. *Official and estimated Spanish GDP for the period 2007–2013 (in millions of current Euros).*
Source: National Statistical Office; Ministry of Economy; Ministry of Education, Ministry of Health, Consumption and Welfare; and Own Elaboration.

To our knowledge, this would be a unique case in Europe. We specifically made similar calculations for other European countries, including Greece and Italy, using some of the same indicators, although in a less extensive way. In none of these countries was there such a significant overestimation of GDP. For example, between 2008 and 2011, the behaviour and dynamics of these indicators in Spain and Greece were similar, but the Greek GDP fell 16.5% more than the Spanish one

3.4. Final remarks: The black economy and the stability of correlations

Two aspects could cause the unexplained overestimation of the Spanish GDP for the period 2009–2013 we have found using three different methodologies. On the one hand, the role that the black market could have played in the gaps we have detected. Secondly, the stability of the correlations between GDP and a series of indicators we have used from the demand side approach.

According to Schneider (2015), the size of the shadow economy in Spain fell from 22.2% of GDP in 2007 to 19.2% in 2012 and 18.2% in 2015. However, in Medina and Schneider (2017) the size of the shadow economy in Spain increased from 22.7% of GDP in 2007 to 24.1% in 2012, decreasing afterwards to 22.1% in 2015. But these discrepancies are irrelevant because by its very nature the black economy is outside the official calculation of GDP, we believe that its evolution does not affect the results of our analysis at all. It should also be considered that given the indicators from which we approach GDP calculation are generally surveys, the incentive to declare figures lower than the real ones is lower than in the data sources used for GDP. Therefore, if there were an effect, it would be to accentuate the discrepancy we have found even more.

In our correlation analysis, from the demand side, we do not implicitly assume that a high correlation between two variables implies that both variables should be falling by the same percentage during the economic downturn between 2007 and 2013. In statistics, we have measures such as the semicorrelation, the semistandard deviation and/or the semicovariance that allow us to calculate them for the cases of negative variations in the different economic indicators. The historical database available for the analysis from the demand side using those times series of indicators that historically have presented a high correlation with GDP refers to a phase of vigorous economic growth before the bust of the housing bubble that drove Spain to a balance-sheet recession. We lack historical time series data for these indicators referred to other crises in Spain, such as the one during 1975–1985 or during 1992–1993. There is, therefore, insufficient data to calculate measures such as semicorrelation, semistandard deviation and/or semicovariance. However, implicitly, there are two procedures to justify the stability of correlations is not the reason for those big discrepancies.

First, although we have applied the correlation analysis only for the calculation of GDP from the demand side, the estimates from the supply and income approaches produce similar results. Second, we have calculated the accuracy of the adjustment for the period 2013–2016, which is a recovery phase. In this case, as you can see in Table 8, we observe that economic growth has probably been a little more intense than that reflected by the National Accounts, between 1.1 and 2.0 points higher than reported, depending on the perspective from which it is evaluated. But this discrepancy, in fact,

Table 8. *The gap of Spanish (GDP estimated-GDP reported) for the period 2013–2016*

Period	Supply method activity indicators	Income method remunerations paid	Demand method expenditures
2013–2016 (in millions of Euros)	17,201	29,490	23,246
2013–2016 (% of GDP at the end of 2016)	1.18%	2.02%	1.60%

Source: National Statistical Office; Ministry of Economy; Ministry of Education, Ministry of Health, Consumption and Welfare; and Own Elaboration.

is really of a negligible magnitude compared to the overestimation of GDP that the National Accounts collected for the period 2007–2013.

4. Estimating the impact of Spanish GDP overestimation on Sovereign Bond Risk Premia

Amid the Great Recession, in the years 2008–2009, all global risk markets, clearly overvalued, collapsed (Keen 2012a, 2012b; Laborda and Laborda, 2014a; Laborda et al. 2014b). In this phase of global risk aversion, see Figure 4, the risk premiums of Spain's debt begin to pick up.

Between December 2007 and August 2012, the risk premium on Spanish sovereign debt, defined as the spread between the 10-year interest rates of the Spanish central government bond and the German one, increased by 540 basis points, that is, 5.40%, going from a differential of 0.12% in December 2007 to 5.52% in August 2012. Only when the financial markets perceived that the European Central Bank would act decisively to save the Euro, after the speech from the president of the European Central Bank, Mario Draghi, at the Global Investment Conference in London, on July 26, 2012, *Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough*, did the risk premium on Spain's debt begin to decrease.

In addition to the decisive action of the ECB to reduce risk premiums in Spain and Italy, there was another very important factor from the perspective of economic policy. From the middle of 2013, Spain's fiscal policy ceased to be restrictive. The data of the European Commission show that for Spain in the period 2010–2013 fiscal policy was tremendously contractive. The structural deficit was cut from levels above 7% of GDP to figures close to 2% in the context of deleveraging of the private sector, which accelerated a deeper economic recession. But from mid-2013, with the consent of Brussels, austerity was relaxed and economic recovery began in Spain.

Therefore, it is in the context of a strong increase in risk aversion between 2008 and mid-2012, and in the face of the growing difficulties of refinancing Spanish private and public debt, when the overestimation of the Spanish National Accounts for the period 2008–2013 took place. The question is whether such overestimation prevented the risk premium from being higher. So this section investigates the macroeconomic determinants of Spanish sovereign bond risk premium, for the period 2002–2018, using quarterly data, and, specifically, if the independent variable Total Debt/GDP is statistically significant.
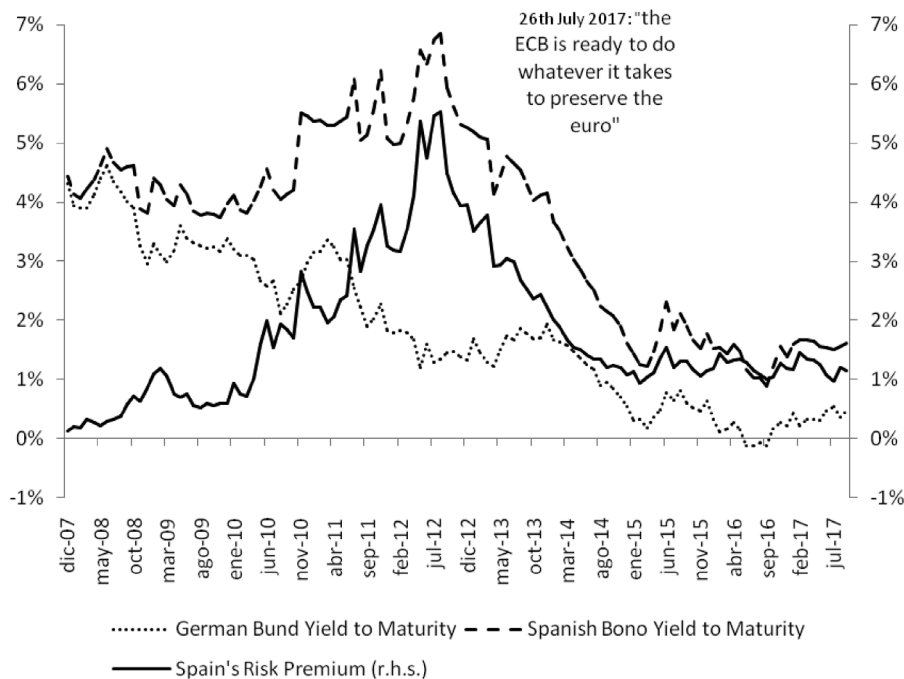
Fig. 4. *Evolution of risk premiums of the sovereign debt of Spain (2008–2014).*
Source: Bloomberg and Own Elaboration.

In García and Werner (2016), the authors evaluate many potential determinants and select what factors have explanatory power for a risk premium. They find that macro-economic factors, economic activity and sentiment indicators, are relevant in explaining the variability of risk premium before the crisis, and during the Great Recession in different European countries. For Spain, the selected factors include production per-ception (EC Business surveys); retail sales; building permits and unemployment rate. García and Werner (2015) display the full list of macroeconomic factors detailing their transformation to achieve stationarity. We will include some of these variables in our analysis. Table 9 introduces the definition of the explanatory variables used in the ana-lysis, as well as the source of the data.

We use as independent variables, a Spanish synthetic consumption indicator, as a proxy of economic activity sentiment; and the price expectations over the next three months in the building sector in order to capture the boom and bust of the Spanish housing bobble. It is expected that higher economic activity affects nega-tively the Spanish risk premium, decreasing it; while the process of formation of the housing bubble makes the Spanish economy vulnerable, so that the increase in price expectations affects, albeit with a certain delay, positively to the risk premium, increasing it. We introduce a control dummy variable related to monetary policy that captures, both the speech from the president of the European Central Bank, Mario Draghi, at the Global Investment Conference in London, July 2012, and the asset purchase programs introduced in early 2015 by the ECB. This dummy variable should help to reduce the risk premium. Our final independent variable is

Table 9. *The explanatory variables of the Spanish Bond Risk Premia*

Variable	Definition	Source of data	Disposable period
CPE3MA: Construction Price Expectations Three Months Ahead	It refers to construction price expectations over the next three months. It is a balance seasonally adjusted variable. So the variation of this variable should be calculated as the difference the between current value and one quarter or one year-ago value.	European Commission https://ec.europa. eu/ info/index_en	2002–2018
SCI: Synthetic Consumption Indicator	It refers to the Spanish synthetic consumption indicator index	Ministry of Economic and Business. Government of Spain http:// serviciosede. mineco. gob. es/Indeco/ inicioSIE.aspx	2002–2018
ECBDUMMY: ECB Dummy Variable	It is a dummy variable related to monetary policy that captures, both the speech from the president of the European Central Bank, Mario Draghi in July 2012, and the asset purchase programs introduced in early 2015 by the ECB.	Own elaborated and Bank of Spain https:// www.bde.es/ bde/es/	2002–2018
Total Debt/GDP	The ratio of the total debt of the Spanish economy over Spanish nominal GDP	Financial Accounts of the Spanish Economy of Bank of Spain. https://www. bde. es/webbde/en/ estadis/ccff/ccff. html	2002–2018

the Spanish total debt over GDP, which captures the progression of risk appetite and the debt accumulation process. It is expected that when total debt over GDP increases, the risk premium will increase.

The estimation method, according to the corresponding tests in order to correct by autocorrelation and heterocedasticity, assumes a generalized autoregressive conditional heteroskedasticity model (GARCH) (1,1) for the variance of the residuals. So the technique used is maximum likelihood. The equation on the determinants of the Spanish bond risk premium (SBRP) is formulated as follows, where u_t refers to the residuals (RESID):

$$SBRP_t - SBRP_{t-1} = \beta_0 + \beta_1(Annual\ Variation\ CPE3MA)_t + \beta_2 Ln(SCI)_{t-1}$$
$$+\beta_3 ECBDUMMY_{t-1} + \beta_3(Total\ Debt/GDP)_{t-1} + u_t, u_t = v_t\sigma_t, \sigma^2{}_t = \alpha_0 + \alpha_1 u^2{}_{t-1} + \alpha_2\sigma^2{}_{t-1}$$

$$(1)$$

The results of the estimation on equation (1) appear in Table 10.

As expected, the Spanish synthetic consumption indicator, a proxy of economic activity, has a negative and significant effect on the variation of Spanish bond risk premium. In a phase of economic growth, the Spanish bond risk premium decreases. The dummy variable related to monetary policy has a negative and significant effect, that is, a monetary policy of preemptive stabilisation (Draghi speech) and the ECB quantitative easing reduces the Spanish bond risk premium. The annual changes in price expectations three months ahead in the building sector has a positive and significant effect on the variation of Spanish bond risk premium. The process of formation of the housing bubble makes the Spanish economy vulnerable so that the increase in hosing price expectations increases the risk premium. Finally, the progression of risk appetite and the debt accumulation process, measured by the Spanish total debt over GDP, has a positive and significant effect. The higher Total Debt over GDP, the higher Spanish bond risk premium.

This result allows us to evaluate indirectly the impact of the overestimation of GDP, calculated in the previous section, on the Spanish bond risk premium. From the estimation of equation (1) we can conclude the overestimation of GDP has allowed for significant savings in interest payments through a lower risk premium. Specifically, this overestimation of the Spanish GDP has meant an annual reduction of the Spanish bond risk premium in 70 basis points or 0.70%, which means roughly annual of savings around 3,000 millions Euros. But there is one qualitative effect possibly much more important: it prevents a default from being activated.

These results, on the other hand, can be related to the debate on measuring the output gap in Europe and the cyclically adjusted budget (Costantini, 2017). If economic growth were much lower than the estimated potential, the output gap would be negative and the cyclically adjusted public deficit would increase. If that were to

Table 10. *Estimation of the variation of Spanish bond risk premium*

Dependent Variable: $SBRP_t$-$SBRP_{t-1}$			
Method: ML ARCH—Normal distribution (BFGS / Marquardt steps)			
Sample: Q1 2002-Q4 2018			
Explanatory variables	**Coefficient**	**Std. error**	***t*-ratio**
Constant	0.047856	0.000249	192.115***
(Annual variation CP3MA)$_t$	1.00E-05	5.51E-06	1.818124*
$Ln(SCI)_{t-1}$	−0.011659	6.68E-05	−174.4795***
ECBDummy$_{t-1}$	−0.003963	0.001059	−3.741843***
(Total debt/GDP)$_{t-1}$	0.002172	0.000175	12.40412***
Variance equation			
C	−9.23E-10	1.94E-08	−0.047436
RESID $(-1)^2$	0.611273	0.186469	3.278152***
GARCH (-1)	0.64428	0.046751	13.78123***

Note: (***) significant coefficient at 1%; (**) significant coefficient at 5%; (*) significant coefficient at 10%.

happen, economic prescriptions based on the formulation of statistical estimates, output gaps, and political interpretations supported by questionable theoretical approaches are put into practice. Specifically, a growing cyclically adjusted deficit is interpreted as the need to carry out structural reforms that may also lead to wage devaluations and budget cuts, deepening recession. In this scenario, risk premiums increase. If the real GDP is notably overestimated, as we have detected in the Spanish case, the output gap would be underestimated so that the cyclically adjusted public deficit would be less, and so does the pressure of budget cuts, decreasing the risk premiums.

5. Some brief lessons for economic policy: The role of private debt and Hyman Minsky financial instability hypothesis

The overestimation of the Spanish public accounts, which has benefited the Treasury, was unknown to investors. This shows that markets are not efficient, and that information is incomplete. It is the umpteenth example that implies some of the hypotheses underlying Neoclassical Theory are not fulfilled: the efficient markets hypothesis; the investors' rational expectations hypothesis; the complete markets hypothesis. So it is necessary to go beyond the theory of adverse selection or moral hazard. To understand what has happened from a macroeconomic point of view, we must look for another theoretical framework, namely the role of private debt under Hyman Minsky's hypothesis of financial instability.

The overestimation of Spanish public accounts took place in a context of the inability of Spanish academic orthodoxy, and economic and monetary authorities to understand the role of private debt in the economy. As a consequence, they did not foresee the magnitude of the economic contraction during the Great Recession. Although this did not only happen in Spain, but also see, for example, the optimism about the state of the macro in Blanchard (2009), the perception at the beginning of the Great Recession that Spanish banks were on the margins of the financial crisis, which proved excessively optimistic, subsequently sharpened the real negative effects on employment and output beyond the perspectives existing in 2009 (Bentolila et al., 2017). Therefore, at the centre of both the Great Recession and the overestimation of Spain's national public accounts is the role of debt, which is by no means neutral (Keen, 2012a, 2012b). Instead of necessarily producing equilibrium between aggregate demand and aggregate supply, aggregate demand will exceed aggregate supply if debt grows, and fall below aggregate supply if debt falls. The nominal volume of money is important, and banking and debt dynamics must be included in macroeconomic models, rather than ignoring them as neoclassical economic theory usually does. They must also be taken into account when implementing fiscal policies.

This process of debt accumulation within the *financialisation* of the global economy (Palley, 2007; Stockhammer 2010; Fumagalli and Lucarelli, 2011; Toporowsky, 2013; Mazzucato and Wray 2015) presents two clearly defined time phases. In the first, the emptying of the economy, low wages, and the increase in underemployment were compensated by basically more private sector credit and debt, which became the solution to stimulate demand and the rate of return on capital. While it lasted, corporate profits multiplied, and wages were depressed. Once the collateral that fuelled that debt exploded, we entered into a private balance sheet recession.

Fumagalli and Lucarelli (2011) point out that financialization is not limited to changing the behaviour of consumer-savers; investments have changed as well. Let's take a look at the 1990s where new industrial technology favoured over-financed leverage. These excesses caused the stock market to fall in 2000–2002, but they did not really stop economic growth and were not interpreted as evidence of financial fragility. The financial bubble was simply delayed, contained mainly by the Fed's low-interest rate monetary policy.

In the second phase, during the Great Recession, private sector actors—banks and creditors—were subsidized, financed and rescued through an expansion of sovereign debt, while fiscal austerity and wage devaluation were promoted in order to improve competitiveness. However, an alternative was not taken. Toporowsky (2013) points out the practical and political irrelevance of exchange rates in an economically and financially integrated Europe. An independent monetary policy completely loses its attractiveness under modern banking balances, being necessaries other policy instruments to reverse the debt deflation affected Europe. In the absence of monetary solutions to the crisis, it is important that primary fiscal deficits and public investment are maintained, and even increased until nominal GDP starts to grow faster than public debt. At the same time, it is vital to maintain liquidity in the money markets to avoid debt deflation. In this senses, Toporowsky (2013) proposes issuing government bonds maturing at the same time as European Central Bank refinancing operations.

During this process, two economic policy mistakes had a very negative effect on the Spanish economy, producing an undesirable collateral effect which was the overestimation of public accounts. First, the European Central Bank in 2002 implemented an excessively expansive monetary policy, with the ultimate aim of stimulating Germany's economy so that it would not have to expand its growth via fiscal policy (Koo, 2012b). This accelerated and inflated the housing bubble in Spain to unprecedented levels (Piketty and Goldhammer, 2014). There would have been no need for such an expansionary monetary policy by the ECB if Germany had used fiscal policy to stimulate its domestic demand. The problem stems from the establishment of ad-hoc fiscal deficit and sovereign debt stock limits in the Maastricht Treaty, which implies unreasonable monetary policy requirements for the ECB during this type of recession.

Second, the Great Recession revealed an inefficient institutional design of the Euro which did not anticipate that guaranteed bank liabilities would eventually be converted into government debt in crisis situations. What started as a private debt problem ended up contaminating public debt.

In short, during the Great Recession, what was optimal and efficient, economically and socially, was not done (Varoufakis et al., 2013). As a necessary, but not sufficient condition, in a private debt crisis, the size of the banking system must be reduced in line with the real economy at the expense of management, owners and creditors; at the same time, part of the debt must be restructured (Leigh et al. 2012; Bunn and Rostom 2014; Mian and Sufi 2014; Dobbs et al. 2015). But further reforms of the financial system are needed. The major international financial centres must be placed under public supervision. However, this is not enough. It is also necessary to promote the full separation of commercial and investment banking through the global restoration of the Glass-Steagall Act. There is also a need to control ex-ante the growth of credit (Keen, 2012a, 2012b), rather than punishing debtors ex-post, which is a consequence of the endogenous nature of money. The systemic banks, taking advantage of the moral

hazard they are 'too big to fail', are being subsidized by taxpayers in different countries. This must stop. There is a need to consider imposing limits on the concentration of deposits, loans or other bank indicators, ultimately, limiting the size of banks.

But the current lack of private productive investment will only be corrected when the state implements massive investment projects focused on energy, transport, education, research and development in water treatment infrastructures (Varoufakis et al. 2013), which will later serve as a drag on the private sector. In an environment of exorbitant debt like the current one, you cannot avoid using the central banks' balance sheet to implement fiscal policy, via *seigniorage*, applying modern monetary theory and its guaranteed work program (Wray 2012; Mitchell et al. 2016; Wray et al. 2018).

5.1. The seminal works of Hyman Minsky

The theoretical basis of this approach is found in Hyman Minsky. In the late 1980s, and throughout the first half of the 1990s, Hyman Minsky's main research project focused on redirecting funding towards investment in productive capital. This includes both public and private productive capital, as well as human capital; in short, everything that has to do with productive capacity.

Minsky argued that in order to reform the system, it must be understood. It started with a simple idea: capitalism is a financial system. This is a view diametrically opposed to the neoclassical theory that denies in all its forms that the financial system plays a relevant role. Neoclassical theory is unable to determine the role of money in its model.

However, the financial structure of the economy is important. In particular, the financial structure of the global economy has become much more fragile over the last half-century. And this fragility often ends in economic stagnation or even deep depression. And obviously, a stagnant capitalist economy will not promote the development of capital. However, this can be corrected and improved by an appropriate reform of the financial system as a whole.

According to Minsky, banks are not mere intermediaries. On the contrary, banks 'create money'. The banking business consists of 'accepting' the responsibilities of borrowers and making payments on their behalf by crediting the accounts of the beneficiaries of the expenditure. This is a 'liquidity-creating' business, but where the ultimate provider of such liquidity is the government through the central bank. The rest of liquidity creation is mere 'leverage' of money issued by the central bank.

The problem is that the business of creating liquidity is highly pro-cyclical: it expands during the economic boom and evaporates during a crash phase. Financial crises begin with a race for liquidity, but where what was once considered liquid is no longer liquid. During this phase, spending and investment are reduced, which reduces revenues and debt service capacity. Suddenly, the liquidity crisis turns into an insolvency crisis, a much more difficult problem to solve. This is the core of Minsky's hypothesis of financial instability.

Minsky argued that the reduction in bank concentration—exactly the opposite of what is being done—coupled with the need to force banks to retain the risk, will redirect them back to traditional banking. The government must play a fundamental role in new regulation and the supervision of financial institutions. Banks should be supervised by trained and committed professionals from regulatory agencies. Minsky also said the government must play a vital role in the direct provision of financial services:

from payment systems, through direct loans or guarantees in joint public-private actions, to financing R&D and other parts of the innovation process.

6. Conclusions

The nominal volume of money is important so that banking and private debt dynamics should be included in macroeconomic models, rather than ignoring them as neoclassical economic theory usually does. Private debt fed by a financial and/or real estate bubble matters. Central Banks should be preventive, including asset inflation as one of its objectives. This would limit subsequent private balance sheet recessions. This is especially true when after the bursting of a financial or real estate bubble, the banking system, which created the debt, is rescued at the expense of the taxpayers. In this case, private debt is transformed into public debt, deepening a balance sheet recession at a time when the economic authorities, mistakenly, implemented fiscal austerity.

European and Spanish policymakers, deeply neoclassical, committed two economic policy mistakes, which had very negative consequences on the Spanish economy. The first economic policy mistake was that the European Central Bank in 2002 implemented an excessively expansive monetary policy in order to stimulate Germany's economy so that it would not have to expand its growth via fiscal policy (Koo 2012b). This accelerated and inflated the housing bubble in Spain to unprecedented levels, and it became one of the biggest real estate bubbles in history. That was the seed for the Great Recession in Spain. It is deeply discouraging to observe that from the start of the Euro zone crisis there were more efficient and equitable solutions to the debt problem, but they were ignored. There was an alternative path, debt write-off with far less austerity. However, this choice was not taken.

In this sense, the second economic policy mistake emerged from an inadequate institutional design of the Euro that eventually allowed guaranteed bank liabilities to be converted into government debt in a balance-sheet recession. Therefore, what started as a private debt problem ended up contaminating the public sector debt. That deepened the Great Recession in Spain at a time when the European economic authorities were implementing fiscal austerity. As a result, a recessive process was being fed back through the increase in sovereign and banking risk premiums and the implementation of a restrictive fiscal policy that intensified the recession. However, there was one fact that limited these negative effects. We are referring to the overestimation of Spanish GDP in the public accounts for the period 2007–2013, which delayed the Minsky moment of the Spanish economy.

We quantify the unexplained overestimation of the Spanish GDP for the period 2007–2013 using three different methodologies. Each one corresponds to the alternative approaches used to estimate GDP. The first approach refers to the estimation from the supply side; the second has to do with the income side; and the last one was done from the demand side. All three approaches lead us to a similar conclusion—an overestimation of the Spanish GDP by 17% to 18%.

Therefore, it is in the context of a strong increase in risk aversion between 2008 and mid-2012, and in the face of the growing difficulties of refinancing Spanish private and public debt, when the overestimation of the Spanish GDP aggregates for the period 2007–2013 took place. So, we analyze the macroeconomic determinants of Spanish sovereign bond risk premium, for the period 2002–2018, using quarterly data, and,

specifically, if the independent variable Total Debt/GDP is statistically significant. We conclude the overestimation of GDP has meant an annual reduction of the Spanish bond risk premium in 70 basis points or 0.70%, which means roughly annual savings of around 3,000 million Euros. But besides it has probably avoided a default from being activated.

However, this overestimation of Spanish GDP has negative implications too. Spanish ratio of debt to GDP would be higher, just like its public deficit. That means that without monetary sovereignty any increase in risk aversion would seriously complicate its financing. Spain could enter into a vicious cycle of debt crisis/banking crisis, with further impoverishment of Spanish citizens. This overestimation also means that our tax burden would be one of the highest in Europe. Thus, Spain's economy is extremely vulnerable.

Some lessons in terms of economic policy should have been learned from the detailed analyses in this paper. There was an alternative path, debt write-off with far less austerity. However, debt has been used as an excuse to tighten the neo-liberal economic order. Today, more than ever, deep reforms of the financial system are needed. The major international financial centres must be placed under public supervision. It is also necessary to promote the full separation of commercial and investment banking through the global restoration of the Glass-Steagall Act. If we have leverage cycles, after debt write-off the answer lies in controlling credit ex-ante rather than punishing debtors ex-post. Finally, the monetary and economic authorities should dispense with the moral hazard 'too big to fail', which has been used to subsidize systemic banks. They should establish limits on the concentration of deposits, loans or other bank indicators. In other words, establish limits on the size of banks.

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