



UNIVERSITAT DE
BARCELONA

The classical gold standard and the Mediterranean periphery: the Spanish case (1870-1913)

Alba Roldán Marín

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The classical gold standard and the Mediterranean periphery: the Spanish
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Dedicatoria / Dedication

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growth
money
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crisis
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fiscal
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counterfactual
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Introduction

“There is no consensus on the cause or causes of the divergence. (...) [We] need to change the conversation and put forward one of the big debates – perhaps the biggest debate – in Spanish economic historiography: to what do we owe this long divergence?”

Albert Carreras and Xavier Tafunell (2004, p. 209)

“Examining the monetary question at that time also provides us with a particularly interesting perspective (...) the politics of money has multiple facets: ideological arguments and power relations, economic factors and external responses. Its results affect not only the economy, but the fate of society itself: so we are facing an objectively "greater" issue.”

José María Serrano (2004, p. 16)

Overall picture of the classical gold standard

Can the study of the classical gold standard period help to understand this divergence?¹ The gold standard was the dominant international monetary system during the period under study: 1870-1914. The gold standard was a monetary system characterised by fixed exchange rates, free convertibility and perfect capital mobility that entailed an automatic mechanism to correct any disequilibrium in the balance of payments (Martín Aceña et al., 2000, p. 3). The gold-based system was notable for the stability of exchange rates.

The geographical scope attained by the monetary regime enables to gauge its importance and its success. The regime went from four members in the eighteen-fifties (England, Canada, Australia and Portugal) to twenty-eight countries prior to the First World War. Between 1870 and 1913, up to 35 countries were linked to gold. Most European countries chose to adopt the gold standard in the eighteen-seventies.

The monetary system based on gold spread rapidly. For their part, Portugal, Canada and Australia had already been members of the regime since 1854, 1853 and 1852, respectively. The defeated French were forced to pay five billion francs in war reparations to Germany, which took

¹ See figure 1 in chapter 1. For a state of the art on this question, see Carreras and Tafunell (2004).

advantage of the situation to sell silver and buy gold. Germany, Europe's second power, adopted the gold standard in 1871 (Eichengreen, 1985, p. 5). Germany's decision to adopt the gold standard was caused, mainly, by its financial relationship with the United Kingdom and the compensation received from the French after the Franco-Prussian. The old monetary regime (a bimetallic system) was considered a thing of the past, and so Germany could adopt the gold standard without losing face. As Germany was the leading industrial power in continental Europe, the attractiveness of gold increased significantly (Eichengreen, 1996). From then on, the remaining European countries opted to join the same monetary system as their trading and financial neighbours. The general expectation was that the gold standard would provide a solution to the shocks that assailed the global economy in the 1870.

Denmark, Netherlands, Norway, Sweden and the countries of the Latin Monetary Union were among the first to adopt the gold standard because of their trade with Germany. The Scandinavian Monetary Union consisted of Norway, Denmark and Sweden joined the gold standard in 1873 (Bordo and Schwartz, 1984, p. 362). France also followed in 1873 and Italy in 1884, though the latter only managed to remain in the system for ten years and is not regarded as a strict follower of the rules of the gold standard.² Austro-Hungary did not formally institute the convertibility of its currencies into gold. However, it fixed its currency to those of countries on the gold standard, and its exchange rate remained largely stable with the exception of specific currency crises. The United States joined the gold standard in 1879.³ Argentina, which would repeatedly enter and leave, took part in the gold standard in the periods 1867-1876, 1883-1885 and 1899-1914 (Ford, 1962). By 1880, most countries were on the gold standard. Brazil, whose situation resembled that of Argentina, remained on the gold standard in the periods 1883-1889 and 1905-1914. Chile, for its part, stayed in the regime between 1895 and 1898. Mexico, Peru and Uruguay also instituted the convertibility of their currencies at some point. Russia and Japan adopted the gold standard in 1897 (Mosley, 2003, pp. 10 and 12). A year later, India tied its currency to pound sterling and, thereby, to gold, as did Ceylon and Siam (Eichengreen, 1996, p. 26).

The challenges of managing the bimetallic standard were growing increasingly problematic.⁴ Moreover, many historians attribute the triumph of the gold standard to France's defeat in the Franco-Prussian War due to the amounts of silver sold by Germany and the discovery of silver mines in Nevada, California and elsewhere in the 1850s (Eichengreen, 1996, p. 24, and Sabaté, 2000, p. 47). However, according to Eichengreen, the answer lies in industrialization. The steam

² For France, see Flandreau (1996). However, Bordo (2005, p. 223) considers that France adopted the gold standard in 1878. For Italy, see Bordo and Rockoff (1996, p. 401), and García Iglesias (1999, p. 6). Italy had gold convertibility from 1861 to 1866 in a bimetallic system.

³ Eichengreen (1985, p. 5), Bordo (1989, p. 19), and Bordo (2005, p. 223). Bordo (1981, p. 2), and Eichengreen (1996, p. 30), underscore that the gold standard was limited until 1900, the year that the US passed the Gold Standard Act, which lifted requirements on the purchase of silver.

⁴ For any additional information, consult De Cecco (1974).

engine helped overcome technical barriers. Great Britain, which had been in the monetary system for years, had become the leading world power in the wake of a successful process of industrialisation. In addition, the English were the primary source for external finance. As a result, Great Britain became the model to follow for countries that were in need of capital or wanted Great Britain as a trading partner. The triumph of monometallism, was mainly the result of Great Britain's importance on the world stage.

The gold standard was not the result of a planned process. Gallarotti (1995) describes it as a system of "spontaneous order". Bayoumi and Eichengreen (1996, p. 165) wrote that it "*constitutes an analytical mystery and an important policy question*".⁵ The key was considered to be commitment, i.e., credibility (Krugman, 1991 and Svensson, 1994). There were varying degrees of compliance with the gold standard.⁶ Few countries were fully committed. For many, the gold-based monetary system was more of an aspiration than a practice (Martín Aceña et al., 2000, p. 2). In response to an economic shock, periphery often pursued measures that ran contrary to the rules of the gold standard in order to promote recovery. If the international financial community was convinced of a country's commitment to gold, its short-term economic policies were less important. A country could violate the rules of the game in the short run, because nobody doubted that once the shock had passed it would take all necessary steps to defend convertibility and the exchange rate (Eichengreen, 1996, pp. 42 and 46-49, and Bordo and Rockoff, 1996, p. 391).

Costs and benefits of being the gold standard. A brief state of the art.

One of the successes of the gold standard was that it preserved exchange-rate stability throughout much of the world (Triffin, 1985, p. 128). This created a climate of monetary stability that proponents of the regime credited with contributing to economic growth. In general, however, the positive effects of stability and growth were limited to advanced economies. A large number of the countries on the periphery experienced major exchange-rate fluctuations and instability (Triffin, 1985, p. 128). Joining the gold standard was easy for the industrialised economies at the core of the regime. By contrast, it was not easy for the periphery countries, which had to undertake painful and sometimes unbearable adjustments in their domestic economies (Martín Aceña et al., 2000, p. 2). Despite the difficulty of those adjustments, many countries on the periphery strove to adopt the gold standard.

Bordo and Rockoff point out that being on the gold standard was a sign of good behaviour that led to greater access to capital markets, lower interest rates on borrowing and a higher volume of

⁵ Quoted in Cesarano et al. (2010).

⁶ Bordo and Rockoff (1996, p. 396). The different ways of following the monetary regime can be boiled down to four: some countries remained on the gold standard throughout, some left but returned at original parity or they followed some rule of non-convertibility, some did not join but shadowed the gold standard, and some suspended payments and devalued their currencies.

capital inflows.⁷ In their view, belonging to the gold standard ensured that a country was following prudent monetary and fiscal policies. Central banks were committed to gold and they could not use monetary policy to finance government debt. It is supposed that this forced governments to face structural problems and control the budget. Thus, it provided fiscal credibility. As a result, the risk of default fell because there was complete trust that a member country would take action to avoid such an outcome.⁸ In the same study, Bordo and Rockoff point to the need for capital in the developing economies on the periphery as a reason for them to take all possible steps to join the international monetary system.⁹ Beyond the benefit of easy access to foreign capital, Bordo and Rockoff highlight three additional advantages for countries that joined the gold standard: smaller fiscal deficits than non-members, a more stable growth in their money supply and lower inflation rates (Bordo and Rockoff, 1996, p. 416). A further advantage was the possibility of converting any currencies subject to the same standard. This promoted trade relationships and capital movements among countries in the gold area.

The gold standard worked well for decades. However, it seems that peripheral economies were unable to join and take advantage of this monetary system. We need to know whether peripheral countries would have been able to adopt the gold standard and whether the benefits would have outweighed the costs. The fact that that British capital during the period of the classical gold standard did not flow to developing countries with lower levels of capital per worker is consistent with an example of the so-called Lucas' paradox.¹⁰ Contrary to positions claiming that the stability of interest rates and the gold standard's seal of good behaviour should result in better access to capital and increased investment, the study found that belonging to the fixed exchange-rate system

⁷ Bordo and Rockoff (1996, pp. 389, 395, 396 and 416) find that the differences in long-term interest rates charged to countries in the capital markets are correlated to their commitment to gold; the greater their commitment, the lower their rates of interest. This reflection can also be seen in Bordo and Kydland (1995) and in Martín Aceña, Reis and Llona (2000, p. 2). Bordo and Jonung (2001, p. 14) also state that interest rates were lower under the classical gold standard than under subsequent monetary systems.

⁸ Eichengreen (1996, pp. 46-49), emphasises that trust was the factor that permitted optimal functioning of the gold standard in the final decades of the nineteenth century and the first decade of the twentieth century. Because of the trust placed in countries on the gold standard, they could often diverge from the rules of the game over the short run. For additional information on the theory and rules of the game, see Martín Aceña and Reis (2000) and Eichengreen (1985), who devote chapters and sections to theoretical models of the gold standard.

⁹ Bordo and Rockoff (1996, p. 390). Martín Aceña, Reis and Llona (2000, p. 9), also stress that insufficient domestic savings compelled countries to rely on foreign capital to finance economic development.

¹⁰ For more on the Lucas paradox, see Lucas (1990, p. 92). According to neoclassical models, if there are two countries with different levels of capital per worker, the country with the greater level will invest in the one with the lower level. However, the Lucas paradox observes that investment does not flow from developed countries to developing countries in spite of the latter having a lower level of capital per worker. With respect to work, I refer to the working paper by Clemens and Williamson (2000), in which they looked for the determining factors in the foreign investment decisions taken by Great Britain, after they had ruled out that developing countries did not receive capital flows because of a failure in international capital markets.

was not a significant variable in explaining the destinations of British capital flows (Clemens and Williamson, 2000, pp. 6 and 15).

Martín-Aceña et al. (2000) emphasise that the sign of good behaviour might not have been very significant, given that some countries within the gold standard were unattractive to foreign investors, whereas others that were not on the gold standard proved able to attract large sums of foreign capital. In their view, even if it was a credible indicator, the costs could become excessive for countries on the periphery. Were the costs excessive? Martín Aceña et al. (2000) also stress that countries had to deal with a number of problems to maintain convertibility.

Moreover, many periphery countries specialised in exports of raw materials. As a result, their export price indices were more volatile than their import indices. To maintain convertibility, the prices of non-tradable goods needed to be as flexible as the prices of tradable goods. If they were not flexible enough, an external shock would affect the real economy. The economies on the periphery were debtors in the global financial system, making them vulnerable to the withdrawal of funds in times of financial constraint (De Cecco, 1974; Temin, 1995, p. 28 and Bordo Flandreau, 2003, p. 420). In addition, speculation was a key problem under the gold standard.

A loss of confidence would spark a speculative attack on the currency in question (Eichengreen, 1996, pp. 46-49; Bordo and Jonung, 2001, p. 14, and Bernanke, 2015, p. 26). Countries with weak fundamentals experienced capital flight. Self-fulfilling expectations magnified and intensified the currency and financial turmoil. Bond spreads rose to high levels, fragmenting financial markets across borders. (Corsetti et al., 2019). Credibility varied enormously between the core and the periphery (Hallwood et al., 1996, p. 129; Bordo and Flandreau, 2003, p. 446; Bordo and MacDonald, 2005, p. 326 and Mitchener et al., 2010, p. 54).

In addition, Triffin notes that the adjustment mechanism of the international capital markets was not symmetric (Triffin, 1964). A periphery country always had an interest rate that was a few points higher than the interest rate in the core countries. The effect of an interest-rate hike to halt the outflow of gold was different for a core country than for one on the periphery. In the latter case, the result was not only to increase the cost of borrowing for the state and the cost of financing investments, but it could also generate negative expectations and lead to capital flight.

The highest cost of stability was to forego the use of monetary policy instruments in response to economic problems. In the fixed exchange rate regime, countries lost their monetary autonomy (Obstfeld et al., 2005).¹¹ As a consequence of maintaining fixed exchange rates, economies are

¹¹ Obstfeld and Taylor (2003) consider that international financial history can be explained by appealing to the economic trilemma from the standard Mundell and Fleming model. More on the trilemma can be found in Obstfeld et al.,(2005), Obstfeld et al. (2010). For an approach focus on EMU framework see O'Rourke (2014)

not able to run expansionary fiscal or monetary policies. Most economies relinquished flexibility in their reaction to economic shocks. Accordingly, the countries on the gold standard could suffer from more severe shocks than the countries outside this monetary system.¹² In the face of this discipline, a country could be forced to suffer sharp outflows of gold or rises in unemployment, among other problems, without being able to apply corrective measures.¹³

However, this affected more peripheral or less developed economies. Many core countries did not follow the rules of the game (Bloomfield, 1959). As most were committed to long-term gold standard objectives, the agents considered them to be credible (Krugman, 1991; Svensson, 1994; Bordo and Rockoff, 1996), they could violate the rules in the short term. Therefore, being on the gold standard did not imply the complete loss of monetary policy for core countries in the short run although this was indeed the case in the long run. The periphery had fewer opportunity to break the rules of the game. They faced far more severe consequences than the core: the violation of the norms in the periphery could cause a direct loss of credibility. In this way, peripheral economies suffered from the loss of monetary policy. No less important was the brake that the gold standard exerted on the growth of the money supply. Because the money supply was tied to a metal, its growth did not always follow demand and this created problems of deflation.

In short, the gold standard could be a constraint on potential monetary and fiscal policy actions in reaction to fluctuations in the economic cycle (Bordo and Kydland, 1995, pp. 436-441; Bordo and Jonung, 2001, pp. 12-13, and Bernanke, 1995, pp. 11-12). According to Keynes, the defect of the classical gold standard, in which the exchange rates between a country and the outside world were fixed and the level of domestic prices had to adjust to them, was their excessive slowness and lack of sensitivity in their way of thinking. "*The classical gold standard is not appropriate to overcome [such difficulties] in practice, simply because it cannot produce the readjustment of domestic prices quickly enough*" (Keynes, 1931/1988, p. 180). We could say that peripheral economies such as Spain, with the essential problems that they had in the balance of payments and in the constant public deficits, required this system to be much more flexible and adaptable to economic changes. The gold standard worked because, for a very specific moment of time, it provided not only stable exchange but also a stable price level (Keynes, 1931/1988, p. 179). A fluctuating exchange rate can be preventative for countries prone to spend abroad beyond what their resources allow.

¹² Bordo and Rockoff (1996, p. 416) show how the countries outside the gold standard used exchange-rate fluctuations to cushion the impact of shocks on their economies.

¹³ Bordo and Jonung (2001, pp. 12-13) note that monetary and fiscal policies were subordinated to the maintenance of convertibility. Thus, national targets were relegated to a secondary priority.

Relevance of this research in an international perspective nowadays.

As has been seen, many of the problems posed by the gold standard are the same as the ones raised recently by the euro in the debate between the core and the periphery or the countries of the South and the North. Thus, I work on the debate about fixed or flexible exchange rates because the euro crisis, the great recession and the debate about monetary sovereignty have increased the importance of this topic. The gold standard is an important research topic for economists and economic historians. Peripheral economies such as Spain, Italy or Portugal have suffered a great deal in the recent euro crisis, in a context of fixed exchange rates between euro economies and divergence from the northern countries such as Germany. Eichengreen and Temin (2010) consider that the gold standard and the euro share the attributes of the little girl in the Longfellow poem:

*“There was a little girl, who had a little curl
Right in the middle of her forehead,
And when she was good, she was very, very good,
But when she was bad she was horrid.”¹⁴*

It is important to understand the impact of monetary regimes on economic growth. The era of globalization in the 19th century is particularly relevant today, in the light of the directions currently being taken by countries such as the US (with President Trump) or the UK (with Brexit) during the second globalization.

The gold standard has been compared with the European Monetary Union by top scholars (Friedman, 1997; Bordo and James, 2008; Eichengreen and Temin, 2010; Hoffmann, 2013; James, 2012; Bordo and James, 2014, Eichengreen, 2014; Stiglitz, 2016, among others). Both systems are based on fixed exchange rates and monetary and fiscal orthodoxy (Bordo and James, 2014). The gold standard, like the euro, limited government power because it prevented the manipulation of the exchange rate and excessive fiscal and monetary policies. Hoffman (2013) considers the euro as a proxy for the gold standard for these reasons. Bordo and James (2014, p. 276) emphasize that a period of austerity and rigour before entering a strict monetary regime is required in order to achieve monetary and fiscal orthodoxy. Eichengreen and Temin (2010) point out that severe crises need the stimulus of expansive monetary and fiscal policy, and that this was not possible within the gold standard. For this reason, the topic is relevant today. The adoption of a system of fixed exchange rates and free movement of capital eliminates monetary autonomy (Obstfeld et al., 2005). Obstfeld et al. (2005, p. 424) qualified the gold standard as a period of great globalization, basically with fixed exchange rates, capital mobility and, therefore, limited monetary independence.¹⁵ However, Bordo and James (2014) point that “(...) *the gold standard*

¹⁴ Quote by Eichengreen and Temin (2010, p. 1). They consider that the gold standard and the euro are both extreme forms of the fixed exchange rate: good in times of growth, but a problem in times of crisis.

¹⁵ Domestic political and economic factors affecting the adoption of the new monetary system have been studied by Friedman (1990) and Gramm and Gramm (2004) for the United States and Flandreau (1996) for France.

was a contingent rule—in the case of an emergency like a major war or a serious financial crisis --a country could temporarily devalue its currency. The EMU has no such safety valve.”

Moreover, Sabate et al. (2019, pp. 38-40) underline “*the gold standard and the EMU involved the acceptance of a monetary objective, convertibility into specie during the standard and price stability within the Eurozone (...) the recent crisis has resuscitated the North– South partition that was so prevalent in the gold standard literature*” and “*whenever southern European countries felt compelled to run profligate fiscal policies inconsistent with keeping their prices in line with the international (gold) prices, they would break free from their “golden fetters” (Eichengreen, 1992) and abandon convertibility. In this sense, history provides an interesting contrast for the (so far) contemporary willingness of countries like Greece, Italy, Portugal and Spain to wear what, in the form of fiscal austerity and internal deflation, have become tight (euro) “paper fetters” (Eichengreen and Temin, 2010)*”. Thus, it seems to me extremely important to investigate on the role played by fixed exchange systems on peripheral economies such as Spain during the classical gold standard period to learn lessons that can be useful in the present.

Importance of the thesis questions from economic history literature.

In the late nineteenth century, Spain was the only European country that did not adopt the gold standard. Spain never adopted the gold standard¹⁶ and the consequences for its economy, whether positive or negative, remain a topic of debate to this day. The classic thesis on the issue, which was put forward by Joan Sardà, can be considered a short-term analysis (Sardà, 1987). Sardà stressed the positive effects for the Spanish economy that resulted from not adopting the gold standard. Years later, Solé Villalonga and Tortella backed Sardà’s thesis using some long-term arguments.¹⁷ In opposition, the new economic history laid out a critical thesis similarly based on long-term arguments. The leading exponent of the critical thesis, Pablo Martín Aceña, held that not adopting the gold standard was one of the root causes of Spain’s divergence from Europe between 1883 and 1914 (García Iglesias, 2005, p. 13). Concretely, Martín Aceña (1993, 1997, 2000 and 2017) supports the idea that Spanish economic growth would have been higher under the gold standard.

In the past twenty years, the question has continued to be a matter of concern for a number of the Spanish’s most prominent economic historians. Sudrià and Tirado (2001) have revived Sardà’s thesis, using short-term and long-term evidence to carry out a quantitative analysis whose aim has been to define the effects and consequences of not adopting the gold standard in Spain. I refer to

¹⁶ While there has been debate on the issue, this statement appears obvious today. Indeed, it is accepted by many scholars, including Sardà (1987); Martín Aceña (1981, p. 267); Martín Aceña (1993, p. 135); Tortella (1994a, p. 323); Martín Aceña et al. (2011, p. 3); García Iglesias (2005, p. 62); Serrano (2004, p. 155); Sabaté et al. (2006, p. 310); Martínez Ruiz and Nogués Marco (2014, pp. 9 and 19) and Martín Aceña (2017).

¹⁷ Solé Villalonga (1964 and 1967) and Tortella (1981 and 1994a).

the volume entitled “*Peseta y Protección*” [in English, “*Peseta and Protection*”], in which Catalan et al. (2001), Cubel (2001), Lloná (2001), Ródenas et al. (2001) and Sabaté et al. (2001) seek to show the positive effects for the Spanish economy that resulted from not adopting the gold standard.

In 2004, Carreras and Tafunell looked at the issue from the perspective of economic growth and Serrano made a major contribution to the debate when he published “*El oro en la Restauración*” [“*Gold in the Restoration*”]. In Nogues-Marco’s (2007, p. 208) view, “*Juan Velarde Fuertes contends that Serrano’s argument ‘brings to an end a whole series of debates on the gold standard and Spain’ (Serrano, 2004, p. 191); however, in my opinion, he has instead thrown them open again*”. Cubel et al. (1998), Aixalá (1999), Prados de la Escosura (2003), García Iglesias (2005), Bru and Ródenas (2006), Sabaté et al. (2006), Nogués Marco (2007, p. 208), Martín Aceña et al. (2011), Escario et al. (2012), Betrán and Pons (2013), Martínez Ruiz and Nogués Marco (2014), Martínez Ruiz and Nogués Marco (2017), Martín Aceña (2017 and 2018), Martínez Ruíz and Nogués Marco (2018) and Sabaté et al. (2019), among others, have carried on the debate. However, neither the classic thesis nor the critical thesis can be confirmed or rejected and so the debate remains alive. According to Pedro Lains (2006, p. 185), “*the interpretation of the consequences of not joining the gold standard in the eighteen-eighties (...) will likewise need to be reviewed*”.

Martín Aceña et al. (2000, p. 3) add that “*the debate on the feasibility and the costs and benefits for periphery economies of being on the gold standard is still far from closed*” (this is discussed in chapter one). Moreover, recently published studies underline the relevance of the gold standard for the Spanish case (Martín Aceña, 2017 and 2018, and Martínez Ruiz and Nogués Marco, 2017). Martín Aceña et al. (2011) also consider that “*Spain’s historic detachment from the world monetary system cost the country dearly in terms of both its debt burden and GDP growth, two questions that warrant further research*”. This author highlights that the debt question in relation to the gold standard needs further research for Spain. Sabate et al. (2019) stress that “*the sovereign debt crisis in the Economic and Monetary Union (EMU) reignited the discussion on the sustainability of a single currency without a single fiscal policy*”. Therefore, it seems important to study the fiscal situation in Spain during the period of the classical gold standard (chapter 2).

Serrano (2004) underlines that “*the great question of the possible effect of Spain’s monetary strategy on the country’s development during the Restoration (...) remains to be explored*” considering that more research on the impact of monetary policy adopted during the Restoration (Chapter 3) is required. Moreover, García-Iglesias (2005) defends that neither theory can be confirmed or rejected (considering the two existing theses on the gold standard in Spain). Then, my research in chapter 3 seems necessary. Martín Aceña et al. (2014) point that the cost of having

a different monetary system needs further research. In this way, Martín Aceña (2017, p. 35), considers “*Remaining outside the gold standard was unwise, to say the least, unless it could be proven that its adoption would have been catastrophic for the national economy (...)*” leaving open future analyses of how the Spanish economy would have fared under a fixed exchange rate regime (chapter 4). I find very relevant to understand what would have happened in Spain’s economy if it would have kept the exchange rate stable. Finally, the two periods with higher average of crises depth (understood as a cumulative loss of GDP) are the two globalization periods, 1880-1913 and 1973-2000 (Betrán and Pons, 2013). It is the primary objective of this dissertation to focus on the first period.

While Spain’s divergence from Europe in the late nineteenth and early twentieth centuries has been confirmed, “*the absence of a clear and generally accepted explanation for the progressive divergence of the Spanish economy from the European economy in the three decades prior to the outbreak of the First World War is still the main challenge for the economic historiography of contemporary Spain*” (Carreras and Tafunell, 2004, p. 221).

Contribution of the thesis

Was the gold standard one of the main causes of Spain’s backwardness relative to the European average during that period? To answer this question from the perspective of monetary history, we need to pose a series of further questions: Was there a desire to join the gold standard? Was it even possible to do so? Why didn’t Spain adopt the gold standard? What were the costs and benefits of maintaining flexible exchange rates (i.e., not adopting the gold standard) for a backward country like Spain? Would the Spanish economy (economic growth) have been different under a fixed exchange rate? This thesis aims to understand why Spain was not able to adopt the gold standard, to establish the impact of having a flexible exchange rate on the Spanish economy and to determine whether there was a cost in terms of growth due to the non-adoption of the system.

I study the gold standard in Spain by means of an analysis of the causes and consequences. To establish whether or not the gold standard was favourable for the Spanish economy, we need first to determine whether membership was in fact possible. If we establish that it was possible, then we can assess its hypothetical impact.

The first chapter presents an assessment of the costs and benefits of the monetary system based on gold for the Spanish case between 1874 (the year in which the monopoly of issuing was granted to the Bank of Spain) and 1913. This chapter also serves provides a brief state of the art. Therefore, after the first chapter, the question of Spain’s possibilities of joining the gold standard is addressed in the second chapter, and develops into an analysis of the impact of having a flexible exchange rate on the Spanish economy in Chapter 3. Finally, we hypothesize how the Spanish economy

would have fared with a fixed exchange rate (Chapter 4) and the similarities and differences between Spain and Italy for the period under study (Chapter 5). Each of the chapters of the thesis is outlined below. It is important to recognize that it is not a finished work, nor is it intended to be: It is an ongoing investigation in which much remains to be studied.

First, the major debates on Spain and the gold standard are reviewed in Chapter 1: "Costs and benefits of Spain not joining the gold standard (1874-1914): A review". This chapter presents the state of the art. It divides the main debate on the effect on Spain of non-membership of the gold standard into more specific discussions. First, we discussed the economic problems that made it difficult to adopt the monetary system. Could a country with a structural problem in the balance of payments and a large accumulation of public debt lose its ability to decide on monetary and fiscal policy? The first chapter also introduces the themes that will be studied in chapter 2, i.e., the causes and consequences of not adopting the gold standard. At the end of chapter 1, an approach is presented that differentiates between the short and the long term as a prequel to the question proposed in chapter 3. Chapter 1 argues that the positive or negative evaluation of Spain's decision not to adopt the gold standard depends largely on the theoretical and temporal perspective from which the problem is analysed. If one considers the effectiveness of monetary policy in the short run and values short-term economic stability, then, monetary sovereignty is essential. Therefore, a monetary system such as the gold standard should not be adopted. In contrast, if one considers that the goal is long-term stability, then economic policy and, if necessary, national welfare can be sacrificed in the present for a better future. Thus, a monetary system of fixed exchange rate will be adopted. Finally, it is questioned whether the long term could be a luxury for the Spanish economy. During the era of the gold standard, non-membership allowed Spain to protect itself from volatile fluctuations in the economic cycle. This is discussed in chapters 3 and 4. In summary, this first chapter presents the main issues of the thesis to be addressed in the following chapters

In chapter 2, "Why were Mediterranean economies unable to join the gold standard? The case of Spain", focuses on one of the main explanations: the accumulation of debt. Spain had constant budget deficits during the end of the 19th Century. While it is true that this was not the only problem, it is considered to be especially given the importance that other works (Sabaté et al., 2006; Escario et al., 2011; Escario et al., 2012, and Sabaté et al., 2015) have assigned to seigniorage. The recurrent deficit in the balance of payments was also one of the main problems of the Spanish economy during that period. Considering that fiscal discipline was an important element for remaining on the gold standard, this paper analyses whether or not Spain's fiscal policy was sustainable and, consequently, whether the country was simply unable to join the gold standard before first solving the structural problems of its economy, which were mainly fiscal.

Chapter 2 is an analysis of the sustainability of Spanish public debt. It is considered that the amount of debt relative to the budget balance must be sustainable in order to adopt the gold standard: otherwise this would lead to gold outflows as happened in Portugal in 1891. Thus, this paper sheds new light on the analysis of Spanish fiscal solvency by applying two different econometric approaches following the studies of Bohn (1998 and 2007) and Afonso (2008 and 2011) respectively. It involves employing a VAR model to estimate the impulse-response functions of public debt and fiscal deficit. I propose the second method in order to check the robustness of fiscal reaction function results. Local impulse responses are run (instead of VAR impulse response) due to the number of observations. While no quantitative studies have been carried out to analyse the unsustainability of Spain's debt for the period under study, there do exist narrative analyses and reconstructions of historical series in Comín (1985, 1988, 1989, 1997, 1999, 2003, 2004, 2005 and 2013) as well as studies on fiscal dominance (Sabaté et al., 2006; Escario et al., 2011; Escario et al., 2012, and Sabaté et al., 2015). As far as I know, there are no studies on fiscal solvency for Spain during that period.

The fiscal reaction function is estimated over the period 1874-1913. The response of primary balance to changes in public indebtedness is tested. The main findings are that primary balance responded negatively to an increase in debt until the beginning of the twentieth century, when the response started to be positive. Moreover, I find that seigniorage did not explain the sustainability of the debt. This result has not been presented before for the Spanish case. According to my results, the sustainability or unsustainability of debt depends not on the seigniorage but on the fiscal policies adopted by Raimundo Fernández Villaverde at the beginning of the twentieth century. In this way, there is a structural change in 1903, the result of the policies carried out by Fernández Villaverde, which had not been found in other studies related to debt or fiscal dominance. The year 1903 marks the point at which the debt went from unsustainable to sustainable. In addition, it was also in 1903 when Fernández Villaverde made a draft bill to manage the entry of Spain into the gold standard. From 1903 onwards, the debt was sustainable and entry into the gold standard was possible. Before 1903, Spanish debt was unsustainable (independently of considering seigniorage or not). Thus, it was very difficult to join the gold standard due to this huge debt accumulation and the weakness of the country's political position until 1903. From that time on, the results suggest that Spain would have been able to join the gold standard. In the future it will be necessary to study the sustainability of the balance of payments and compare the results of debt sustainability and the balance of payments in Spain with a neighbouring country such as Italy.

The second important issue is the consequences of failing to adopt the gold standard (chapters 3 and 4). First, we study whether non-adoption was positive or negative for Spain (chapter 3), in an analysis that distinguishes between the short and the long term and links the two main theories

about the gold standard in Spain. In this chapter I do not study how much Spain lost or won or what would have been better; rather, my aim is to establish whether having a different monetary system (a flexible exchange rate) could have had a positive or a negative impact on the economy. This chapter studies what happened by considering two different temporal approaches. I only intend to assess the impact of having a fiduciary system (thus, of having a flexible exchange rate) on the Spanish economy considering both the short and the long run.

The third chapter contributes to economic history of Spain by linking the two existing theories put forward to explain (the consequences of) Spain's decision not to adopt the gold standard in the late nineteenth century, and does so by comparing the outcomes of short- and long-run approaches. The question in chapter 3 is to understand what happened. What effect did the flexible exchange rate have on the Spanish per capita gross domestic product (GDP)?¹⁸ I assume that the classical thesis, explained above, has a mainly short-term approach while the critical thesis is closer to a long-term analysis. Thus, chapter 3 distinguishes between the short and the long term as previously stated in chapter one. I intend to determine which theory provides a more faithful reflection of the repercussions of not adopting the gold standard, considering a new perspective. In so doing, I study the short-term and the long-term separately. Finally, by using this new approach I establish a point of union between the two theories. I also aim to examine causality between the three macroeconomic policies under study (monetary policy, fiscal policy and exchange rate adjustments). This allows me to understand if the path followed by exchange rate was due to expectations, due to the monetary policy among other explanations. Moreover, I can check in different way what was underlined by Sabaté et al. (2006), Escario et al. (2011), Escario et al. (2012) and Sabaté et al. (2015).

To do this I use autoregressive distributed lag (ARDL) models to distinguish between the short and the long run. The empirical results obtained from applying an autoregressive distributed lag model (ARDL) framework are reported. This ARDL analysis reveals that the expansionary monetary policies implemented had a positive impact on Spain's output in the long-run. Exchange rate had a positive impact on Spanish output in the short run but not in the long run. The study confirms how adjustments to the exchange rate played a prominent short-run role in Spain's economic growth. However, in the long run, the exchange rate had non-significant impact on Spanish GDP when new fiscal data (Comín, 2017) is used and negative and significant when classical data on fiscal balance (Comín and Díaz, 2005) is used. Thus, both theories are correct if a distinction is made between the long and the short term. This paper provides new empirical evidence for the core-periphery debate through an analysis of the impact of being or not being in

¹⁸ Chapter 3 analysis is done considering real GDP.

the gold standard by dividing the analysis between the short- and the long-run. Thus, it sheds new light on the developments in Spain at the time of the classical gold standard.

Although there is no chapter devoted to this issue, the appendix presents new series for the real effective Spanish exchange rate between 1870 and 1913. Aixalá (1999) had used Sardà's series of wholesale prices and that had been strongly criticized (Bustelo y Tortella, 1976, p. 142; Segura, 1983, pp. 177-178; Prados de la Escosura, 1993, p. 41; Martínez Vara, 1997, p. 89 and Morellà, 1997, p. 625). Aixalá' series appears in Martín Aceña and Pons (2005) as part of the historical statistics book edited by Carreras and Tafunell (2005). Therefore, I decided to build two new series for Spain: one with Leandro Prados de la Escosura's deflator and another with Jordi Maluquer de Motes' Consumer Price Index. The results of this thesis do not depend on the real effective exchange rate used; they do not change. The results for both estimations can be found in the Annexes. Chapter 4 also uses this real effective exchange rate estimation.

Chapter 4 "Did the non-adoption of the gold standard benefit or harm Spanish economy? A counterfactual analysis between 1870-1913" answers the following question: what would have happened if we had had a fixed exchange rate? Spain made several attempts to adopt the monetary system. What would have happened if one of these attempts had succeeded? The case of the Spanish economy offers an opportunity to estimate counterfactual analysis in a country that never adopted the gold standard¹⁹. Thus, counterfactuals are estimated in order to compare economic growth under the gold standard (with a fixed exchange rate) and economic growth outside the gold standard (with a flexible exchange rate). This paper is an attempt to draw an overall picture of what would have happened if Spain had kept its exchange rate stable (if there had been no exchange rate shocks affecting economic growth) between 1870-1913. It is said that in the face of dramatic economic shocks, the rigidities of the monetary system could have inhibited recovery, particularly in countries on the periphery. Would the impact of business cycles have been much greater under a fixed exchange rate regime?

To address this question, I assess the attempts to join the gold standard. Then, I consider whether having a flexible exchange rate damaged Spain's economy, and whether Spain should have been adopted the gold standard or not (counterfactual analysis). After that, the importance of macroeconomic policies on economic growth is studied: that is, how much of the fluctuation in economic growth is explained by each policy shock and how this effect changes over the years. To determine whether non-adoption of the gold standard was beneficial or detrimental for the Spanish economy, I run a counterfactual analysis of what would have happened if Spain had kept

¹⁹ Sardà (1987), Martín Aceña (1981, p. 267), Martín Aceña (1993, p. 135), Tortella (1994a, p. 323), Serrano (2004, p. 155), García Iglesias (2005, p. 62), Sabaté et al. (2006, p. 310), Martín-Aceña et al. (2011, p. 3), Martínez Ruíz and Nogués Marco (2014, pp. 9 and 19), Martín-Aceña (2017) and Sabaté et al. (2019).

its exchange rate stable. The counterfactual analysis is based on the SVAR framework²⁰. This study also aims to analyse how important the instruments of monetary, exchange rate and fiscal policy were in order to explain the Spanish economic growth. I intend to understand which variables helped to increase growth and which ones harmed the economy by analysing the historical decomposition of the variables. As far as I know, for the Spanish case, this type of study (with its focus on estimating a counterfactual analysis) has no precedents for the period spanning the late nineteenth and early twentieth centuries.²¹

My analysis sheds new light on the discussion about the Spain's non-adoption of the classical gold standard, and also provides new empirical evidence for the core-periphery debate during this period. The main finding is that the depreciation of the exchange rate had positive effects on the Spanish economy outside the gold standard, mitigating the effects of the crises during the period 1870-1903. As Fernández Villaverde stated, this was not the time to adopt the gold standard. Before 1903, a fixed exchange rate would have generated deeper falls in GDP than flexible exchange rate. The historical decomposition analysis reveals that adjustments in exchange rates and monetary policy were important for sustaining growth and played an important role in explaining economic growth behaviour until 1903. The exchange rate level helped to improve the terms of trade, promoted exports until the beginning of the twentieth century. The effects of fiscal policy were less significant. After 1903, the adoption of the gold standard would have been possible and positive. Having a fixed exchange rate would not have damaged the economy. If the peseta exchange rate had not been permitted to separate from its historical parity, the growth of the Spanish economy would have outpaced the actual growth at the beginning of the twentieth century. On the other hand, had it entered in 1876, the economic shocks would have been greater and the economy would have been negatively affected in the short term.

The results show that the non-adoption of the prevalent monetary system cannot explain the divergence experienced by Spain before the Great War. The results in chapter 2 show how debt became sustainable 10 years before the war. The results in chapter 3 are inconclusive; however, considering the new data on fiscal balance, it seems that the flexible exchange rate did not have a real impact on Spanish economy between 1870 and 1913. The results in chapter 4 are clear: having a fixed exchange rate would have permitted a higher economic growth at the beginning of the twentieth century but not during the last decades of the nineteenth. Therefore, the monetary system does not seem to have been a cause of the divergence experienced by Spain during the period under study.

²⁰ A formal explanation of SVAR can be found in Sims (1986).

²¹ There are some counterfactual analysis for other cases such as Shibamoto and Shizume (2014) for Japan or Bordo et al. (2004) for the US among others.

Finally, the chapters were not written in the order in which they appear in this document. Chapters 3 and 4 were written first, followed by chapter 2.

Chapter 1: “Costes y beneficios de la entrada de España en el patrón oro (1874-1914): Una revisión”. *†

Resumen

El patrón oro fue el sistema monetario preponderante entre finales de los setenta y la Primera Guerra Mundial. España nunca formó parte de él. El tipo de cambio de la peseta fue flexible. Las consecuencias de no adoptar el patrón oro todavía se discuten. Una parte de los estudios destaca el impacto negativo a largo plazo que esto pudo tener para el crecimiento económico español. Otros señalan que el coste de formar parte de dicho sistema monetario era inasumible para un país periférico como España. El debate sigue abierto.

Palabras clave: Patrón oro, España, tipo de cambio.

Códigos JEL: E42, E52, E63, N10

Abstract

The gold standard was the dominant monetary system between the late 1870's and the First World War. Spain never joined the system. The exchange rate of the peseta was flexible. The consequences of not adopting the gold standard are still a matter of controversy. Some of the studies stress the negative impact this could have for the Spanish long term economic growth. The opposite view points out that the cost of being part of this monetary system was unaffordable for a peripheral country like Spain. The debate is still open.

Key words: Gold standard, Spain, exchange rate.

JEL codes: E42, E52, E63, N10

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I. Introducción

El patrón oro fue el sistema monetario internacional dominante durante el periodo estudiado, 1874-1914.¹ España no adoptó el patrón áureo (Sardà, 1987; Martín Aceña, 1981, p. 267; Martín Aceña, 1993, p. 135; Tortella, 1994a, p. 323; Martín Aceña et al., 2011, p. 3; García Iglesias, 2005, p. 62; Serrano, 2004, p. 155; Sabaté et al., 2006, p. 310 y Martínez Ruíz y Nogués, 2014, pp. 9 y 19). Las consecuencias, positivas o negativas, que la no adopción del sistema monetario internacional tuvo para la economía española son, todavía hoy, objeto de debate.

La tesis clásica sobre la cuestión pertenece al profesor Joan Sardà y consiste en un análisis a corto plazo. Sardà destacó los efectos positivos que la no adopción del patrón áureo tuvo para la economía española. Años más tarde, Solé Villalonga (1964 y 1967) y Tortella (1981 y 1994a) se posicionaron a favor de Sardà utilizando argumentos de largo plazo. La nueva historia económica presentó la tesis crítica con argumentos de largo plazo. Su máximo exponente, Pablo Martín Aceña, consideró la no adopción del patrón oro como una de las causas fundamentales de la divergencia que vivió España respecto a Europa entre 1883 y 1914.

En los últimos quince años algunos de los historiadores económicos más notables del país se han seguido preocupando por la cuestión. En el libro de homenaje a Joan Sardà, *Peseta y Protección*, se debate la tesis del profesor catalán con evidencias de corto y largo plazo y se adopta un análisis de carácter cuantitativo que aborda los efectos de la no adopción del patrón oro en España (Catalan et al., 2001; Cubel, 2001; Llona, 2001; Ródenas et al., 2001 y Sabaté et al., 2001). Sin embargo, para García-Iglesias (2005, p. 13), “los resultados obtenidos no permiten respuestas contundentes”.

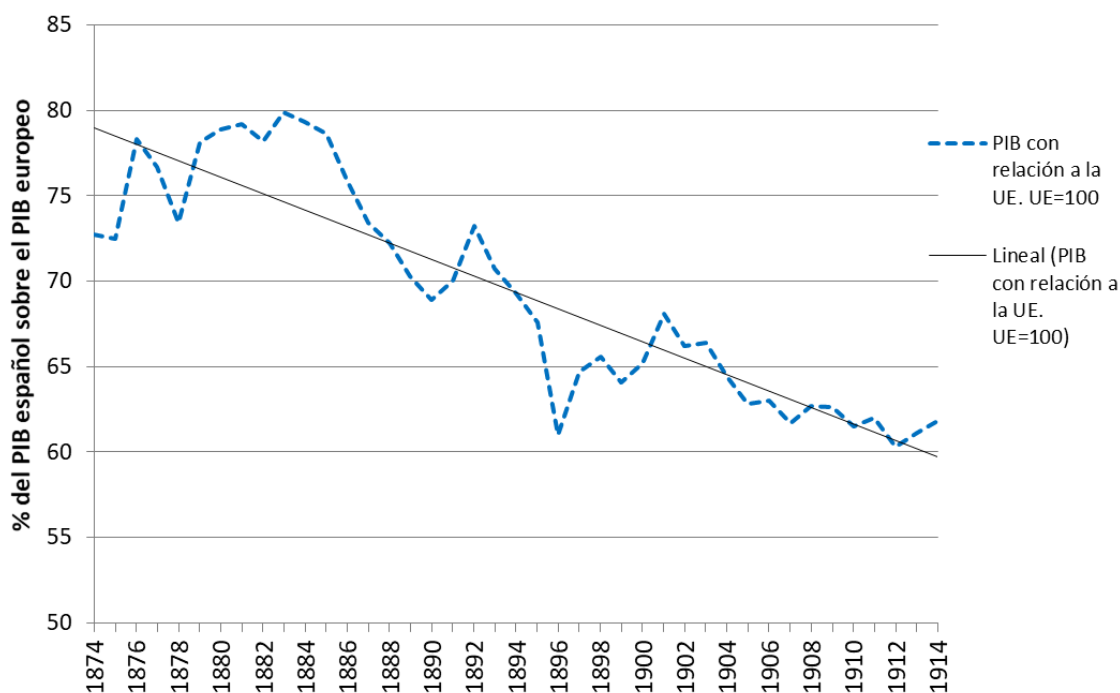
En el año 2004, Carreras y Tafunell aportaron una visión al problema desde el crecimiento económico. En ese mismo año, Serrano publicó *El oro en la Restauración* haciendo una gran contribución al debate. A pesar de todo, Nogués (2007, p. 208) afirma que lejos de cerrarse el debate se ha reabierto.

Prados de la Escosura (2003), García Iglesias (2005), Bru y Ródenas (2006), Martín Aceña et al. (2011) y Martínez Ruíz y Nogués (2014), entre otros, han continuado el debate. Sin embargo, ni la tesis clásica ni la crítica se pueden confirmar o rechazar y el debate sigue vigente.

¹ Para más información sobre las características del patrón oro, ver Eichengreen y Flandreau (1985). En relación a su funcionamiento, ver Eichengreen (2000, pp. 42 y 46-49), Bordo y Rockoff (2000, p. 391), y Bordo (1990, p. 14). Sobre los problemas de los patrones bimetálicos que ayudaron a la hegemonía del patrón oro se puede ver De Cecco (1974). En esta línea, Eichengreen (2000, p. 25), destaca que fueron las externalidades de red del nuevo régimen monetario las que provocaron una rápida adopción por parte de los vecinos de Alemania. Compartir sistema monetario tenía ventajas. Sin embargo, Oppers (1996) y Flandreau (1993) consideran que el patrón bimetálico se podría haber mantenido.

Para Carreras y Tafunell (2004, p. 221), encontrar una explicación sobre la progresiva divergencia de la economía española respecto a la europea entre finales del siglo XIX y principios del XX sigue siendo un gran desafío para la historiografía económica de España.² Martín Aceña et al. (2000, p. 3) afirman, también, que el debate sobre la viabilidad y los costes del patrón oro en España se mantiene, todavía, abierto.

Figura 1. PIB en relación con la UE (UE = 100), 1874-1914



Fuente: Carreras y Tafunell (2004), columna 4 del apéndice.

El presente trabajo abarca el periodo que va desde la concesión del monopolio de emisión al Banco de España en 1874 hasta el inicio de la Primera Guerra Mundial. El objetivo es mostrar la situación en que se encuentra hoy el debate sobre los efectos de la no adopción del patrón oro en el crecimiento económico de España. La principal pregunta del ensayo es la siguiente: ¿Fue posible y deseable la entrada de España en el patrón oro?

El texto pretende dar respuesta a la pregunta principal. En primer lugar se intenta contestar por qué no se entró en el oro. En segundo lugar, se estudia si fue provechoso para España no adoptar el patrón áureo. Por último, se expone una conclusión.

² Véase el gráfico 1.

II. El debate historiográfico en España.

¿Fue posible adoptar el patrón oro?

Existen 2 visiones sobre este asunto. Por un lado, se señala que no existieron motivos que impidieran la adopción del patrón oro en España. Según Martín Aceña (1981, p. 288), España estaba prepa-rada para disfrutar del patrón áureo. A pesar de ello, no se hicieron las políticas adecuadas para entrar en el oro y la decisión nunca fue tomada (Martín Aceña, 1993, pp. 155-156; Martín Aceña et al., 2011, p. 148).

Por otro lado, se considera que no fue posible adoptar el patrón oro. La economía española tenía importantes problemas que impedían su adhesión al oro: la balanza de pagos y la hacienda pública. Estos se analizan a continuación.

La balanza de pagos

Sardà apuntó a la balanza de pagos como motivo que imposibilitó el acceso de España al patrón oro (Sardà, 1987, pp. 184, 185, 193 y 210; Tortella, 1974, pp. 480-481). García Ruíz (1996, p. 164) destacó, también, la importancia de ésta para determinar qué sucedió en el estado español entre finales del siglo XIX y principios del XX. Más recientemente, Catalan et al. (2001, p. 22) y Ródenas et al. (2001, pp. 140-141) apuntan al mismo problema. Los problemas en la balanza de pagos dificultaban la obtención de oro para asegurar un buen ritmo de acuñaciones.³ A su vez si no se podía controlar la balanza de pagos tampoco se podía mantener estable el tipo de cambio a corto plazo. Herranz y Tirado (1996, p. 11), destacan una mayor elasticidad renta de la demanda de importaciones frente a la de exportaciones. La economía española debía hacer frente a estrangulamientos en los pagos exteriores. Esto afectaba a la cotización de la peseta y llevaba a incurrir repetidamente en déficits comerciales. De este modo, el equilibrio acababa dependiendo de elementos no comerciales de la balanza de pagos.

Entre 1876 y 1882 llegó una gran cantidad de capitales del exterior proveniente de deuda pública, inversiones, remesas y exportaciones de vino (Llona, 2001, p. 171). Dichos capitales permitieron paliar los déficits por cuenta corriente.

En 1882, con la crisis financiera internacional, se inicia un cambio de rumbo. La afluencia de capitales hacia España se frenó (Sardà, 1987, p. 174; Martín Aceña, 1993, p. 155; Herranz y Tirado, 1996, p. 12; Llona, 2001, p. 172 y Ródenas et al., 2001, p. 138).⁴ Además, la bonanza del

³ Lo podemos ver en Sardà (1987, pp. 169-170): “(...) es preciso dudar mucho de que el patrón oro se hubiera podido consolidar sin que la economía española hubiera logrado previamente equilibrar su balanza de pagos”.

⁴ Sardà (1987, p. 174): “Las aportaciones de capital extranjero que habían predominado desde los sesenta perdieron su importancia.”.

vino llegó a su fin. Se iniciaron salidas de oro a gran escala.⁵ A tal situación se sumó la exportación de capitales como consecuencia del arreglo de la deuda de Camacho y la tendencia depresiva de la economía internacional hasta finales de los ochenta (Ródenas et al., 2001, p. 138).⁶ El déficit por cuenta de renta fue más importante a partir de 1883 y la balanza comercial continuó con un saldo desfavorable excepto en 1888 y 1890. El pasivo de la balanza de pagos se tuvo que saldar con oro (Sardà, 1987, p. 185).

Entre 1892 y 1901 sólo se consiguió superávit en 1896, 1897 y 1898. La partida negativa más importante fue el servicio de la deuda.⁷ A partir de 1899 con el empeoramiento de la situación del tipo de cambio aumentan las compras de deuda exterior realizadas por españoles.⁸ Por el contrario, con las políticas deflacionarias de Villaverde el déficit comercial fue de los más bajos del periodo (Sardà, 1987, p. 204). Esto permitió sostener la balanza de pagos.

Sardà sostiene que el problema del tipo de cambio se encontraba en la balanza de pagos y que la difícil situación de ésta derivaba de la posición de España como país deudor (Sardà, 1987, p. 205 y Llonja, 2001, pp. 156 y 168). Por contra, Prados de la Escosura (2010, p. 196) apunta que la balanza de pagos no fue responsable de la no entrada de España en el patrón oro. También, (Martín Aceña et al., 2011, p. 5 y Martín Aceña, 1993, p. 154) señalan que éstos no significaron una restricción en el momento de optar por el régimen monetario. Los mismos investigadores consideran que los déficits significaron un porcentaje pequeño del PIB y que el compromiso creíble de entrar en el oro hubiera mejorado el acceso al mercado de capitales, reducido los costes de transacción y, con ello, mejorado la situación de la balanza de pagos. Dentro del patrón oro, los momentos de dificultad de la balanza de pagos se hubieran solventado con entradas de capital.

Para los defensores de la tesis crítica, los problemas en la balanza de pagos son consecuencia de no haber adoptado el patrón oro. En cambio, para los partidarios de la tesis clásica estos problemas son una causa de que España no pudiera acceder al patrón. Se considere una causa o una consecuencia, la balanza de pagos se encontró en una situación complicada entre 1883 y 1914.

La Hacienda pública

La insuficiencia en los recursos de la Hacienda fue el otro factor principal que hizo inviable la vinculación de España con los sistemas monetarios de ámbito europeo (Serrano, 2004; Sabaté,

⁵ La Ley de Gresham actuó por la diferencia entre el valor legal y el valor real de la plata de modo que la moneda mala (la plata) expulsó a la buena (el oro).

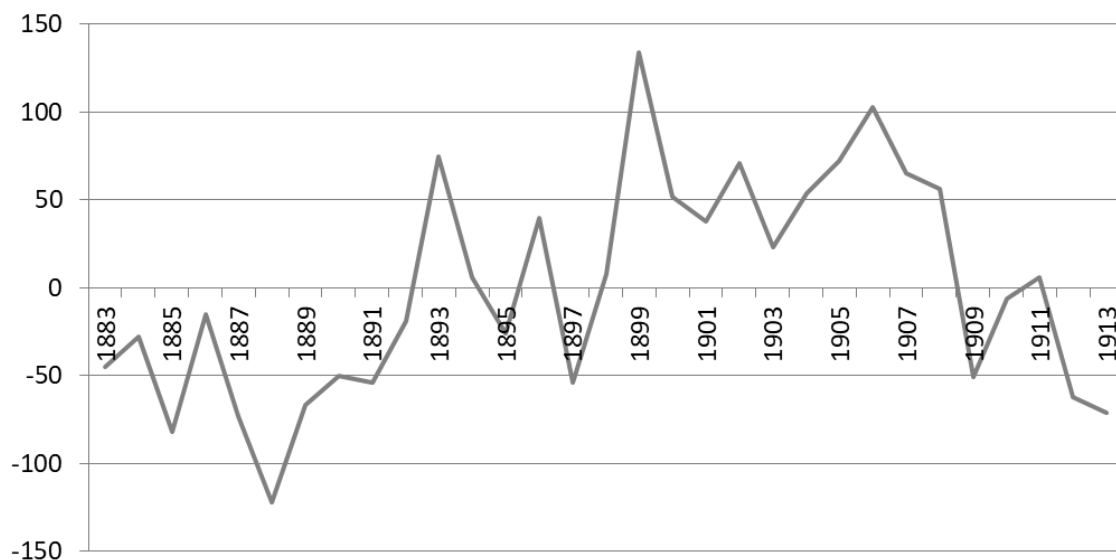
⁶ La conversión fue dispuesta en la Ley del 29 de mayo de 1882 que se encuentra en la Gaceta de Madrid de 30 de mayo de 1882.

⁷ Se observa la intrínseca relación entre los problemas hacendísticos y los de la balanza de pagos.

⁸ Sardà (1987, pp. 193 y 195), considero causa inmediata de la situación la marcha de la balanza de pagos.

Gadea y Escario, 2006 y Sardà, 1987).⁹ El déficit público contribuyó a desequilibrar las cuentas exteriores que iban saldándose con repetidas salidas de numerario (figura 2).

Figura 2. Saldo presupuestario liquidado, 1874-1913 (millones de pesetas).



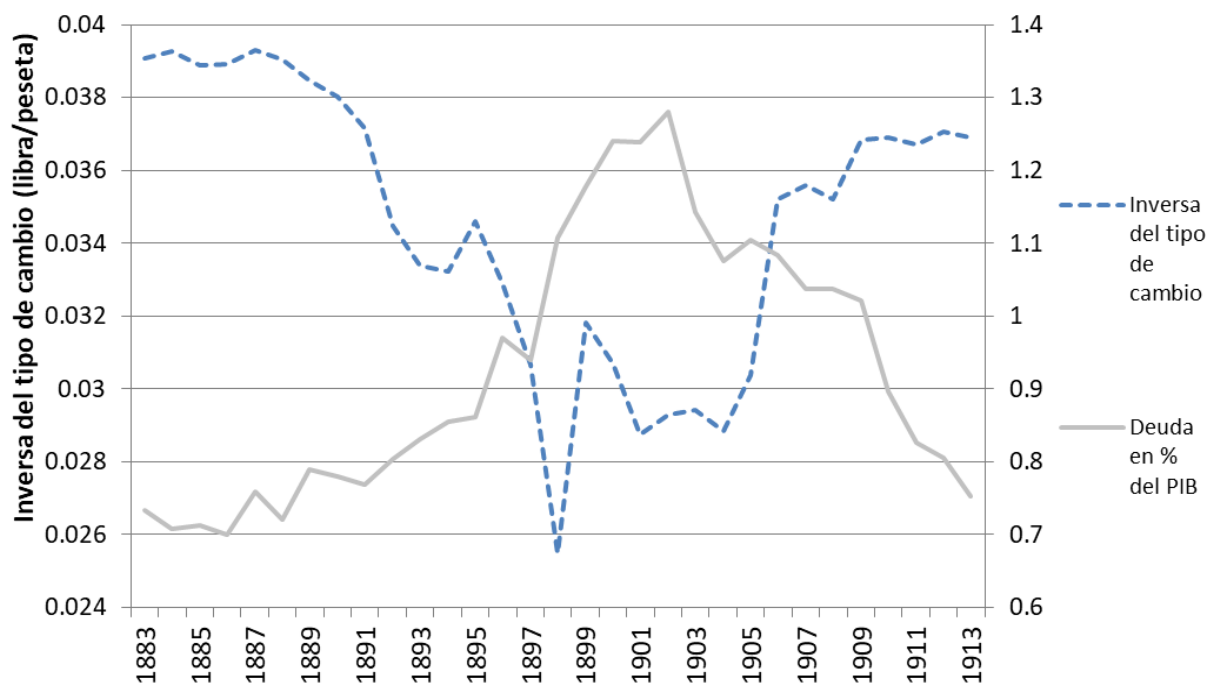
Fuente: Comín y Díaz (2005, pp. 951-952).

Por un lado, España no implantó el patrón oro por el pánico que tenían sus políticos y el Banco de España a que los déficits de la balanza comercial y del presupuesto causaran una salida de oro que hiciera el proyecto inviable (Tortella, 1994a, p. 324,). Esto quedó recogido en el Dictamen de la Comisión del patrón oro (Dictamen, 1929, pp. 24, 61 y 66). Serrano Sanz (2004, p. 156) señala que el déficit dificultó la disciplina monetaria.¹⁰

⁹ Flores de Lemus en el Dictamen de la Comisión del Patrón oro señaló, ya, este problema. Para un análisis exhaustivo sobre la Hacienda del siglo XIX véase Comín (1988).

¹⁰ También, Jordi Nadal ha señalado como muchos de los propósitos de los gobiernos españoles se abandonaron ante la prioridad de cumplir con las obligaciones de pago.

Figura 3. Inversa del tipo de cambio (libra/peseta) y deuda pública como porcentaje del PIB, 1880-1910.



Fuente: Para la deuda pública, Comín y Díaz (2005, p. 961); para el PIB, Carreras et al.(2005, p. 1339); y para el tipo de cambio, Martín Aceña y Pons (2005, p. 704).

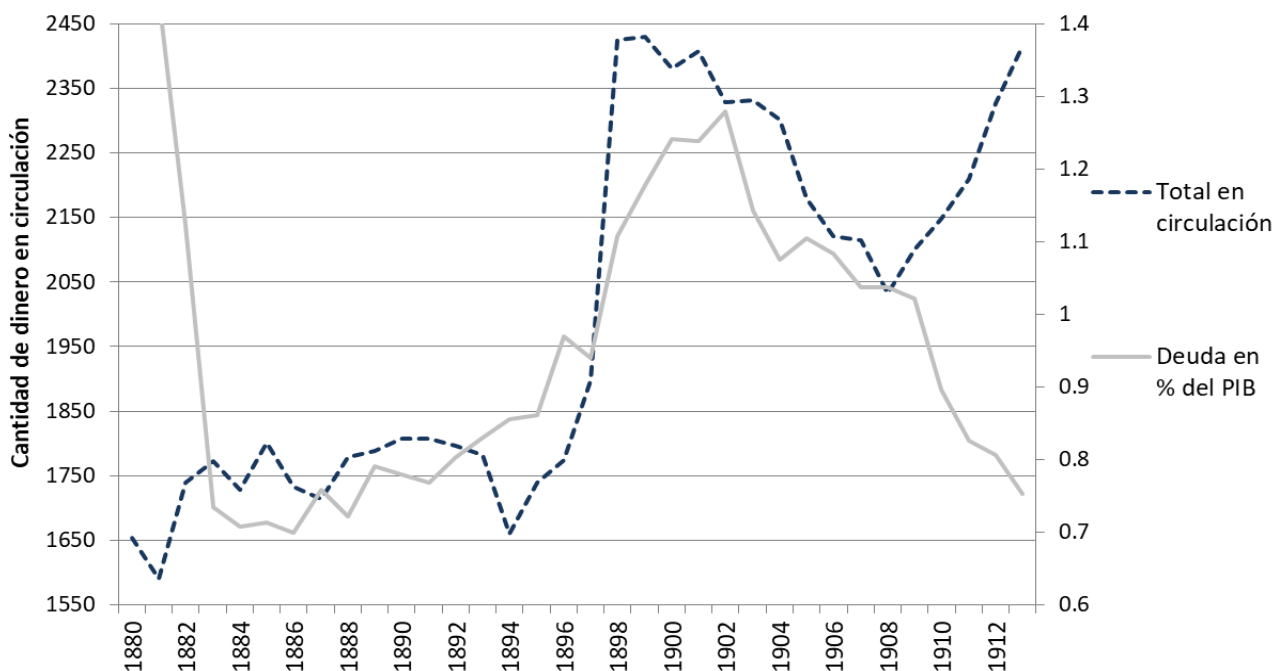
Por otro lado, la situación de la hacienda subordinaba la política monetaria a las necesidades fiscales (Tortella, 1994a, p. 325, Sabaté, et al, 2006, p. 328). Esto afectaba al tipo de cambio en forma de depreciación (Sardà, 1936, p. 34; Tortella, 1994a, p. 325 y García Iglesias, 2005, p. 17).¹¹ El figura 3 muestra como el valor exterior de la divisa seguía un comportamiento contrario al de la deuda pública: al aumentar la deuda, la peseta se depreciaba debido al aumento de la circulación de dinero y, al revés, al disminuir la cantidad de deuda, la divisa se apreciaba. Los déficits y la necesidad de financiar la deuda hicieron que la cantidad de dinero en circulación aumentara. El figura 4 muestra que la cantidad de dinero en circulación seguía un comportamiento muy similar a la evolución de la deuda pública.

Por último, el figura 5 indica que España se mantuvo todo el periodo con un gasto del servicio de la deuda sobre el gasto total del estado superior al 30%. Según Comín, un porcentaje superior al 30% indica insostenibilidad de la deuda. Las anteriores evidencias tienden a sugerir que la

¹¹ En García Iglesias (2005), p. 17: “La relación entre el Banco de España y el Tesoro influyó de manera decisiva en las decisiones tomadas con respecto al sistema monetario”.

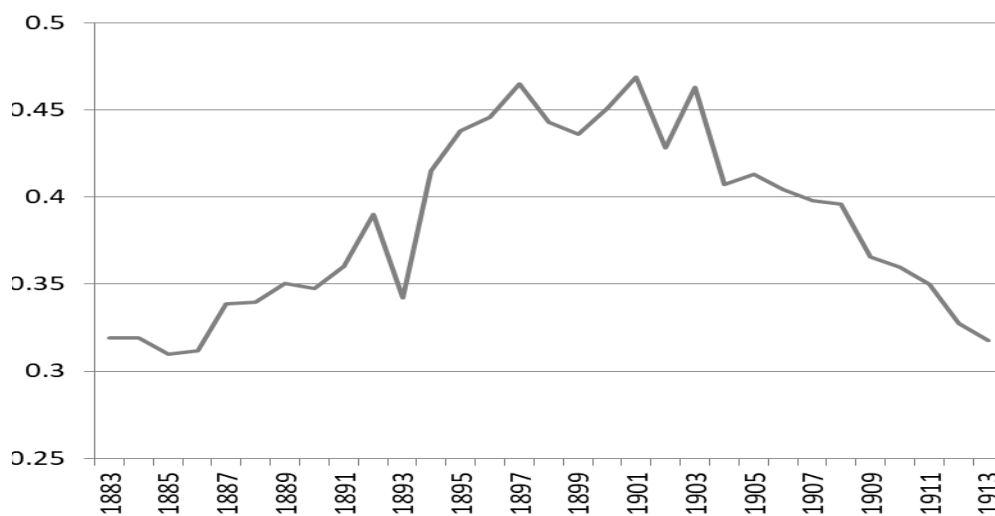
situación del Tesoro dificultaba la adopción del patrón oro. Los problemas de la Hacienda necesitaban que la peseta fuera inconvertible (Sabaté et al., 2006, p. 328).

Figura 4. Deuda pública como porcentaje del PIB y cantidad de dinero en circulación(millones de pesetas), 1880-1913.



Fuente: Para la deuda pública, Comín y Díaz (2005, p. 961);Fuente: Para la deuda pública Comín y Díaz (2005, p. 961), para el PIB, Carreras et al.(2005, p. 1339); para la cantidad de dinero, Martín Aceña y Pons (2005, pp. 678, 679 y 683), sumando el metálico y los billetes en circulación.

Figura 5. Gasto en deuda pública sobre el gasto total del Estado en porcentajes.



Fuente: Comín y Díaz (2005, p. 961).

¿Fue deseable la adopción del patrón oro?

La discusión sobre las consecuencias negativas o positivas de la no adopción del patrón oro la podríamos asociar a la discusión entre tipos de cambio flexible y tipos de cambio fijos. Los defensores del tipo de cambio flotante acostumbran a dar razones de corto plazo. Los argumentos a favor del tipo de cambio flexible son la facilidad de ajuste en momentos de crisis gracias a una mayor autonomía de la política macroeconómica, el efecto estabilizador del ciclo real o la mayor simetría en los procesos de ajuste. Éstos acostumbran a estar a favor de la preservación de la soberanía monetaria y fiscal. Por contra, los partidarios del tipo de cambio fijo suelen apostar por las uniones monetarias y dan, sobretodo, argumentos de largo plazo. Insisten en una mayor disciplina económica, un mayor control de la inflación, una mayor atracción de capital foráneo o una reducción de los tipos de interés. Como corolario, estas ventajas incentivarían el crecimiento económico a largo plazo.

Sardà (1987, p. 198I), destacó los efectos positivos que la no adopción del patrón áureo tuvo para la economía española: “Puede decirse que la conjunción de expansión fiduciaria y proteccionismo dio resultados felices para la economía española”. Para el profesor catalán, la posibilidad de utilizar la política monetaria permitió mayor capacidad para afrontar shocks externos de la que tuvieron los países del patrón oro. Cuando hubo peligro de recesión entre 1880 y 1913, la flotación de la peseta parece haber actuado como cojín de los efectos depresivos (figura 12). Posteriormente, Solé Villalonga (1967) y Tortella (1994a y 1997), con argumentos de largo plazo, se posicionaron cerca de la tesis de Sardà. Tortella (1997, p. 24) destacó que, después del colapso financiero del decenio de 1860, la desvinculación del patrón oro ayudó a España a no volver experimentar otra crisis bancaria de grandes dimensiones hasta la de 1978-1985.

Para Martín Aceña la no adopción del patrón oro en España tuvo negativas consecuencias para el crecimiento económico. Según el profesor madrileño, un sistema de tipos de cambio fijos limitaba los excesos en la creación de liquidez y, por lo tanto, aumentaba la disciplina de los países previniendo elevadas inflaciones o estanflaciones. Además, considera que seguir la regla del oro facilitaba el acceso a los mercados de capital. Tortella (1974, pp. 480-481 y 1994a, p. 177) ataca esta hipótesis argumentando que mantener a España en el patrón áureo era “bien de lujo” para un país atrasado como el nuestro.¹²

En un primer momento el debate está en el corto plazo resaltando, por lo tanto, los costes de adopción. Posteriormente, en los 70s, 80s y principios de los 90s, el debate se sitúa en el largo plazo destacando, así, los beneficios de la entrada en el oro. De nuevo, a de finales de siglo, se adopta una perspectiva de corto plazo pero añadiendo el análisis econométrico en las

¹² Tortella (1994a) afirma que en un país pobre como España el oro debía ser utilizado para comprar alimentos, tecnología, etc. Considera un despilfarro utilizar el metal amarillo como circulante.

investigaciones. Recientemente, los autores favorables a la tesis crítica han recuperado los enfoques de largo plazo aplicando también un enfoque cuantitativo.

Beneficios del patrón oro en España, 1883-1914.

1. Aumento del comercio exterior

Una de las principales ventajas del oro fue disfrutar de la primera globalización e incrementar el comercio internacional (Martín Aceña, 1981, pp. 267, 288 y 289; Martín Aceña, 1993, pp. 136, 139 y 158; Martín Aceña, 1997, p. 9; Flandreau y Maurel, 2001; López-Córdova y Meissner, 2003; García Iglesias, 2005, p. 15 y Mitchener y Weidenmier, 2015). López Córdova y Meissner (2003, p. 344) encuentran que tener el mismo régimen monetario incrementó el comercio. En esta línea, Mitchener et al. (2010) destacan el aumento de las exportaciones con los países del oro que obtuvo Japón.

España pudo haber disfrutado más de estas ventajas. Según los partidarios del patrón áureo, se perdió la posibilidad de aprovechar la expansión del comercio mundial. Hay trabajos que relacionan la depreciación de la peseta con un aumento de la protección (Prados de la Escosura, 1982, pp. 29 y 51; Prados de la Escosura, 1988, pp. 188 y 191; Martín Aceña, 1981, p. 267; Tortella, 1994a, pp. 35, 122, 178 y 331 y Sánchez Alonso, 1995, p. 185). Sin embargo, otros han defendido la posición opuesta. Gallego (2001, p. 70) afirma que la política de comercio exterior no fue determinante en la asignación de recursos. Sabaté destaca que las depreciaciones de 1896-1897 no favorecieron el proteccionismo y no aumentaron el nivel de reserva del mercado interior¹³ Serrano et al. (1998), a través de la construcción de un índice de productos comercializables, comprueban si se cumplió la Paridad del Poder Adquisitivo.¹⁴ Los resultados confirman el cumplimiento de la PPA en la relación entre la peseta y la libra para el periodo 1883-1931. A largo plazo la peseta fue neutral para la economía española debido a la compensación de las diferencias en precios relativos efectuada por el tipo de cambio.¹⁵ Las evidencias empíricas apuntan que el efecto de la depreciación de la peseta no fue tan importante. Más recientemente, Sabaté et al (2011, p. 16) destacan que a corto plazo pudo existir este aumento de protección y se produjeron variaciones respecto a la PPA a pesar de que en el largo plazo se cumpliera la PPA.

¹³ Serrano et al. (1998, p. 87) señalan que, teniendo en cuenta la evolución de los precios relativos y el tipo de cambio de la peseta respecto de otras monedas vecinas, la peseta sufrió una apreciación real en 1896 y 1897 respecto a 1892 y sólo podemos hablar de depreciación en el año 1898. Para mayor información véase el Apéndice de Serrano et al. (1998).

¹⁴ Para Serrano et al. (1998, pp. 88-89), lo que determina la protección que el tipo de cambio pudo ofrecer a la economía española son las relaciones entre las diferentes cotizaciones y los precios relativos.

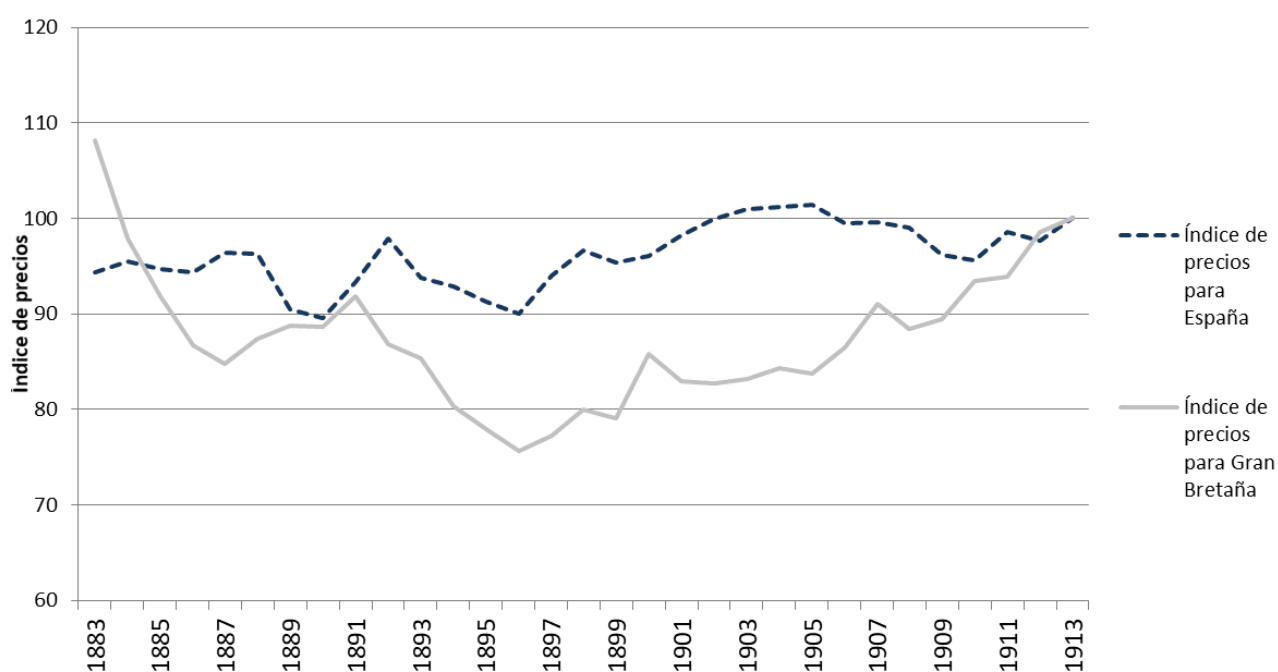
¹⁵ Hubo desajustes puntuales. El primero de estos desajustes fue el de los ochenta. Se produjo una apreciación debida al mantenimiento de la estabilidad del tipo de cambio mientras se producía una deflación diferencial de los precios británicos. Otro desequilibrio fue debido a la expansión monetaria por la Guerra Colonial. Ésta generó una divergencia en precios y la depreciación de la peseta.

2. Aislamiento internacional

Convergencia de precios

Otro de los beneficios del patrón oro fue experimentar una mayor convergencia internacional. La no adopción del patrón áureo es considerada como una vía de desarrollo aislacionista o semi-autárquica (Martín Aceña, 1981, pp. 267 y 290, Martín Aceña, 1993, pp. 136 y 158; Martín Aceña, 1997, p. 9; Tortella, 1994a, p. 331; García Iglesias, 2005, p. 32 y Martínez Ruíz y Nogués, 2014, p. 90). Sin embargo, Catalan et al. (2001, p. 29) consideran que no existen evidencias para pensar que el tipo de cambio flotante provocó un aislamiento internacional. Nadal y Sudrià (1993, pp. 208-210) demostraron como los precios de los tejidos de algodón en la península no siguieron una trayectoria diferente a los británicos. Llona (2001, p. 160) afirma que los precios españoles evolucionaron de forma similar a los británicos y que en España no se produjo tal aislamiento internacional. Más recientemente, Maluquer (2013, pp. 82-83) señala que España tendió a converger en precios con Gran Bretaña, Francia e Italia (figura 6).¹⁶ España mostró una gran estabilidad de precios en el largo plazo.¹⁷

Figura 6. Índice de precios en España y Gran Bretaña (1913 = 100), 1883-1913.



Fuente: Maluquer (2013) para España y Mitchell y Deane (1962) para Gran Bretaña.

¹⁶ Maluquer señala que hubo alguna desviación coincidiendo con las guerras coloniales, pero fue mínima y que el comportamiento en precios de los cuatro países fue muy similar. En el gráfico se muestran sólo los precios para España y Gran Bretaña.

¹⁷ Se desmiente la tendencia inflacionista que señalaba Cubel (2001) a causa de utilizar los datos del deflactor implícito del PIB de Prados de la Escosura (1995). Prados de la Escosura en una nueva estimación en 2003 muestra la corrección de este error suavizando los efectos inflacionistas.

Disminución de los tipos de interés.

Una ventaja del oro pudo ser mantener tipos de interés más bajos. Bordo y Jonung (2001, p. 14), afirman que los tipos de interés fueron más bajos durante el patrón oro clásico que en los sistemas monetarios posteriores. También, Bordo y Rockoff (1996, pp. 389, 395, 396 y 416) encuentran que las diferencias entre los países en los tipos de interés cobrados a largo plazo en los mercados de capitales están correlacionadas con su compromiso con el oro; a mayor compromiso, los tipos de interés fueron más bajos.¹⁸ García Iglesias (1999, p. 15) lo confirma para el caso de España.

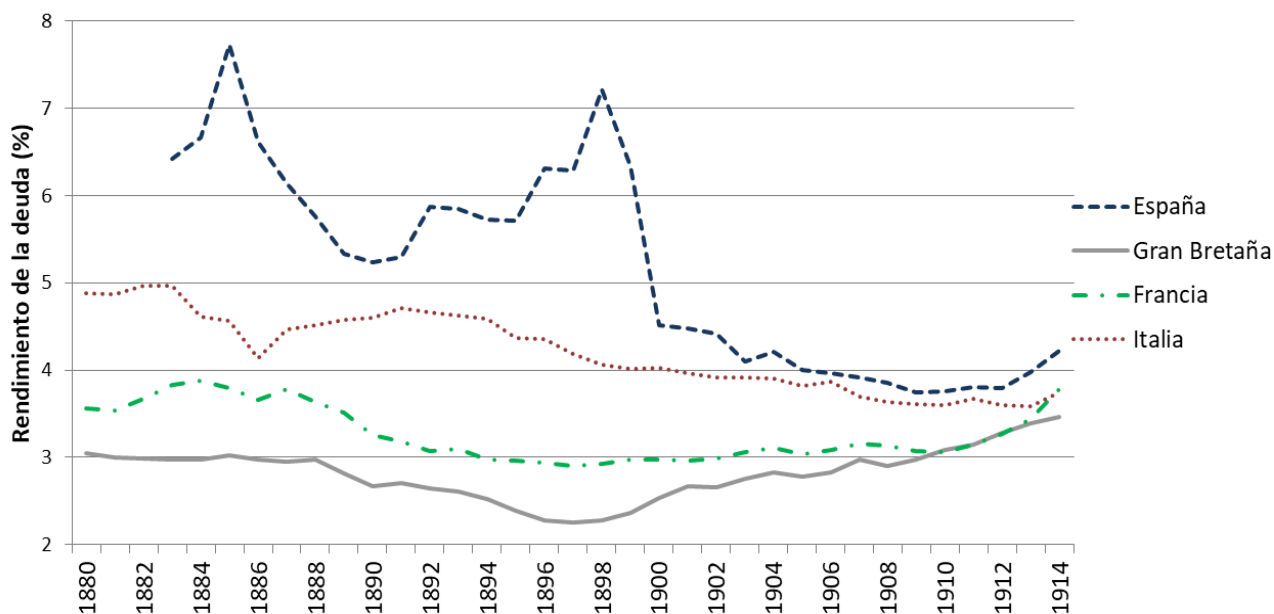
En cambio, Carreras y Tafunell consideran que “las investigaciones realizadas [para el caso español] no llegan a resultados sólidos o concluyentes acerca del efecto de los mayores tipos de interés sobre el crecimiento económico”.¹⁹ Catalan et al. (2001, p. 33) y Cubel (2001, p. 191) sugieren que no estar en el oro provocó un aumento del tipo de interés pero la tendencia a lo largo del periodo fue a converger con el del Reino Unido y que, en este sentido, pudo ser más importante la disciplina fiscal que el régimen de cambio. También, Bordo y Rockoff (1996, p. 405) sugieren la existencia de convergencia también en los tipos de interés entre España y Gran Bretaña. El tipo de interés fue muy alto en los setenta debido a los impagos de la deuda. En cambio, cuando se siguió una disciplina fiscal cercana al oro los tipos de interés fueron más bajos y tendieron a converger (figura 7). Por lo tanto no parece existir una gran correlación entre el régimen cambiario y el aumento de los tipos de interés.

Por su parte, Triffin (1964) señala que el mecanismo de ajuste del mercado internacional de capitales no era simétrico. Un país periférico dentro del oro siempre tenía el tipo de interés unos puntos por encima del tipo de interés de los países del núcleo. Una subida del tipo de interés en un país periférico, además de aumentar el coste de la deuda para el Estado y el coste de financiación de las inversiones, podía generar expectativas negativas y provocar una fuga de capitales.

¹⁸ También, en Bordo y Kydland (1995) y en Martín Aceña et al. (2000, p. 2).

¹⁹ Carreras y Tafunell (2004, p. 217), destacan que la guerra de Cuba, que fue uno de los peores momentos respecto a la credibilidad española y en la que riesgo del país debería estar muy alto coincidió con una fuerte convergencia de la economía española.

Figura 7. Rendimiento a largo plazo de los bonos del Estado para España, Gran Bretaña, Francia e Italia (%), 1880-1914.



Fuente: Martín Aceña (1985) para España, Friedman y Schwartz (1982) para Gran Bretaña y De Mattia (1978) para Francia e Italia.

3. . Disminución del riesgo

También se destaca como un beneficio del patrón oro la disminución del riesgo en las transacciones internacionales, tanto de comercio como de capital (Martín Aceña, 1981, pp. 280 y 288; Martín Aceña, 1993, pp. 136, 139 y 158; Martín Aceña, 1997, p. 9; Tortella, 1994a, p. 331 y García Iglesias, 2005, pp. 15, 29 y 77). García Iglesias (1999 y 2002) encuentra que el riesgo sistémico fue mayor para los países que se mantuvieron a la sombra del oro. Los partidarios del patrón áureo señalan que España quedó desconectada del sistema financiero internacional. El coste del capital era más alto para compensar una posible depreciación.

En cambio, Mitchener y Weidenmier (2015, pp. 481-482) analizan el riesgo de cambio para 21 países encontrando que unirse al patrón oro no eliminó el riesgo cambiario para las economías periféricas. En esta línea, Ferguson y Schularick (2006) muestran cómo pudo ser más importante formar parte de un imperio que estar en el patrón oro para reducir los costes del capital. También, Domowitz et al. (1998) observan que si los mercados financieros no consideraban totalmente creíble el régimen del tipo de cambio fijo, la prima de riesgo permanecía alta, incluso, estando en el oro. En esta línea Bordo y Flandreau (2003) sugieren que entrar en el patrón oro no ofrecía de

inmediato credibilidad a los países periféricos.²⁰ Por lo tanto, los mercados financieros no confiaban en las restricciones aplicadas en la periferia como elemento de disciplina.

4. Incremento de la inversión

Los defensores del patrón áureo señalan que formar parte del oro permitía atraer mayor cantidad de capitales extranjeros al aumentar la confianza de los inversores sobre la disciplina de los países (Martín Aceña, 1981, pp. 267, 269, 288 y 289; Martín Aceña, 1993, pp. 158-159; Martín Aceña, 1997, p. 9; García Iglesias, 1999, p. 15 y Sussman y Yafeh, 2000, pp. 442-443). Bordo y Rockoff (1996) destacan que estar en el patrón oro fue una señal de buena conducta que permitió un mejor acceso al mercado de capitales, así como aumentar el volumen de capital atraído. En el mismo trabajo, p. 390, apuntan a la necesidad de capital que tenían las economías en desarrollo de la periferia como motivo por el cual los países hacían todo lo posible para adoptar el sistema monetario internacional. En esta línea, Obstfeld y Taylor (2003) encontraron, para una muestra de muchos países, que riesgo cambiario pudo desincentivar la inversión.

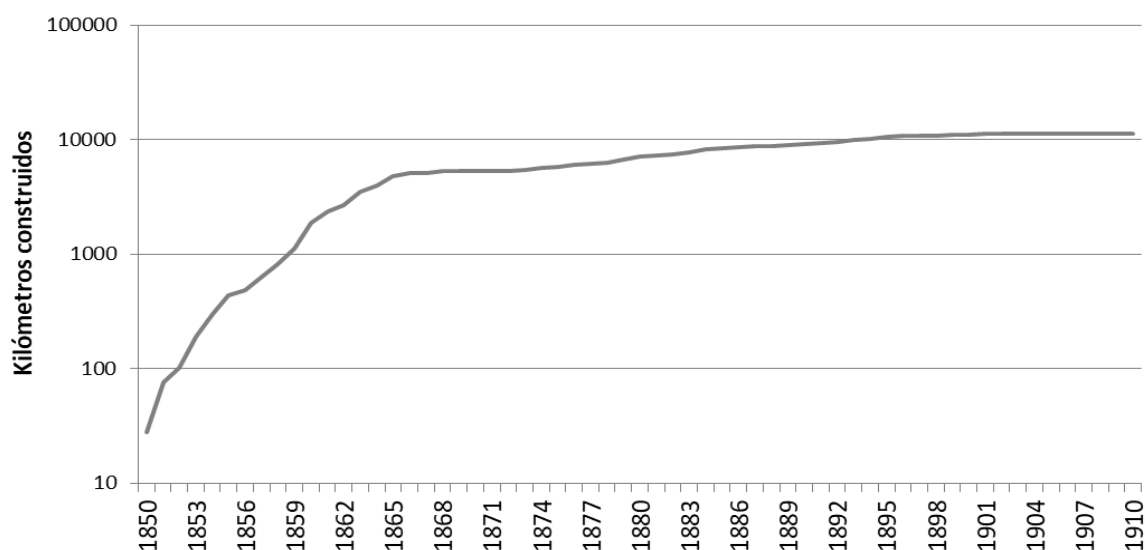
Sin embargo, no está claro que los países periféricos pudieran obtener este beneficio. En un trabajo sobre la Paradoja de Lucas se señala que el capital británico, durante periodo del patrón oro clásico, no fue a parar a los países que tenían menos capital por trabajador y estaban desarrollándose.²¹ A pesar de las posturas que defienden que la disciplina del oro permitía tener un mejor acceso al capital y recibir mayores inversiones, en este trabajo pertenecer al patrón áureo es una variable no significativa para explicar el destino del capital británico (Clemens y Williamson, 2000, pp. 6 y 15).

Por un lado, el destino de las inversiones dependía en gran medida de la existencia de un imperio y de la capacidad de explotar las nuevas tecnologías. Por ejemplo, Italia recibió mayor inyección de capital extranjero que España. Sin embargo, no se ha demostrado si esta inversión estuvo directamente relacionada con el sistema monetario. Su buena relación con Alemania y la enorme reserva hidroeléctrica de los Alpes fueron claves. España, con un territorio poca atractivo para explotar nueva tecnología, había estado orientada a Francia y no vivió un proceso de tal intensidad.

²⁰ Mitchener, Shizume y Weidenmier (2010, p. 54) encuentran que la adopción del patrón oro en Japón no disminuyó el coste del capital ni produjo un aumento de la inversión.

²¹ Sobre la paradoja de Lucas véase Lucas (1990, p. 92). Respecto al trabajo, véase el working paper de Clemens y Williamson (2000). En este estudio se busca encontrar que factores fueron determinantes en las decisiones de inversión extranjera que tomó Gran Bretaña, ya que se descarta que los países en desarrollo no recibieran capital por una fallada del mercado internacional de capitales.

Figura 8. Kilómetros de ferrocarril construidos entre 1850 y 1910.



Fuente: Gómez Mendoza y San Román (2005, p. 532)

Por otro lado, los principales exportadores de capital antes de la Gran Guerra fueron Gran Bretaña y Francia (Pollard, 1985, p. 492).²² La mayor parte de la inversión inglesa fue hacia el Imperio y América Latina. Ésta estuvo centrada, básicamente, en infraestructura de transportes. En 1883, España tenía construida la mayor parte de su red ferroviaria (figura 8) (Catalan et al., 2001, p. 31). No parece que se pudiera haber recibido más inversión inglesa de haber mantenido la convertibilidad (Catalan et al., 2001, p. 31).

En menor medida el capital francés también empezó a perder interés por el Mediterráneo (Catalan et al. 2001, p. 31).²³ Catalan et al. (2001, p. 33) consideran que la vinculación de España al oro no hubiera provocado mayor llegada de capitales ni un cambio significativo en el proceso de industrialización español. En las estimaciones de inversión extranjera de Broder se observa una tendencia a aumentar las entradas de capital en España a partir de 1900. Esto corroboraría que lo importante eran las expectativas y no tanto el régimen de cambios (figura 9). En segundo lugar, como dicen Carreras y Tafunell (2004, p. 212) “*resulta difícil imaginar más inversión extranjera dirigida a un país que ya había recibido tanta*”.

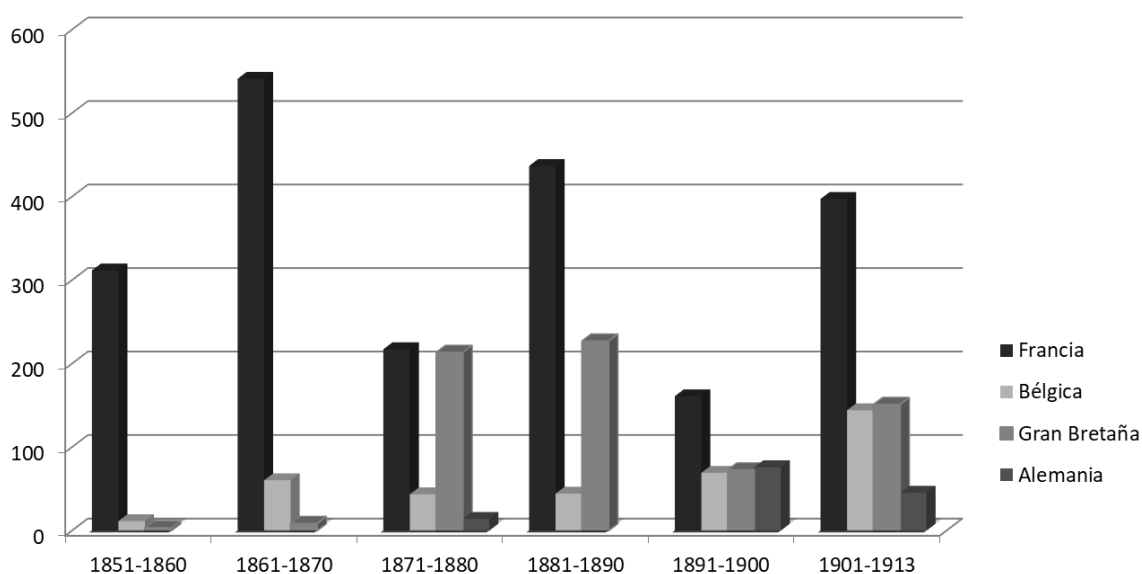
García Ruíz (1992, p. 62) apunta que un aumento de la inversión extranjera de un 1% hubiera incrementado el crecimiento de la renta en un 0,16%. Del mismo modo, Catalan et al. (2001) señalan que, analizándose las tendencias a largo plazo de los principales inversores, no parece

²² En el cuadro 3 de Pollard (1985, p. 492), se observa como el 63,9% de la inversión extranjera la hacían estos dos países.

²³ Los mismos afirman que el interés por España y, también, por Portugal, Italia, Suiza y Austria, se redujo. Para más información citan a Lévy-Leboyer (1977, p. 139), Berend y Ránki (1982, p. 78) y Broder (1993, p. 176).

que el aumento del capital extranjero destinado a inversiones productivas hubiera sido suficiente para afectar de forma positiva el proceso de industrialización española. Martín Aceña, Reis y Llona (2000, p. 2), destacan que la señal de buen comportamiento pudo no ser tan significativa dado que algunos países que estuvieron en el patrón oro fueron poco atractivos para los inversores extranjeros mientras que otros que no estuvieron en él fueron capaces de atraer grandes sumas de capital foráneo.

Figura 9. Flujos de capital extranjero hacia España (millones de francos), 1851-1913.



Fuente: Broder (1976).

5. Disciplina fiscal

Pertenecer al patrón oro, como dijeron Bordo y Rockoff, era garantía de seguir políticas monetarias y fiscales prudentes y, por lo tanto, el riesgo de un *default* disminuía, ya que existía total confianza en que el país evitaría tal situación. Eichengreen (2000, pp. 46-49) destaca que la confianza fue el factor que permitió el óptimo funcionamiento del patrón oro durante las últimas décadas del siglo XIX y el primer decenio del XX. Dicha confianza permitía que, a corto plazo no se siguieran las reglas del juego. Aunque, según Flandreau et al. (1998), no se puede asegurar que el mercado generará incentivos suficientes para mantener la disciplina. El patrón oro sobrevivió con flujos de deuda elevados y con depreciación en la periferia.

España, al permanecer al margen, redujo sus incentivos a mantener el presupuesto equilibrado (Martín Aceña, 1981, p. 289; Sabaté et al., 2006, p. 328 y Serrano, 2004, p. 165). Los ajustes necesarios para conseguir un equilibrio presupuestario debían hacerse en la fase expansiva del ciclo. Analizando el éxito de las reformas de Villaverde, se hubiera podido mantener un

presupuesto equilibrado durante el periodo que va de 1888 a 1895, pero no más allá. Después de la pérdida de las colonias se consiguió equilibrar el presupuesto gracias a las medidas adoptadas por Villaverde. Éste duraría poco, pues en 1909 el gasto bélico volvió a ser protagonista por la intervención militar en Marruecos (Catalan et al., 2001, pp. 33-34). De todos modos, España no utilizó todas las oportunidades que le ofrecía el sistema fiduciario y, excepto en momentos de guerra, siempre siguió una política a la sombra del patrón oro que evitó que se cometieran excesos.

6. Integración europea

Otro de los beneficios que tenía la adopción del patrón áureo era la integración de España en el entorno europeo (Martín Aceña, 1981, p. 290; Martín Aceña, 1993, p. 160 y Wiese, 1892-93, pp. 388-389). Los países centro del sistema económico adoptaron el patrón oro por diferentes motivos y el resto de países les siguieron. España tendría que haber seguido el mismo ejemplo y haber adoptado el patrón oro. Martín Aceña cita a Wiese, economista austríaco, para destacar la importancia de seguir las decisiones de Europa.²⁴ En la actualidad el caso sueco niega que se deba seguir la tiranía de la mayoría.²⁵

7. Crecimiento económico

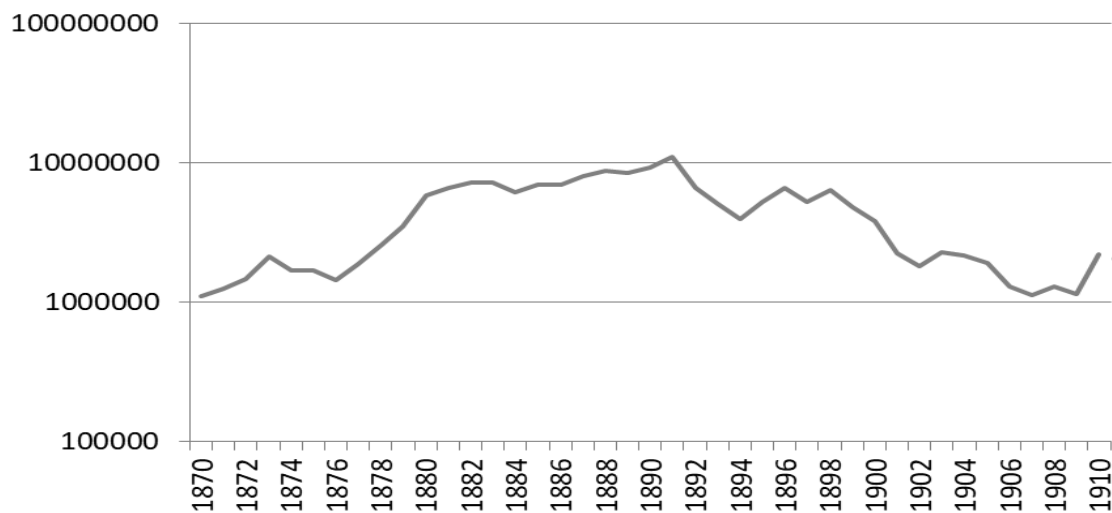
La suma de todos los beneficios daba como resultado un mayor crecimiento económico. Uno de los éxitos del patrón oro fue preservar la estabilidad del tipo de cambio en gran parte del mundo (Triffin, 1985, p. 128). Así, se creó un clima de ausencia de perturbaciones monetarias que, según los partidarios del sistema áureo, contribuyó al crecimiento económico. Por contra, se considera que la no adopción del patrón oro contribuyó al lento crecimiento económico e industrial experimentado por España entre finales del XIX y principios del XX (Martín Aceña, 1981, pp. 267, 288 y 289; Martín Aceña, 1993, pp. 158 y 160 y García Iglesias, 2005, pp. 16, 19 y 77).²⁶ En el caso español, algunas fuerzas que estimulaban el crecimiento antes de 1883 desaparecieron. La demanda de vino por parte de Francia se disipó una vez superada la epidemia filoxérica y las exportaciones cayeron (figura 10). Las exportaciones de minerales se estancaron por los rendimientos decrecientes de la actividad extractiva y la difusión de procesos alternativos a la utilización de mineral de hierro de bajo contenido fosfórico en la siderurgia europea (figura 11). Además, las inversiones en ferrocarril habían llegado a su fin (figura 8).

²⁴ Wiese (1898-1899, pp. 388-389): “*Si Europa se equivoca adoptando el patrón oro, nosotros, a pesar de ello, para bien o para mal, debemos unirnos en su error y de esta forma recibiremos menos daño que si nos resistimos y nos empeñamos en ser ‘racionales’ por nuestra cuenta*”.

²⁵ Suecia aprendió de la historia de su última depresión y no adoptó la moneda única. Después del desastre del SME decidió mantener su divisa. Esto le ha permitido un impacto menor de la crisis económica del euro del que han tenido países como España que si adoptó la moneda única. Para el caso de Suecia, véase Catalan (2002).

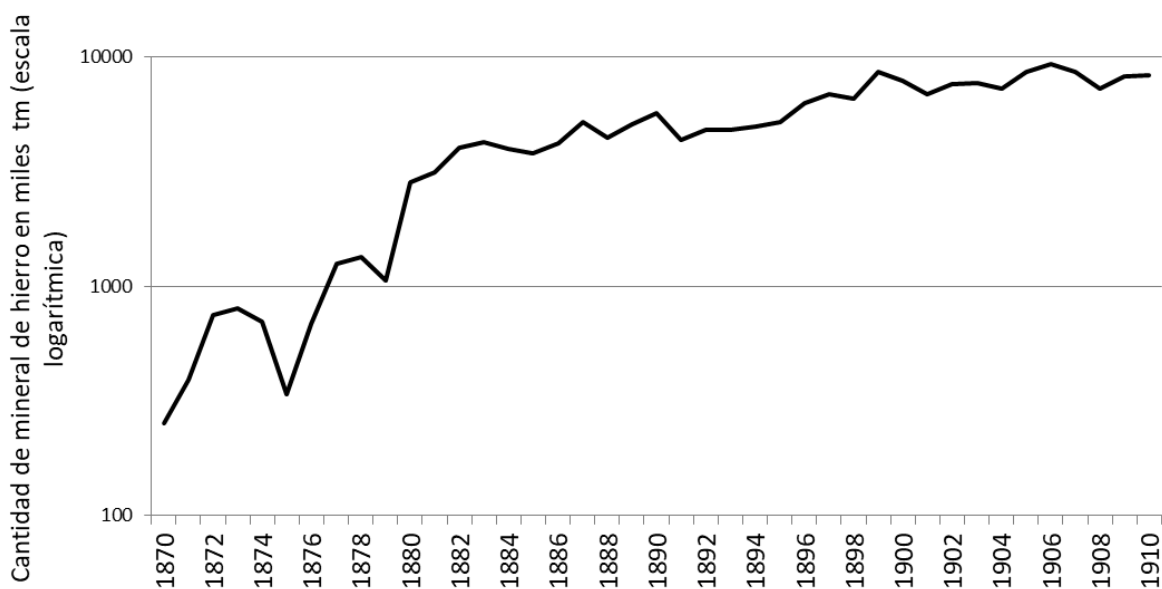
²⁶ Véase el gráfico 1.

Figura 10. Hectolitros de vino exportados entre 1874 y 1910 (escala logarítmica).



Fuente: Barciela y Giráldez (2005, p. 331).

Figura 11. Cantidad de mineral de hierro exportado en miles de toneladas métricas entre 1870 y 1910.



Fuente: Carreras (2005, p. 417).

El patrón oro y España

El régimen monetario no parece un elemento capaz de explicar el atraso finisecular español ni el causante de la divergencia respecto a Europa experimentada por España en aquellos años. Serrano

(2004, p. 165), también, descarta el régimen cambiario como causa del lento crecimiento experimentado por España a finales del siglo XIX y principios del XX y considera que el culpable fue un sector público atrasado. Asimismo, García Iglesias (2005, p. 30) señala que el sistema monetario no fue relevante para el crecimiento. Después de un análisis cuantitativo sobre el crecimiento de Italia, Portugal y España indica que no se puede demostrar que el régimen monetario afectara al crecimiento económico entre 1850-1913.

Los posibles beneficios de adoptar el oro hubieran mostrado sus efectos en el largo plazo. Pero, ¿podía resistir la economía española en el corto plazo por un futuro, supuestamente, mejor? Lo expuesto anteriormente sugiere que sin un gran coste a corto plazo, el objetivo del patrón oro estaba muy alejado de la realidad española. En esta línea, Martín Aceña, Reis y Llona (2000, p. 2) consideran que aunque el patrón oro fuera un indicador creíble, los costes podían llegar a ser excesivos para los países periféricos. Como afirmó Tortella (1994a), el patrón oro era demasiado para la economía española.

Beneficios del sistema fiduciario en España, 1883-1914

1. Autonomía de la política económica

El principal beneficio de la no adopción del patrón oro fue mantener la autonomía de la política monetaria y fiscal. Bordo (1990) y Bordo y Kydland (1995) afirman que pertenecer al patrón oro restringía las acciones de política monetaria y fiscal a los gobiernos. Bordo y Jonung (2001, pp. 12-13), señalan que las políticas monetarias y fiscales estaban subordinadas al mantenimiento de la convertibilidad. Así, los objetivos nacionales quedaban en un segundo plano. Como consecuencia de mantener fija la relación entre las diferentes monedas, no se podían adoptar políticas económicas demasiado expansivas. El patrón oro limitaba la capacidad de los gobiernos para actuar frente a dichos shocks con instrumentos de política fiscal y monetaria. Es decir, reducía la respuesta respecto a las perturbaciones del ciclo. Además, el sistema de funcionamiento del patrón áureo facilitaba la transmisión de tendencias depresivas o inflacionarias de un país al resto países. De este modo, los países del patrón oro podían experimentar mayor volatilidad macroeconómica que aquellos países que estaban fuera del sistema monetario. Según Bordo y Rockoff (1996, p. 416), los países que estaban fuera del oro utilizaron las fluctuaciones del tipo de cambio para amortiguar el impacto de los shocks en sus economías. Esto podría ayudar a explicar las dificultades que encontraron los países periféricos del sur de Europa para mantenerse dentro del patrón oro y la importancia de mantener la autonomía de su política económica.

La pérdida de la política económica hubiera dificultado la posibilidad de utilizar instrumentos a los que el gobierno recurría para solucionar los problemas coyunturales de la economía española (Tortella, 1994a, p. 331; Herranz y Tirado, 1996, p. 32; Catalan, Sudrià y Tirado, 2001, p. 25; García Iglesias, 2005, p. 15 y Martínez Ruíz y Nogués, 2014, pp. 19 y 94). Sardà (1987, p. 198)

afirmó que “*el proteccionismo, junto a la política monetaria expansionista, tuvieron como consecuencia evitar una baja excesiva de las inversiones, manteniendo el progreso de la economía del país*”. En conjunto, la economía española no sufre ningún retroceso fuerte con la guerra de Cuba”. Tortella (1994a, p. 178) destaca que la política monetaria llevada a cabo fue la más acertada de las políticas realizadas. Herranz y Tirado (1996, p. 32) señalan que adoptar el patrón oro hubiera limitado la libertad de acción de los gobiernos españoles. Martínez Ruíz y Nogués (2014, p. 19) confirman esta ventaja afirmando que el oro implicaba subordinar la política monetaria a la estabilidad del tipo de cambio. Martín Aceña (1981, pp. 284-285) critica este argumento señalando que utilizar la política monetaria de forma libre no tiene implicaciones a largo plazo ya que los cambios en la cantidad de dinero tienen efectos insignificantes en el crecimiento de la renta real a largo plazo.²⁷ Años más tarde, durante la depresión de los años treinta, fueron los países que salieron del patrón oro, los primeros en recuperarse (Bernanke, 1995, pp. 11-12). Esto sugiere que el ejercicio autónomo de la política monetaria y fiscal es fundamental para afrontar el impacto de los *shocks* económicos. En esta línea, los países europeos que están fuera del euro han podido reaccionar mejor y más rápido ante la depresión sufrida durante los últimos años que los países que comparten moneda.²⁸

2. Evitar la deflación

La relación entre el funcionamiento del patrón áureo y política monetaria fue complicada. Por un lado, la capacidad de una nación para expandir su oferta monetaria estaba limitada, entre otras cosas, por la situación de su balanza de pagos. Un déficit en la balanza de pagos podía provocar salidas de oro, deflación y, en última instancia, desempleo a causa de los efectos del círculo vicioso. En esta situación, el país no podía aplicar políticas correctoras. Por otro lado, el patrón áureo ejercía de freno sobre el crecimiento de la oferta monetaria. Ésta estaba determinada por sus existencias de oro. Al ligar la oferta monetaria a un metal, el crecimiento de ésta no seguía a la demanda.²⁹ El suministro de oro limitaba el crecimiento económico y provocar una disminución de los precios. Al reducirse los precios, las empresas se podían ver forzadas a despedir trabajadores y esto generaba una espiral negativa que acababa produciendo falta de demanda. ¿Era España capaz de soportar tales efectos? Sardà (1987, p. 197) y Tortella (1974, p. 480) afirman que, con el sistema fiduciario, España se mantuvo al margen de la depresión de precios mundial. Martín Aceña (1993, p. 139) coincide con Sardà en destacar que la inconvertibilidad evitó la deflación en España.

²⁷ Se basa en Friedman (1970, p. 217) para hacer esta afirmación.

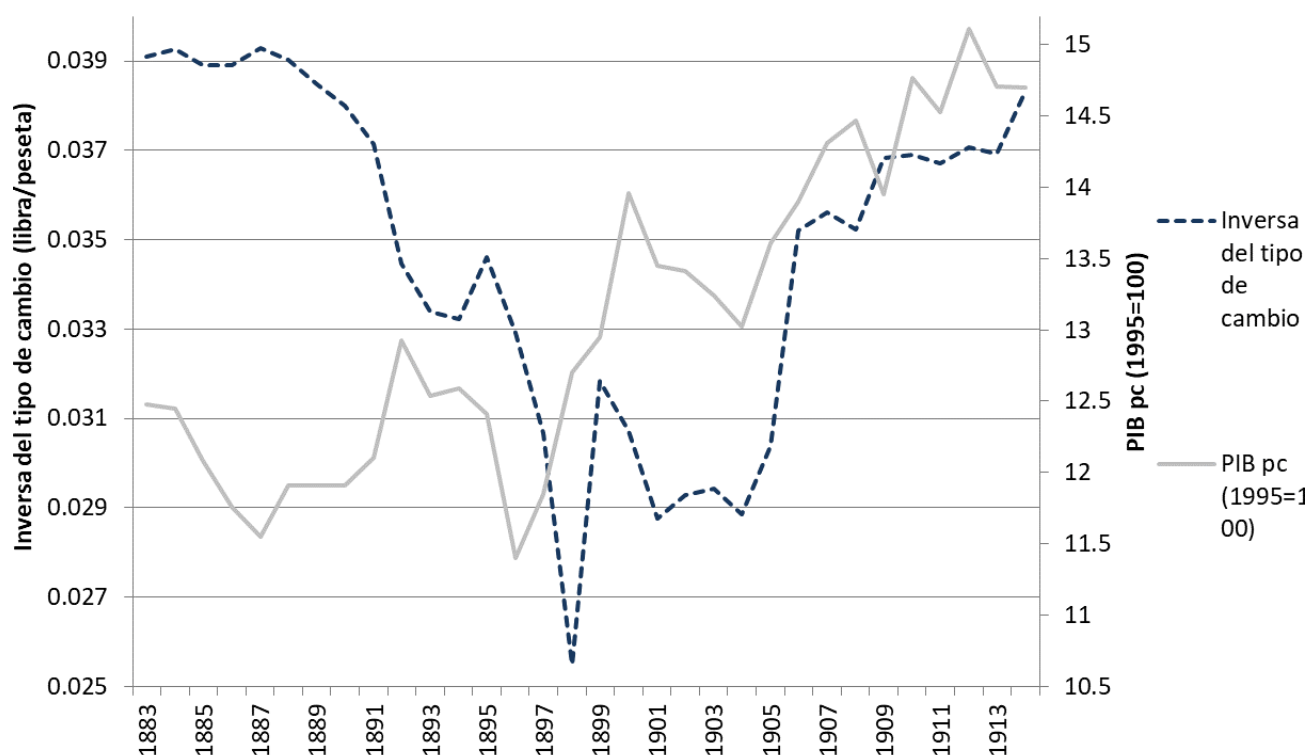
²⁸ Los casos de Gran Bretaña y Suecia serían un ejemplo. Para el caso sueco, véase Catalan (2002).

²⁹ Este defecto lo observó Keynes (1936/1960, pp. 230-231).

3. Tipo de cambio como estabilizador automático

El tipo de cambio flexible y el sistema fiduciario consiguieron aislar a la economía española de las fluctuaciones internacionales (Martín Aceña, 1981, pp. 277, 287 y 288; Sardà, 1987, pp. 196-198; Martín Aceña, 1993, p. 139; Serrano, 2004, p. 163 y García Iglesias, 2005, p. 17). Martín Aceña (1981, p. 287) acepta que la depreciación de la peseta entre 1890 y 1905 pudo haber ayudado a la relación de intercambio y, así, haber incentivado las exportaciones y favorecido el proceso de sustitución de importaciones. Para Serrano (2004, p. 163) el tipo de cambio fue un mecanismo de alarma que conducía de nuevo a la senda de la moderación y permitió mantener el equilibrio e impedir grandes divergencias.³⁰ La no adopción del patrón oro permitió a España tener mayor capacidad para resistir *shocks* externos (Bordo y Rockoff, 1996, p. 416).

Figura 12. Inversa del tipo de cambio (libra/peseta) y PIB per cápita (1995 =100), 1883-1914.



Fuente: Carreras y Tafunell (2004) para el tipo de cambio y Prados de la Escosura(2003) para el PIB per cápita

En el figura 12 se puede apreciar el papel que tuvo el tipo de cambio flexible en España entre 1883 y 1913. Durante las dos primeras crisis después de 1883, la depreciación del tipo de cambio

³⁰ También en Cubel, Pafafoix y Sudrià (1998, p. 75), se destaca el papel del tipo de cambio flexible para ajustar los problemas de la balanza comercial.

ayudó a la recuperación de la economía. Por ejemplo, en las crisis de 1883-1890 y 1893-1898, el tipo de cambio jugó un papel fundamental para la recuperación de la economía española. En Catalan y Sánchez (2012) se encuentra un análisis esquemático de la primera crisis y se destaca la importancia que han tenido históricamente las devaluaciones o depreciaciones de la peseta para afrontar los impactos depresivos sobre la economía española. Éste permitió amortiguar los impactos económicos que de otro modo habrían tenido mayor intensidad y duración.³¹

4. Mantener el bienestar general

Adoptar dicho sistema requería aplicar políticas contractivas. Los efectos positivos de estabilidad y crecimiento estuvieron, en general, limitados a las economías avanzadas. Una gran parte de los países de la periferia sufrieron grandes fluctuaciones del tipo de cambio e inestabilidad (Tortella, 1974, p. 478 y Triffin, 1985, p. 128). La adhesión al patrón oro de las economías periféricas fue complicada y requirió dolorosos y, en ocasiones, insoportables ajustes de su economía nacional.³² Según diversos autores, éstas sólo podían empeorar la situación de la economía española (Carreras y Tafunell, 2004, pp. 219-220). Carreras y Tafunell plantean que realizar este tipo de políticas tenía efectos depresivos. De hecho, Tortella (1994a, p. 325) cuando analiza la velocidad del dinero observa cómo se contrae la oferta monetaria respecto al crecimiento de la renta entre 1899 y 1908. Los historiadores de la Universidad Pompeu Fabra cuestionan que este tipo de políticas fuesen las más adecuadas para una economía empobrecida después de la guerra. Ellos consideran que lo que si puede y debe criticarse del comportamiento español es haberse esforzado hasta sacrificar el bienestar nacional por intentar incorporarse al patrón oro.³³ España, al no adoptar el oro, pudo evitar estos efectos y, sólo cuando intentaba acercarse demasiado a la disciplina del oro éstos se dejaban notar. Serrano (2004, p. 163) destaca la estabilidad de precios experimentada por España durante el periodo. La suma, por lo tanto, de todos beneficios hubiera dado como resultado el mantenimiento del bienestar general.

Sistema fiduciario: ¿Coste o beneficio?

Los beneficios de no haber adoptado el patrón oro se muestran poco cuestionables. Mantener la autonomía de la política monetaria y fiscal, evitar la deflación y estabilizar la economía mediante

³¹ El trabajo de Shibamoto y Shizume (2014, p. 3) encuentra que el tipo de cambio fue el elemento más importante en el caso japonés, para salir de la crisis. El nivel de tipo de cambio promovió las exportaciones y aumentar los precios interiores.

³² Martín Aceña, Reis y Llona (2000, p. 2).

³³ Carreras y Tafunell (2004), pp. 219-220, afirman que “forzar la apreciación es siempre una receta para el desastre económico y un retraimiento de la inversión. La dureza de las políticas de ajuste implementadas entre 1890-1910 provocaron el estancamiento de la economía española. Cuando se abandonó el temor al déficit para financiar la guerra de Marruecos, es decir, cuando se hizo política expansiva, el resultado fue en términos monetarios positivo. Después de 1909 empezaron a llegar capitales extranjeros”. Martín Aceña (1981, p. 277), también, acepta que para equilibrar la balanza de pagos se debían hacer ajustes dolorosos para la economía española.

el tipo de cambio parece que pudo ser superior a todos los beneficios que hubiera conllevado la entrada de España en el patrón áureo (Ródenas, Bru y Almenar, 2001, p. 141). España pudo superar mejor los impactos económicos del periodo 1883-1914 por la capacidad para decidir su política monetaria. Además el tipo de cambio permitía atenuar los shocks en la economía española. Serrano (2004, p. 161) afirma que el tipo de cambio flotante se veía como “*un resultado ineludible*” y no como una causa del retraso de España.³⁴

III. Conclusión

Las consecuencias, negativas o positivas, que tuvo para España la no adopción del patrón oro entre finales del siglo XIX y principios del XX han hecho correr ríos de tinta. Se trata de un tema controvertido y polémico en el que todavía no hay certezas sobre lo que sucedió exactamente y ni sobre qué efectos tuvo para la economía española.

En el fondo de esta controversia de la historia económica de España se encuentran dos debates relacionados: uno teórico y uno político. El debate teórico consiste en la eterna pugna entre el corto y el largo plazo. En este caso se puede traducir en la lucha entre tipos de cambio flotantes y tipos de cambio fijos. La valoración entre lo positivo o lo negativo que fue para España no adoptar el patrón oro depende en gran medida de la óptica teórica y temporal con que se analice el problema. Si uno considera la política monetaria efectiva en el corto y largo plazo y valora significativamente la estabilidad a corto plazo de un país significa que la soberanía monetaria es imprescindible. Por lo tanto, no adoptará un sistema monetario como el patrón oro. Por el contrario, si uno considera que los monetaristas están en lo cierto y el objetivo es la estabilidad a largo plazo significa que se está dispuesto a sacrificar la política económica en el presente y, si es necesario, el bienestar nacional por un futuro mejor. De este modo, se puede adoptar un régimen monetario que no permita utilizar todos los instrumentos de política económica a cambio de la estabilidad y el crecimiento a largo plazo. Pero, ¿todos los países pueden?

El debate político, muy relacionado con el anterior, es sobre la soberanía monetaria y fiscal. Hay disparidad de opiniones sobre en qué grado países periféricos como los del Mediterráneo, con problemas estructurales, pueden sacrificar el uso de su política de regulación de la demanda. En diferentes momentos históricos se ha puesto de manifiesto la incapacidad de estos países para avanzar en un marco económico sin libertad para decidir sobre su política monetaria y fiscal. Patente es el caso español. Durante la época del patrón oro, mantenerse al margen permitió a España protegerse mejor de la volatilidad de las fluctuaciones del ciclo económico. En cambio a finales del siglo XX, hipotecó su política económica en favor de la moneda única y ha acabado experimentando una crisis bastante prolongada. Un país con un problema estructural en la balanza de pagos no puede permitirse el lujo de perder la capacidad de decidir sobre su política monetaria

³⁴ El Dictamen de la Comisión del Patrón Oro coincide con esta idea.

y su política fiscal. ¿Puede que apostar por el largo plazo sea un lujo que los países periféricos no se pueden permitir?

Las evidencias sugieren que no fue posible entrar en el patrón áureo, a pesar de que pudiera ser deseable. Los problemas más importantes de la economía española para adoptar el oro fueron la balanza de pagos y la Hacienda. Los costes de haber entrado con las condiciones que tenía el país pudieron ser demasiado altos. Parece que España no siguió un camino equivocado. A corto plazo, la autonomía de la política monetaria y fiscal y el tipo de cambio flotante permitieron el ajuste del país ante la volatilidad del ciclo económico, contribuyendo a amortiguarlo. España nunca utilizó todas las posibilidades que ofrecía el sistema fiduciario y siguió una política cercana al patrón oro (Tortella, 1974; Sardà, 1987; Martín Aceña, 1993 y 2000; Serrano Sanz, 2004, Martín Aceña et al., 2011).

Los beneficios de haber adoptado el patrón oro pudieron ser de diversa índole: aprovechar la expansión del comercio mundial, disfrutar de la integración económica, menor inflación y tipos de interés más bajos, mayor nivel de inversiones, mejor gestión presupuestaria o mayor un crecimiento económico. Sin embargo, los beneficios del sistema fiduciario pudieron ser, presumiblemente, más elevados.

Chapter 2: “Why was Europe’s southern periphery not able to adopt the gold standard? The case of Spain, 1874-1913”.*

Abstract

Spain had constant budget deficits at the end of the nineteenth century, and it was the only western country unable to adopt the gold standard. I aim to establish whether the Spanish debt was sustainable or not during the classical gold standard period, and how debt sustainability changed due to the various policies implemented by policymakers. This paper sheds new light on the analysis of Spanish fiscal solvency by applying two different econometric approaches: fiscal reaction function, and impulse response analysis. This article also interprets the results using narrative evidence and data from previous studies. I find that Spanish debt was unsustainable between 1874 and 1903, regardless of whether seigniorage is considered. Thus, it was very difficult for the country to join the gold standard due to its huge debt accumulation and its weak political position until 1903. Moreover, seigniorage seems not to be important to explain debt sustainability. From 1903, Spanish debt was sustainable due to a change in economic policy, introduced by Raimundo Fernández Villaverde.

Key words: Classical gold standard, debt sustainability, Spain, fiscal response function.

JEL codes: E42, E52, E63, N10

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“For the believer, salvation is in the holy fear of God; for every finance minister, salvation is in the holy fear of the deficit.”

José Echegaray, 1905

I. Introduction

The debate on fixed exchange-rate systems has grown in importance over the past decade as a consequence of the euro crisis. Questions such as whether any country, regardless of the economic problems that it may have, can join a fixed exchange-rate system like the euro have engaged the interest of economists and economic historians alike.¹ In both the first and second globalizations, peripheral economies strove to emulate advanced economies and, in many instances, their attempts generated serious problems. In the last decades of the nineteenth century, a large number of countries adopted the gold standard. Peripheral economies during the gold standard period had problems of convertibility, while core countries had long convertibility records. As in the recent phase of financial globalization, financial crises increased in the pre-1914 era (Reinhart and Reinhart, 2008 and Powell and Tavella, 2012). There were currency crises and convertibility was suspended (Bordo and Schwartz, 1999). Spain suffered two currency crises in this period (Martínez-Ruíz and Nogués-Marco, 2014) and experienced large-scale accumulations of debt.

The recent sovereign debt crisis has once again highlighted the differences between core and periphery (or North and South). The differences are the cause of the problems affecting the EMU today and recall the difficulties experimented by peripheral countries under the gold standard. Similarly, the euro has created a core of surplus countries and a periphery of deficit countries. The latter have had to sacrifice their domestic economies to restore external equilibrium, and have thus been left unable to respond to crises. The debate between core and periphery remains open, and the stark contrast between core and periphery requires our consideration (Eichengreen and Flandreau, 1997, and Bordo and Flandreau, 2003, p. 419).

The recent international crisis has also stressed the importance of budget balance problems. Governments have paid more attention to the crucial issue of fiscal sustainability. There is a considerable amount of recent literature on the topic: empirical tests of fiscal solvency (or fiscal sustainability) based on Intertemporal Budget Constraint (IBC) and Fiscal Reaction Function

¹ Because there is no tax harmonisation within the eurozone, it is possible to compare the respective problems of the gold standard and the euro. Hoffmann (2013), Bordo and James (2014), Eichengreen (2014) and Matthijs (2014) have done it.

(Bohn, 1998 and 2007) or analyses using impulse response function (Afonso, 2008 and Afonso and Jalles, 2011 and 2017) among others. Moreover, Mendoza and Ostry (2008) show how past increases in debt in non-advanced economies require more powerful responses of the primary balance than in advanced economies.

Several studies have focused on the periphery and its problems of convertibility during the classical gold standard period. A shortfall in the public coffers was one of the major problems that prevented the periphery from joining the gold standard. Fiscal deficits contributed to unbalanced external accounts which resulted in repeated outflows of currency, and budget deficits led to a need for finance. Monetary policy took a back seat to fiscal needs (Tortella, 1994a, p. 325). The south tended to finance its deficits monetarily, a practice that generated a divergence of the country's prices with respect to international prices and caused problems in the balance of payments, gold depletion, and the suspension of convertibility.² In this respect, the countries on Europe's southern periphery were often forced to monetize their debt or, in the worst case, to declare bankruptcy, as Portugal did in 1891 after the country's failed attempt to prop up its exchange rate and stay on the gold standard.

The periphery was not able to remain in the gold standard. Even so, the Kingdom of Spain was not an island in a gold-standard sea. Neither Italy nor Portugal succeeded in staying in the fixed exchange-rate system over the long run. Portugal abandoned the gold standard in 1891 and Italy followed suit in 1894 after a severe economic shock. Recently, Italy, Spain, Greece and Portugal have accepted fiscal austerity and internal deflation to stay in the euro (Eichengreen and Temin, 2010). During the gold standard era, however, these countries felt compelled to break the "golden fetters" and ran wasteful fiscal policies that were inconsistent with price stability.

The effects of the commitment to the gold standard on a country's credibility varied according to its economic status. Advanced countries had better access to capital because of their high level of credibility. This, in turn, enabled them to overcome any disparities in their balance of payments and to finance their debt. By contrast, peripheral economies needed to achieve balanced budgets in order to keep the trust of the markets. Spain never adopted the gold standard; the country had constant deficits and huge amounts of debt during the last decades of nineteenth century, which made difficult to keep the exchange rate stable and maintain fiscal discipline. What happened to the public debt? Was it sustainable? I aim to assess the importance of the fiscal problems in Spain and if they represented a significant reason for not adopting the dominant monetary system. Could Spain adopt the gold standard in this fiscal situation?

² Eichengreen (1992); Bordo and Rockoff (1996); Eichengreen and Flandreau (1997) for the general question and Martín Aceña et al. (2000) and Prados de la Escosura (2010) for the Spanish case.

Considering that fiscal discipline was a key element for joining and remaining on the gold standard, this paper analyses whether or not Spain's fiscal policy was sustainable and, consequently, whether the country was simply unable to adopt the gold standard as a consequence of its fiscal problems. Thus, this paper explores if its debt was sustainable or not. My main hypothesis is that a backward economy such as Spain tended to have a deficit balance of payments and a negative budget balance, and that this made it impossible for it to adopt the gold standard.

Pittaluga and Seghezza (2016) link the gold standard and debt sustainability by studying how Japan was able to remain on the gold standard despite having unsustainable external debt. The overarching goal of these studies is to analyse the fiscal behaviour during the classical gold standard period. Martín Aceña et al. (2012) stresses that the question of Spain's debt in relation to membership of the gold standard needs further research. Sabate et al. (2019) consider that the sovereign debt crisis in the Economic and Monetary Union (EMU) has reopened the discussion on the sustainability of a single currency without a single fiscal policy, making possible comparisons with the gold standard a century ago, such as the ones conducted by Eichengreen and Temin (2010) and Bordo and James (2014).

To answer these questions, the paper will draw on two quantitative methods that have been used extensively in recent years.³ The first approach was put forward by Bohn (1998, 2007 and 2008) in his work on fiscal solvency, while the second one was used by Afonso (2008) and Afonso and Jalles (2011) involves employing a VAR model to estimate the impulse-response functions of the public debt and the fiscal deficit to check the robustness of the results through a VAR. While no quantitative studies have been done to analyse the unsustainability of Spain's debt for the period under study, there do exist descriptive analyses and reconstructions of historical series in Comín (1985, 1988, 1989, 1997, 1999, 2003, 2004, 2005, 2006, and 2016) as well as studies on fiscal dominance (Sabaté et al., 2006; Escario et al. 2011; Escario et al. 2012 and Sabaté et al. 2014).⁴ Thus, this paper estimates the fiscal reaction function for Spain over the period 1874-1913. It is tested how government budget primary balance tends to respond to changes in public indebtedness.

The main findings of the paper are that primary balance responded negatively to an increase in debt until the beginning of twentieth century when the response started to be positive. Moreover, I discover that seigniorage was not important for the sustainability of the debt, a finding that has

³ For more on debt unsustainability, related tests and sustainability indicators, see, among others, Buiter (1985); Blanchard (1990); Blanchard et al. (1991); Chalk and Hemming (2000); IMF (2003); Bohn (2008); Neck and Sturm (2008) and Escolano (2010).

⁴ There are several studies on fiscal dominance in the peripheral countries: Frattiani and Spinelli (2001) and Sabaté et al. (2006, 2015 and 2018) for Italy and Spain respectively, and Morys (2017) for Greece, Bulgaria and Romania.

never previously been reported for the Spanish case. The sustainability or unsustainability of the debt does not depend on seigniorage but on the economic policies (and specifically the fiscal policies) that the country adopted. On the other hand, there is a structural change in 1903 that had not been found in other studies of fiscal dominance. As of 1903, the debt was sustainable and entry into the gold standard was possible. Finally, as far as I know, there are no studies on fiscal solvency for Spain during that period.

Following this introduction, the second section proceeds to analyse the debt in Spain in the late nineteenth and early twentieth centuries. The third section goes on to review the theoretical framework and methodology used in the study of debt sustainability, while the fourth section sets out the data. Lastly, the paper finishes with a presentation of the results and a brief conclusion.

II. The economic problems that prevented Spain from adopting the gold standard: the country's debt.

The debate on the consequences of having constant deficits

Economic growth was slow during this period. There were several debt crises such as the 1876-1885 crisis associated with an increase in the deficit, and slowed in part by Camacho's debt restructuring, and the 1902-1920 crisis caused by the end of Cuban war and solved in part by Villaverde's fiscal policy measures (Comín, 2013).⁵ Why did Spain not adopt the gold standard? Two main answers can be found in the literature. First, some scholars take the view that Spain was simply unable to do so:⁶ the Spanish economy had serious problems that prevented its membership, specifically its balance of payments and its public finances. The second answer is the exact opposite: if the country did not adopt the international monetary system, it was because the monetary authorities decided against membership: that is, they did not pursue the appropriate policies to adopt the gold standard. For Martín Aceña (1981, p. 288), "*Spain had no insurmountable technical or economic impediments to adopting the gold standard*". Indeed, in his view, the Spanish economy was primed to benefit from the international monetary system. Yet, Martín Aceña (1993, pp. 155-56) explains that while there was no reason for Spain not to enter the gold standard, the decision was simply never taken.⁷

⁵ Years of crisis measured by debt/GDP ratio considering the first year the top of the ratio and the last year the minimum point after the crisis. One can find more on this measure and these two crises in Comin (2013). Measured by budget balance/GDP these two crises ran from 1861 to 1873 and from 1895 to 1902. First, there were deficits and then an accumulation of debt occurred. Therefore, the crises ended earlier in terms of budget balance over GDP than in terms of debt over GDP.

⁶ Serrano (2004, p. 161), says that the floating exchange rate can be seen as "*an inevitable result*" and not as a cause of Spain's backwardness. The expert opinion given by the committee on the gold standard (known as the Dictamen de la Comisión del Patrón Oro) concurs with Serrano's idea. Also in Llona (2001, p. 172).

⁷ This position is also advocated in Martín Aceña et al. (2014).

Despite this last view, it is considered that the shortfall in the public coffers was one of the chief factors to make Spain's linkage with any fixed exchange rate monetary system difficult.⁸ It was also one of the most important factors that made joining the gold standard unworkable (Flores de Lemus, 1929 and Serrano, 2004, p. 156). Serrano (2004, p. 144) considers that the Spanish monetary and exchange problem was actually a fiscal problem. According to the Dictamen (Flores de Lemus, 1929) the general direction of the economy was marked by prices and to a lesser extent by the balance of payments. In this way, prices were determined by the money supply and this, in turn, by the budgetary problems of the State. Spain's fiscal system was predicated on insufficient public resources (Comín, 2005). The public deficit contributed to throwing the country's external accounts into disequilibrium, giving rise to repeated outflows of cash.

High nominal and real interest rates, together with low GDP growth, kept the debt-to-GDP ratio high (figure 1).⁹ The Spanish economy was financially underdeveloped, marked by a history of high inflation and poor fiscal discipline. It was also unable to borrow in its own currency.¹⁰ For most of the period, the debt-to-GDP ratio exceeded 100%.

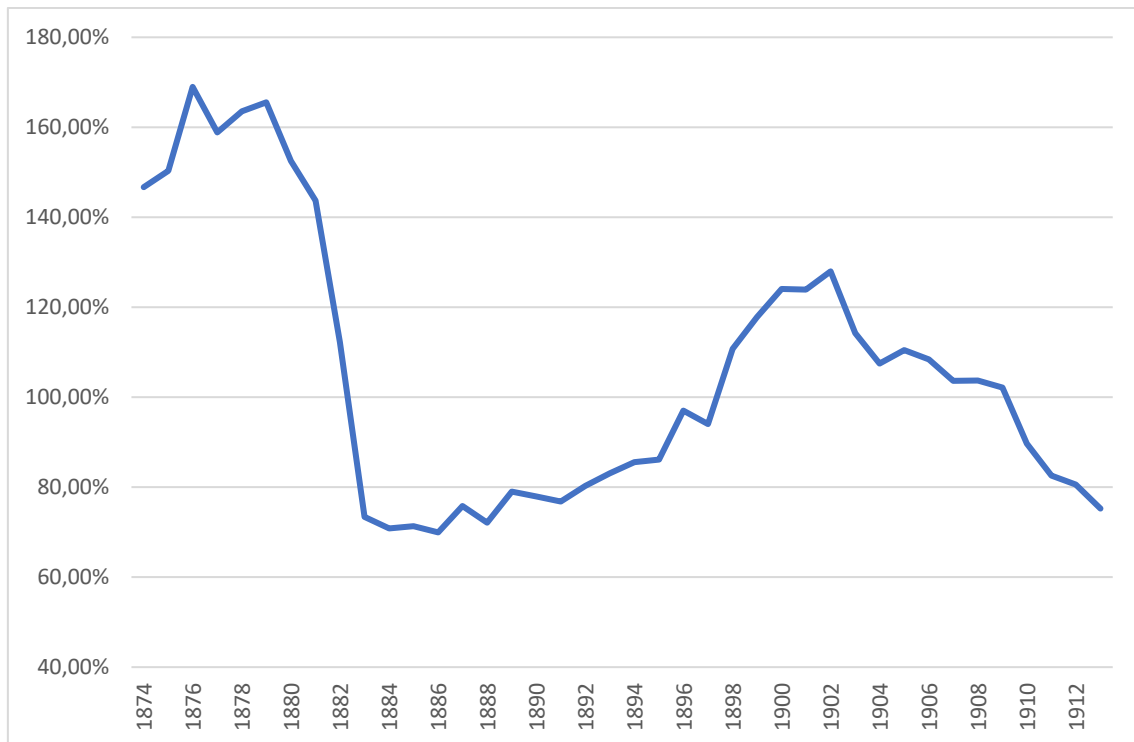
Figure 1 shows public debt for 1874-1913. This sample of 40 years includes all periods from the concession of monopoly of issuing to the *Banco de España* until the first world war. It indicates three maximum points: 1876, 1879 and 1902.

⁸ The problem was already identified by Flores de Lemus in the expert opinion issued by the committee on the gold standard (Dictamen de la Comisión del Patrón Oro). For a thorough analysis of the Spanish treasury in the nineteenth century, see Comín (1988).

⁹ Triffin, for his part, notes that the adjustment mechanism of the international capital markets was not symmetrical. A peripheral country's interest rate was always a few points higher than in the core countries. An interest-rate hike aimed at halting the outflow of gold had a different effect in a core country than in the periphery. In the latter case, the result was not only to increase the cost of borrowing for the state and the cost of financing investments, but might also generate negative expectations and lead to capital flight.

¹⁰ More on this problem in Eichengreen and Hausmann (1999)

Figure 1: Debt over GDP, 1874-1913 (as a percentage)



Source: Comín and Díaz (2005, p. 961) and Prados de la Escosura (2003)

The evolution of debt in Spain, 1868-1913.

The Revolution of 1868 caused a fiscal crisis, due to a reduction in revenue after the elimination of the consumption tax, and the political instability of the time. In addition, in those years, spending increased due to the war in Cuba and the Carlist war. Fiscal deficits and the amount of debt on GDP also rose. In spite of everything, financing remained in an acceptable state thanks to the debt issued by Cuba and the use of the Riotinto and Almaden mines as collateral. It was also financed with loans from the Rothschilds and Floud, though at very high interest rates.

In 1871 payments of the interests on the debt were suspended and, later, the Carlist uprising worsened the situation. In 1872 a debt conversion was negotiated with Britain and France, but was finally rejected. The war in Cuba (1868-1878) was financed by issuing debt for the colony, also through merchants and banknotes of the Spanish Bank of Cuba (Comín, 2016, p. 172). The situation became increasingly difficult.

Ultimately, Echegaray's decree of 19 March 1874 granted the note-issue monopoly to the *Banco de España* in response to the financial straits in which the state found itself.¹¹ In the period from

¹¹ On the one hand, the issue of banknotes rose sharply from 1879 onwards (Sardà, 1987, p. 175, and Tortella, 1994a, p. 177). The issuing of notes evolved inversely to the minting of coins: the fewer the coins that were minted, the greater the amount of banknotes that were issued (Sardà, 1987, p. 175). On the other hand, the bimetallic system permitted a greater expansion of the money supply (gold and silver).

1874 to 1882, Spain received significant amounts of foreign capital.¹² From 1874 onwards, a parallel has been observed between the evolution of the rates of public assets in the *Banco de España* and those of the money supply (Comín, 2016, p 225). It consisted of a cooperation between the banks and the Treasury allowing the banks to subscribe the debt with the privilege of pledging it directly to the *Banco de España* (Bank of Spain).

In 1876 Salaverría, minister of Finance, carried out a debt restructuring with which the payment of interest on the debt was resumed but at a reduced rate. The Salaverria arrangement increased the outstanding debt (there was no treatment in favour of the holders). It was possible to pay a part of the interest and increase the financial burden on the State. According to Comín (2016, p. 173), this did not solve the debt crisis. Despite the momentary slowdown in the growth of the debt in 1879, the situation worsened again, as 42.3% of tax revenues went on debt, which was at 165% of GDP (figure 1). The delay in the payment of interest would soon end; the response was to carry out to a new conversion in order to alleviate the State's financial situation.

Then, in 1881, Camacho restructured Spain's debt.¹³ One of the most important features of the restructuring was the government's commitment to pay interest in francs or pounds.¹⁴ Camacho's restructuring was intended to improve the country's creditworthiness, and it had favourable effects on the budget and the state debt. The laws of 1881 and 1882 joined the previous dispersed issues into two types of debt: amortizable, and perpetual internal and external debt. It was possible to reduce the debt in circulation but not the financial burden of the budget. These measures offered assurance that the coupons would be collected and that foreigners would be paid in gold.

In 1883, an agricultural crisis rekindled the public budget deficit. In response, the government pursued two avenues, one of which was the Treasury's direct loans from the *Banco de España*, which rose in value from 200 million pesetas in 1884 to 409 in 1891.¹⁵ Unlike the previous period from 1883-84 to 1891-92, the deficits remained constant (figure 2). The pressure on the public coffers increased fiduciary circulation (figure 4)¹⁶. When Spain had a deep triple crisis in 1882

¹² Martín Aceña (1981, p. 271).

¹³ For a more detailed explanation of the debt structuring, see Comín and Martorell (2006, pp. 389-391).

¹⁴ Roldán de Montaud (2006, p. 431). This decision had significant effects. Spaniards started to buy foreign debt because interest paid in gold served as a hedge against any potential depreciation of the peseta (Tortella, 1994a, p. 164). The purchase of foreign debt by Spaniards ultimately became a problem.

¹⁵ Against this backdrop, the Spanish parliament passed the Treasury law of 12 May 1888, which ended the Treasury's practice of requesting ongoing advances from the *Banco de España* (Obra de Joaquín López Puigcerver, Gaceta de Madrid, 5-VII-1888). The law in question confirmed the close relationship forged between the Treasury and the *Banco de España* since 1874, which reached its peak when the state delegated the management of all its collections and payments to the private bank.

¹⁶ Fuentes Quintana (1990, p. 40) and Sardà (1987, p. 183).

(currency, banking and stock market) during this period, it coincided with a fiscal or debt crisis. This was the most severe crisis in this period (Betran and Pons, 2018).

The volume of the debt stabilized until 1895, when it increased again due to the resumption of war in Cuba. Spain enjoyed a budget surplus in 1893 and 1894, but the Cuban uprising of 1895, which triggered a war with the United States, halted the trend. Financing the war drove Spain's debt up from 800 million to 3 billion pesetas. The monetization of the debt increased the amount of money in circulation. The law of 14 July 1891 authorized the *Banco de España* to raise its note-issue limit to 1.5 billion¹⁷. Banknotes in circulation increased from 910 million pesetas in 1894 to 1.444 billion pesetas in 1898 (figure 4). As a consequence, Spanish prices rose more than international prices, driving down the value of the peseta.

After that, the decree of 9 August 1898 raised the note-issue ceiling from 1.5 billion to 2.5 billion pesetas. By the end of the war, the money supply had ballooned by more than 50%. The interest rate, which was adjusted as a function of the Treasury's interests, fell in order to lower the cost of debt. The funding of the war ultimately turned into a problem for the public coffers.

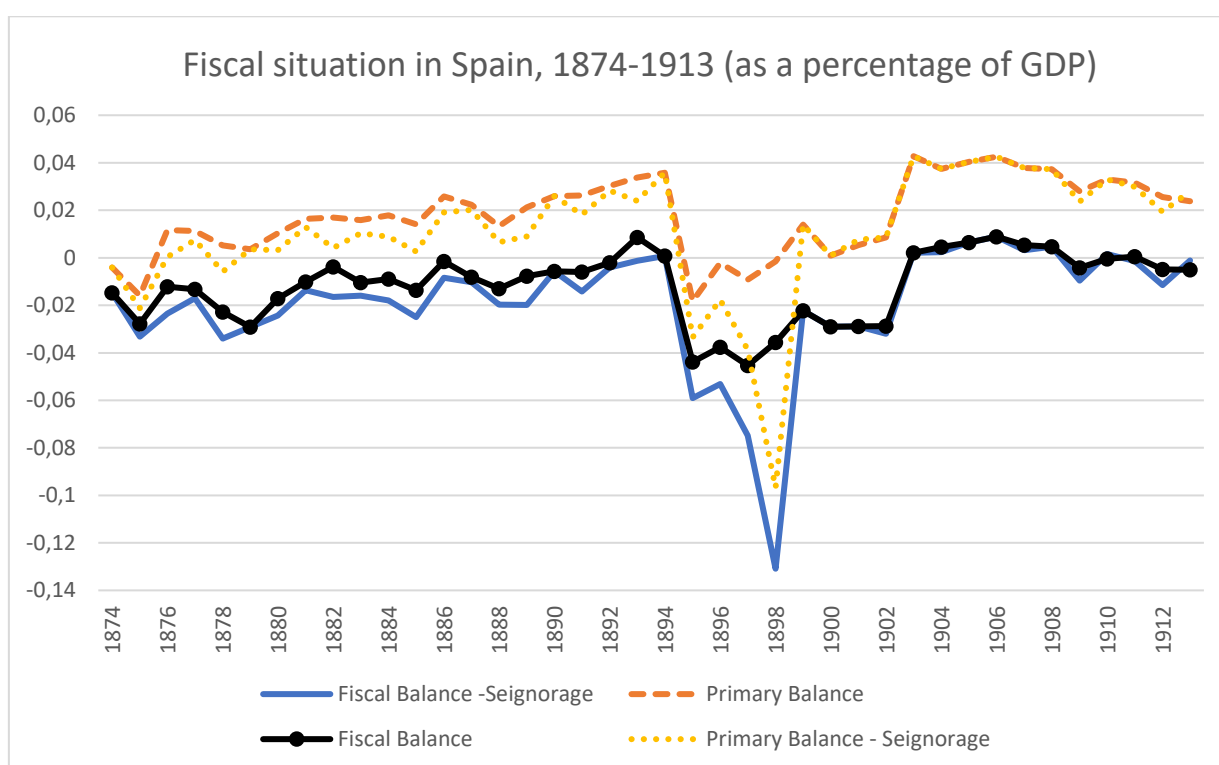
In 1899, Fernández Villaverde prioritized finding a solution to the debt problem, seeking to redress the shortfall in public revenues and laying the groundwork for establishing the peseta's exchange rate, in a bid to return the Treasury to solvency. Before Villaverde applied this adjustment, Spain could not find financing through the Rothschilds and its debt was suspended on the stock exchange. Thanks to Villaverde's efforts, the debt was restructured and the situation of the public finances improved. Indeed, the monetary aspect of his focus on stabilization was successful on the three fronts that it addressed (the debt, budgets, and the currency). The financial burden of the debt decreased although the weight of the perpetual debt and the nominal interest rate increased. An era of budget surpluses was achieved that helped the stability of the Spanish economy (figure 2) and lent credibility to the Spanish treasury for a long period of time.

Villaverde managed the budget balance by reducing public spending without increasing the tax burden (figure 1 and 2). However, in 1909, the budget pressure stemming from wartime spending in Morocco and from interventionism created a budget deficit. The deficit was monetised and borrowing went up, leading to inflation, and the legal limit on the issue of banknotes was raised from 2 billion pesetas in 1899 to 3.5 billion in 1918.

¹⁷ Sardà (1987, p. 189), takes the view that Spain entered fully into a fiduciary money system after the enactment of this law. By raising the note-issue limit, the debt could be monetised. This was the chief way of financing the debt in the period. Sabaté et al. (2006, p. 520), stresses the negative association that has been made between this law and the unwillingness of politicians to straighten out the public finances. She notes that it is necessary to take into account the new guarantee required from the *Banco de España* as well as the budget outcomes in the years that followed.

Figure 2 shows fiscal balances and primary balance from 1874-1913. According to Sabaté et al., 2006; Escario et al. 2011; Escario et al. 2012 and Sabaté et al. 2014, seigniorage was an important tool for Spanish economy. “According to Spanish literature, the failure to control deficits for most of that period led Treasury to repeatedly look for money creation financing (seigniorage) (...)” (Sabaté et al., 2006). The grey line indicates the fiscal balance without considering seigniorage; the dotted orange line shows the primary balance without considering seigniorage, which is total revenue less payments but with no inclusion of interest payments; the dotted yellow line explains the primary balance taking into account seigniorage; and the solid blue line is the fiscal balance considering seigniorage.¹⁸ Greater fiscal deficits were seen from 1894 to 1904, coinciding in part with the end of Cuban war and the change in fiscal policy made by Fernando Villaverde during the first years of the twentieth century. The primary balance ratio records can also be observed. From 1902, the fiscal situation in Spain improved thanks to Villaverde’s debt restructuring in 1900 (Comín, 2013).¹⁹

Figure 2: Fiscal balance, 1874-1913 (percentage of GDP).*



*Fiscal balance minus seigniorage is how the fiscal balance would have been without using seigniorage. The same is for primary balance.

Source: Anes (1874a, 1874b), Comín (2017)²⁰, Martín Aceña (1988) and Prados de la Escosura (2003).

¹⁸ More in data and theoretical framework sections.

¹⁹ More about that is explained in the next paragraph.

²⁰ Data on fiscal balance and primary fiscal balance used in this paper has been transferred by Francisco Comín (University of Alcalá de Henares).

During the nineteenth century there was no unified budget. Therefore, the increase in debt came both from the budget deficit and the extraordinary budgets, as well as the expenses of wars or even debt issuances for public works and subsidies to companies (Comín, 2016). According to Comín (2013 and 2016), these debt crises were the result of high budget deficits, and the excessive weight of short-term debt and external debt.

Comin (2016) studied Spanish debt crises using different indicators. The maximums in the series of public debt in real terms and in ratio debt/GDP are in 1876-78 and 1902 and mark the two crises of the Spanish debt. Public debt grew steadily between 1864 and 1878. In 1886, after Camacho's conversion, the debt fell reaching its minimum. Subsequently, the budget deficits returned to feed the debt between 1887 and 1901. Again, in 1902 the debt reaches a maximum. According to Comín (2016) this was the maximum level of debt that the Spanish fiscal system developed in 1845 could withstand. Villaverde's stabilization would help to reverse the situation. Between 1865 and 1883 the debt / GDP ratio was higher in Spain than in other European countries, indicating that its debt crisis was particularly large. In 1895, after the settlement of Camacho's debt, the path of divergence was re-established and the debt / GDP ratio increased (figure 1). The ratio in this period was higher than that of Italy, which was one of the most indebted countries. After 1850, excessive deficits occurred between 1861 and 1873 and 1895 and 1902. After these, fiscal restrictions were applied. Outside the gold standard, the Spanish Treasury could avoid the orthodoxy of budgetary equilibrium and openly resort to the inflation tax to finance the deficit.

Table 1 shows how, during the 1880s, the deficit was much higher in Spain than in Italy. There was also a large difference between Spain and England until the beginning of the twentieth century. During those years, in the UK the deficit never reached 1% (with the exception of wartime), Italy only exceeded 1% in 1888, but in general was below 1% (table 1). However, Spain usually had deficits over 1% before the twentieth century.

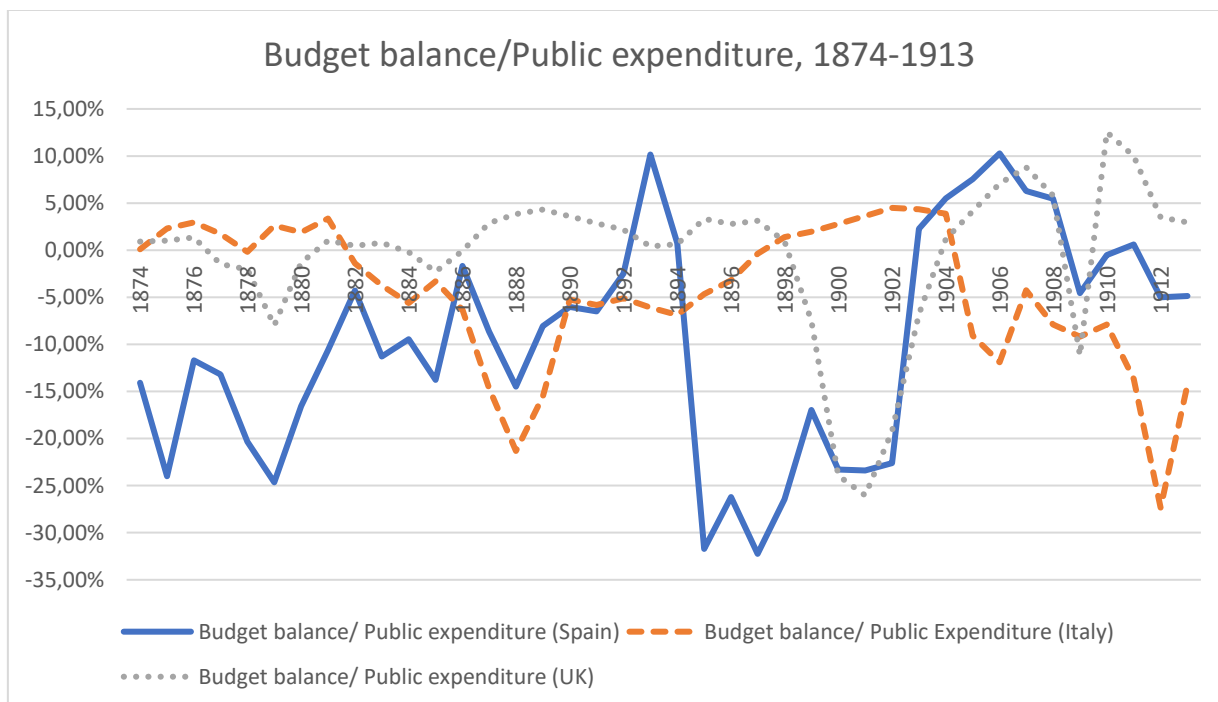
Table 1: Fiscal balance in the UK, Italy and Spain, 1874-1913 (in % of GDP).

Fiscal balance			
	UK	Italy	Spain
1874	0.06	-0.11	-1.47
1880	0.06	0.27	-1.71
1885	-0.004	-0.26	-1.36
1890	0.18	-0.69	-0.57
1895	0.18	-0.64	-4.39
1900	-2.65	0.59	-2.91
1905	0.48	0.56	0.64
1910	0.75	0.18	-0.05

Source: Comin (2017), Prados de la Escosura (2003), Baffiggi et al (2013), Fratianni and Spinelli (2012), Mitchell et al. (1988, pp. 575-593)

Figure 3 also shows that Spain had higher deficits in terms of public expenditure than other countries such as Italy (similar to Spain) or the UK considering the fiscal balance over public expenditure ratio. A tendency toward change can be observed at the beginning of the twentieth century with Villaverde new policies. Spain had deficits that were double those in Europe with a smaller state weight (expenditure/GDP).²¹

Figure 3. A comparison between Spain, Italy and the UK considering budget balance, 1874-1913 (percentage of public expenditure).



Source: Comin (forthcoming), Frattiani and Spinelli (2012) and Thomas, R and Dimsdale, N (2017)

Table 2 shows how, in general terms, Spain had lower public spending on GDP than other countries such as France, Italy and Germany, although in some years it was higher than in the UK. However, it was one of the countries with the highest fiscal deficits (table 1).

²¹ Based on the sources shown in graph 1.

**Table 2: Public expenditure in Europe, 1850-1910 (percentage of GDP)
(State and Public Administrations.)**

	UK	Italy	France	Germany	Spain
1850	12.4		8.5		7.7
1860	12.7	14.6	9.1		10.3
1870	9.9	15.4	11.6	18.5	14.4
1880	10.4	13.1	15.4	12.5	10.4
1890	10.3	17.3	15.0	15.2	9.4
1900	16.9	15.2	15.2	17.4	12.5
1910	14.5	17.8	14.4	16.7	9.7

Source: Comín (1996, p. 151) and Comín (2017). United Kingdom, France (1850 and 1860: State) and Germany: Public Administrations, Spain and Italy (always State)

In the same way, Spain was one of the countries that spent the most on debt interests (table 3). Lastly, the percentage of Spain's spending on the debt remained higher than 30% of total state spending in many years. These were maximum percentages of the financial burden of the debt. Interest was a very important part of the income of the Treasury (table 3). Spain's situation as a peripheral country offering little confidence in the markets, together with high debt levels, explain the high interest payments. Spain was far from the levels of UK and Germany but close to those of Italy and France.

**Table 3: Public expenditure on interest on debt in Europe, 1860-1910
(percentage of the expenditure of the State)**

	UK	Italy	France	Germany	Spain
1860		15.5	20.1		13.2
1870		38.7	38.4	7.8	34.5
1880		35.5	34.2	7.3	26.6
1890	18.2	31.0	36.8	7.9	33.7
1900	7.0	33.3	28.4	7.5	24.0
1910	7.4	18.5	26.1	7.2	34.5

Source: Comín (1996, p. 155) and Comín (2017)

United Kingdom and Germany: AA. PP. France, Italy and Spain: State

Spain's fiscal policy and the gold standard

The above evidence suggests that the situation of the Spanish treasury hindered the adoption of the gold standard²². According to the expert opinion issued by the committee on the gold standard, it would have been difficult to remain on the gold standard in the long run. Later literature has examined the matter and the government of the time also put on record that fiscal policy and the related debt and deficits were among the major problems facing the Spanish economy (Flores de Lemus, 1929).

²² Serrano (2004, p. 165).

For those who hold the view that not enough was done to adopt the gold standard, the policy choices that were made were not in the right direction and lacked the necessary force. Martín Aceña et al. (2014) claim that the monetary and fiscal policies adopted were not well focused on Spain's integration into the gold standard, and were not pursued with sufficient conviction²³. The authorities did not balance the budget nor did they follow fiscal orthodoxy. The question to answer is whether fiscal orthodoxy really could have been followed in a country as backward as Spain. These authors also point to the behaviour of the *Banco de España* to explain why Spain did not adopt the gold standard. They note that the high rate of returns maintained by the *Banco de España* helped to keep Spain off the gold standard. To join, it would have been necessary to decrease the issue of banknotes, which would have lowered the bank's profitability. Along these lines, the authors concur that the *Banco de España* acted as a private bank by prioritizing its own earnings. Serrano (2004), p. 165, also argues that the *Banco de España* took a view that was more financial than economic. That said, however, the Bank of Portugal behaved differently, and Portugal was not spared from leaving the gold standard due to its huge debt. In any case, a debate *Banco de España* and its link or not with fiscal situation is beyond the scope of this paper.

On the one hand, Spain did not adopt the gold standard because of the fear of its politicians and the *Banco de España* that deficits in the trade balance and the budget would cause an outflow of gold that would make the project unworkable²⁴. This fear finds expression in the expert opinion issued by the committee on the gold standard²⁵. Serrano Sanz notes that “*the deficit was undoubtedly an obstacle to monetary discipline at the time (...)*”²⁶.

On the other hand, the situation of the public coffers meant that monetary policy took a back seat to fiscal needs²⁷. In relation to the exchange rate, the result was depreciation because the amount of money in circulation increased due to the role played by the *Banco de España*.²⁸ The deficits and the need to finance the debt drove up the amount of money in circulation. Figure 4 below shows that the amount of money in circulation followed a very similar behaviour to the evolution of the public debt, given the need to finance the country's mounting debt (Sabaté et al., 2006, p.

²³ Martín Aceña, Nogués and Martínez Ruiz (2012).

²⁴ Tortella (1994a, p. 324).

²⁵ Dictamen (1929, pp. 24, 61 and 66).

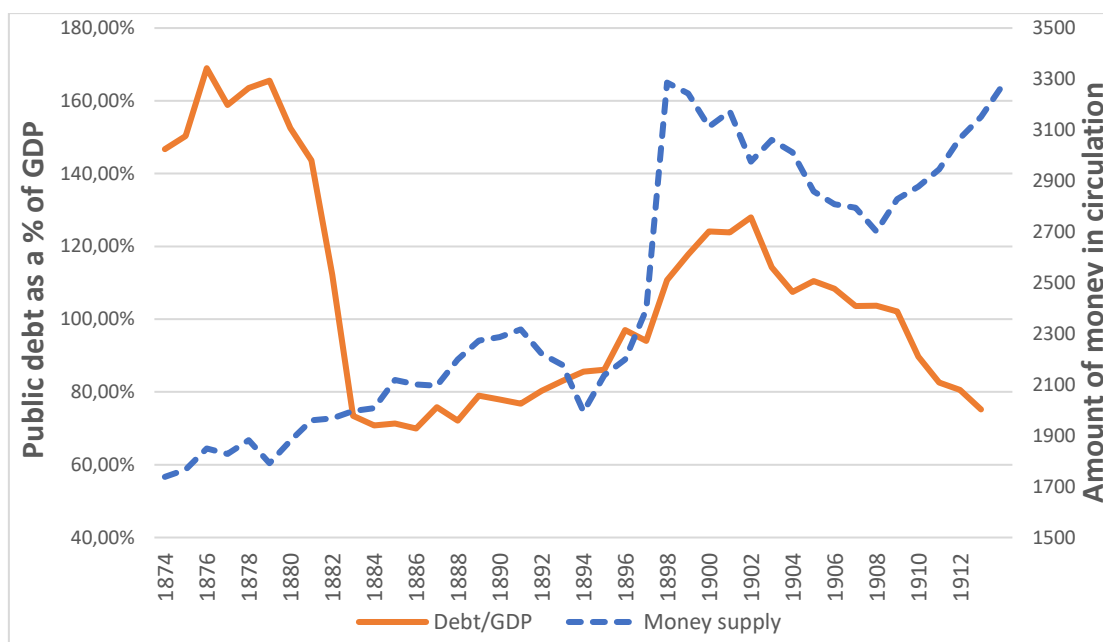
²⁶ Serrano (2004, p. 156). In the same vein, Sabaté et al. (2006, p. 328), point to the behaviour of the Treasury as one of the causes of the peseta's non-convertibility. Jordi Nadal has also noted that many of the proposals of Spanish governments put a higher priority on payment obligations.

²⁷ Tortella (1994a, p. 325).

²⁸ Tortella (1994a, p. 325) and García Iglesias (2005, p. 17) consider that the relationship between the *Banco de España* and the Treasury was very important in the decisions taken regarding the monetary system.

328; Escario et al., 2011; Escario et al., 2012 and Sabaté et al., 2014). Seigniorage was important to safeguard the state's solvency in the long run (Escario et al., 2011).

Figure 4: Public debt as a % of GDP and the amount of money in circulation, 1874-1913
(in million pesetas)



Source: For the public debt, Comín and Díaz (2005, p. 961); for GDP, Carreras, Prados de la Escosura y Rosés (2005, p. 1339); and for the amount of money, Martín Aceña (2005, pp. 678, 679 and 683) adding coinage and banknotes in circulation.

III. Theoretical framework and methodology

Debt sustainability is an extremely important issue in macroeconomic and fiscal analysis. The efforts of researchers have been directed toward building indicators to evaluate debt sustainability and, more recently, devising tests to check whether or not the intertemporal government budget constraint holds with particular data.

It is typically determined by checking whether the stock of outstanding public debt matches the discounted present value of the primary fiscal balance, both at the overall government level and with all types of tax revenues, including all transfers and entitlements. The IGBC is a fiscal solvency condition that includes the former concept of sustainable debt. According to the concept, debt is sustainable if the expected present value of future budget outcomes matches the initial debt. The first studies such as Wilcox (1989), Hamilton and Flavin (1986) and Bohn (1991) focused on IBC, considering that public debt and deficit have univariate properties. They used

cointegration and unit root tests in the IGBC framework. This classic concept of debt sustainability was used by Buiter (1985), Blanchard (1990) and Blanchard, Chouraqui, Hagemann and Sartor (1990), who apply the intertemporal government budget constraint as a condition that relates long-term budget balances over GDP and debt as a percentage of GDP in order to define debt sustainability. Trehan and Wash (1988 and 1991) and Haug (1991) test solvency by determining the order of integration of the public debt series and analysing if there is a cointegration relation between public revenues and expenditures. Hamilton and Flavin (1986), Hakkio and Rush (1991), Quintos (1995) apply the same focus to the US economy. Then, studies by Hakkio and Rush (1991), Haug (1995), Quintos (1995), Martin (2000) among others, explored the structural shocks for IBC. Other studies such as Bohn (1998) underlined the possibility of a non-linear function on IBC.

Bohn was critical of this methodology (Bohn 1998, 2007 and 2008).²⁹ In Bohn's view, testing for debt sustainability is futile, because the IGBC holds under very weak conditions if the variables are integrated in any finite order. Bohn (1998 2007 and 2008) also shows that these misspecification errors lead to incorrect inferences that reject fiscal solvency when it actually exists. As Bohn (2008) stresses, neither a particular order of integration of the debt data nor the co-integration of revenues and government outlays is necessary for debt sustainability. This condition is very weak because it is easy to reject the hypothesis that the variables are non-stationary after differentiating them an infinite number of times. For all these reasons, it is necessary to study the dynamics of fiscal reactions that support fiscal solvency.³⁰

Bohn (1998) incorporates the tax smoothing model of Barro (1979) and estimates a multiple regression to study the systematic relationship between the primary surplus and public debt. Bohn (1998 and 2008) defends an approach that is focused on economic intuition considering the relationship between public debt and primary balance. Bohn (1998 and 2007) deduces a simple rule or fiscal reaction function for testing whether debt was sustainable by solving intertemporal optimization. Bohn (1998) believes that if an economy improves its budget balance when it sees its debt grow, then its debt will be sustainable in the long-run. He also notes that the positive relationship between deficit and debt is not necessary when the level of debt-GDP-ratio is low. Bohn (1998 and 2008) shows that by identifying the fiscal reaction functions, it is possible to study fiscal solvency and understand the dynamics among the variables. This, in turn, provides a better understanding of deficit issues. Bohn (1998) estimates the fiscal reaction function for the US (1916-95) and Bohn (2008) extended the analysis for 1792-2003 showing how public debt was sustainable. As can be seen in Bohn (2008), a linear fiscal reaction function with a statistically

²⁹ For additional information, see Bohn (2007) and D'Erasmus et al (2016).

³⁰ In D'Erasmus et al. (2016), there is an in-depth examination of the reasons why using only the IGBC to analyse debt sustainability is not correct.

significant and positive response of the primary balance to outstanding debt is sufficient for the IGBC to hold. Bohn defines the conditions for sustainability as those in which an agent's ability to borrow is constrained by other agents who are willing to lend (Bohn, 2008). Bohn's fiscal reaction functions (2008) only require data on the budget balance, the outstanding debt and some control variables. As a result, it has recently become more common to estimate the fiscal reaction function, which addresses the reaction of primary surpluses to variations in the debt-to-GDP ratio under a given debt policy (Bohn, 2008 and D'Erasmus et al., 2016).

Ihori et al (2001) applied the same methodology for the Japanese case. Shizume (2007 and 2011) run a similar analysis applying Bohn's method for pre- World war Japanese debt with a new dataset of Japanese fiscal balances. Ghatak and Sanchez-Fung (2006) study the debt sustainability for Peru, Philippines, South Africa, Thailand and Venezuela (1970-2000). Mendoza and Ostry (2008) extended Bohn's analysis. Some studies have sought to provide a better definition of fiscal limits, that is, the maximum debt-to-GDP ratio that is sustainable (Ghosh, Kim, Mendoza, Ostry and Qureshi, 2013 and D'Erasmus et al., 2016). These authors have examined the conditions for fiscal solvency by considering changes to the fiscal balance arising from different levels of debt.³¹ An analysis of debt sustainability with structural changes has been made by Shizume (2007 and 2011).

Bajo-Rubio, Díaz-Roldan and Esteve (2004 and 2006) used TAR (Threshold Vector Autoregressive) for the Spanish case during the second half of the twentieth century. Arestis, Cippolini and Fattouh (2004) also ran a TAR to study the fiscal dynamics depending on the growth level. Others such as Escario et al (2012) studied fiscal dominance and solvency using multicointegration for Spanish case in the long-run. Several studies have addressed this question via Bohn (2008)'s single country analysis and other via panel analysis by Celasun, Debrun, and Ostry (2007) who studied debt paths for emerging countries by estimating fiscal reaction function from a panel regression. A VAR approach has also been used by Afonso (2008).

The approach here is the one proposed by Bohn (1998, 2007 and 2008) in his work on fiscal solvency.³² This approach has the advantage of providing a robust method for a non-structural empirical test that is sufficient to satisfy fiscal solvency (D'Erasmus et al., 2016). By analysing the dynamics of fiscal adjustment, fiscal solvency can be studied by means of the characteristics of the fiscal reaction function. The information on how to obtain the specification comes from tax-smoothing theories on optimal taxation, which suggest that temporary changes in government spending and decreases in income drive up normal fiscal deficits. Bohn (1998) explains that the

³¹ Other studies have examined debt sustainability using different approaches. Two examples are Bi, Shen and Yang (2016) and Arellano and Bai (2017).

³² Bohn developed the analysis that we used here in 1998 with an analysis of the sustainability of the debt between 1916 and 1995. In 2005 he extended the analysis between 1792 and 2003.

tax smoothing theory yields an empirical specification for primary surplus. This model uses a set of other variables to control implying that non-debt determinants of the primary surplus are the level of temporary government spending, g_t and business cycle indicator, y_t .³³ The idea of this paper is to search for a systematic relationship between debt over GDP ratio and the primary balance by estimating a regression whose empirical specification is as follows:

$$s_t = \rho d_t + \beta_0 + \beta_g g_t + \beta_y y_t + e \quad (1)$$

where s_t is primary balance over GDP, d_t is public debt over GDP, g_t is temporary expenditures, y_t is temporary income, e is the error term with zero mean and ρ , β_0 , β_g and β_y are the regression coefficients. Both y_t and g_t are estimated with proxies and prove quite important for identifying the marginal effect of the public debt. The control variables are the output gap for capturing the impact of economic cycles on the budget (y_t) and on defence spending (g_t). Temporary military expenditure is usually calculated following Barro (1986) and Bohn (1998). The sign and the statistical significance of the d_t coefficient is critical in our analysis (table 2). A positive response of coefficient ρ is a sufficient condition for fiscal solvency in a fiscal reaction function. We employ OLS in our regressions. As a result, this coefficient is expected to be positive, indicating that an increase in the public debt ratio is associated with an increase in the primary budget balance. Most studies of this sort also consider seigniorage, taking into account the size of the monetary base that went to finance the state year after year and subtracting the deficits. This approach indicates not just whether there was fiscal solvency, but also how it was achieved.³⁴

In some studies, autoregressive vectors (VARs) have been used to obtain impulse-response functions for the public debt and fiscal balance (Canzoneri et al. 2001, Afonso, 2008 and Bajo-Rubio et al., 2014) in order to provide a further robustness check by showing additional results from a forward looking approach. I use local projections instead of impulse response function based on VAR analysis due to the number of observations. For the purposes of the present study, the latter two methods have been examined because they are the most efficient and the most commonly used in recent studies of debt sustainability and fiscal policy for different countries and different historical periods.

³³ These control variables are called Z_t by Bohn (1998).

³⁴ Another different approach is done by Ghatak and Sanchez-Fung (2007) who employ a recursive t statistical approach to explore within sample developments of debt just of the period. They fix one starting period and change the ending year, extending it. They thus see how the results change depending on the period under study.

IV. Data

The data start in 1874, for historical reasons. The restoration in 1874 restored political stability to Spain (see annex 1).³⁵ This is the time of the gold standard throughout Europe.³⁶ I use new data on primary balance that has not already been published. New data on primary balance come from Francisco Comín (2017) who is the maximum expert on Public Finances in Spain and has recalculated the primary and budget balances.³⁷ Moreover, I will use new data on military expenditure from Sabaté (2016).

In the absence of monthly data, the study makes use of annual data from 1874 to 1913. St is the ratio of the budget balance to GDP that is obtained by Comín (2005) and dt is the ratio of public debt to GDP, also from Comín (2005). Yt is temporary output and the main data points for its calculation come from the estimation in Prados de la Escosura (2003), while gt is temporary spending and the data for its estimation are defence spending figures from Comín (2005) and Sabaté (2016). The data on seigniorage are obtained in the same manner used in Escario et al (2012) and Sabaté et al. (2006). These data come from Anés (1874a, 1874b) and Martín Aceña (1988).

V. Estimating the fiscal reaction function

Following the specification of equation (1), the fiscal reaction function is estimated. Yt and gt are the proxies for temporary GDP and temporary government spending, which are obtained as follows. For economic fluctuations, individuals are assumed to be able to distinguish between trend and cycle in real time as well as an economist can when looking backward. Like others before, we use the Hodrick-Prescott filter ($\lambda=100$) to extract the trend from a series of real GDP data. The difference between the real value and the trend is taken as a proxy for y_t .³⁸ I also use the cyclical component of GDP to check and compare my results. Fluctuations in government spending are basically the result of defence spending. I separate large swings in military expenditure from other fiscal spending. Non-defence spending can be approximated with a random walk process. The permanent component of defence spending, as a ratio of GDP, is estimated with an autoregressive model of order two (AR2), as in Bohn (2008). The results can also be verified by using defence spending as a proxy for g_t as in D'Erasmus et al. (2016). We take the difference between the actual and the fitted components. ρ is expected to be positive and

³⁵ More on this in Serrano (2004, pp. 25 and following).

³⁶ To include seigniorage in our analysis, 1874 should be taken as the starting point, as there are no data on seigniorage prior to this date

³⁷ This data has been used before by Betrán and Pons (2018). New data solves the fiscal deficits underestimation shown in Comín and Díaz (2005).

³⁸ Positive values indicate that the proxy is above the trend.

significant for there to be fiscal solvency. y_t and g_t are expected to be positive and negative, respectively, for the theory of tax-smoothing to hold. In addition, variables such as the squared deviation of public debt from its mean to consider a potential non-linearity in the fiscal balance can be added to verify whether the results are maintained. Table 4 shows the regression results of equation 1. The OLS (Ordinary Least Square) method is used. ρ appears as negative and statistically significant at the 5 per cent level, meaning that there was no fiscal solvency in Spain, and y_t and g_t coefficients appear with the expected sign.

Table 4: Fiscal reaction function for Spain, 1874-1913

FISCAL REACTION FUNCTION OF SPAIN, 1874-1913 (Bohn's test)		
Dependent variable: primary fiscal balance		
Model	Base Model	Time trend
Coefficient	(1)	(2)
Constant	0.0381*** (-0.0085)	0.0042 (0.0148)
Debt	-0.0191** (0.0077)	-0.0100 (0.0079)
GDP gap	0.00001 (0.00001)	0.00001 (0.00001)
Military component	-0.895 (0.5724)	-0.8304 (0.5643)
Time trend		0.0006** (0.0002)
s.e	0.0147	0.013595
Adj. R-squared	0.1519	0.279492
Observations	40	40
DW	0.0160	0.991603

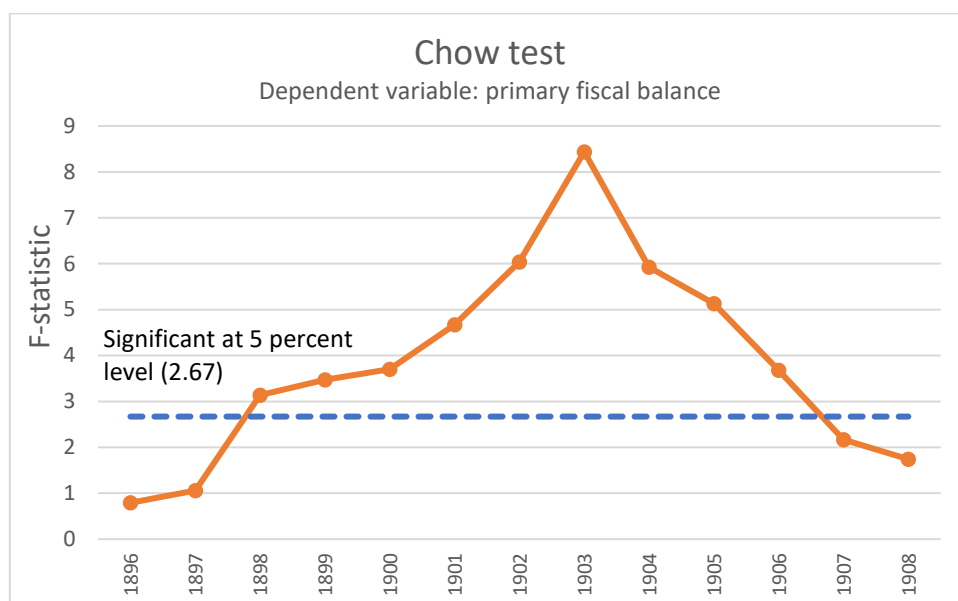
*, ** and *** mean $p < 0.1$, $p < 0.05$ and $p < 0.01$, respectively.
Standard errors in brackets ()

Source: my own estimation based on the data explained above.

However, historiographical evidence suggests that there is a structural change in government behaviour in terms of fiscal policy and debt management within the sample period. A candidate for the structural change is the end of the Cuban war that coincided with a change in fiscal policies made by Fernández Villaverde. Villaverde carried out a debt conversion in 1900 and was able to reduce the public spending achieving superavits from 1899 to 1908. Because of this I check whether there is a structural change in my sample. Bohn's approach is used following Shizume (2011) and considering structural change to explore what happened. First, I use the Chow test to find the structural change. After that, I use Bohn's method with dummy variables to explore the characteristics of structural change. The Chow test analyses if the regression coefficients are

different for split data sets. Basically, it tests whether one regression line or two separate regression lines best fit a split set of data. The result of the Chow test on equation (1) indicates a structural change in 1903.³⁹ Figure 5 shows the results of the Chow test. I find a structural change after with the end of Cuban war, coinciding with the change in fiscal policies run by Fernández Villaverde.

Figure 5. Chow test of equation 1



Source: own calculation

Following Shizume (2007), the equation of Bohn’s approach for testing debt sustainability with structural change is as follows.

$$s_t = \alpha_0 + (\rho_1 d_t + \rho_2 d_t D_t) + (\alpha_1 g_t + \alpha_2 g_t D_t) + e_t \quad (2)$$

D_t has a value of zero before 1903 and one starting with 1903. ρ_1, ρ_2, α_1 and α_2 are the regression coefficients. I exclude the output component in the main model because it is insignificant and I need as many degrees of freedom as possible. When I run the regression with output component, the results do not change.

³⁹ Structural change is found in 1903 even when we consider seigniorage.

Table 5. Fiscal reaction function for Spain considering structural change, 1874-1913

FISCAL REACTION FUNCTION FOR SPAIN, 1874-1913 (Bohn's test)

Dependent variable: Primary fiscal balance								Primary balance considering seignorage	
Model	Base Model	Military spending	GDP gap	GDP cycle	Asymmetric response	Debt Squared	Time trend	Base model	Time trend
Coefficient	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.029*** (0.006)	0.0394*** (0.0083)	0.0283*** (0.0066)	0.0288*** (0.0066)	0.0456*** (0.0148)	0.0322*** (0.0071)	0.0518*** (0.0146)	0.016519 (-0.0115)	0.0604** (0.0258)
Debt	-0.0161*** (0.0058)	-0.014** (0.0063)	-0.0154** (0.0059)	-0.0159*** (0.0058)	-0.0365*** (0.0172)	-0.0221*** (0.0077)	-0.0214*** (0.0064)	0.0104 (0.0132)	-0.0216* (0.0113)
Debt*D1903	0.0227*** (0.0039)	0.031914** (0.0130)	0.022675*** (0.0039)	0.02281*** (0.0039)	0.02605*** (0.0047)	0.025035*** (0.0044)	0.030942*** (0.0061)	0.0296*** (0.007)	0.0455*** (0.0107)
Military component	-0.7965* (0.4691)		-0.859* (0.4726)	-0.8588* (0.4714)	-0.7342 (0.468)	-0.668 (0.4799)	-0.9371** (0.4631)	-0.8326 (0.8374)	-1.1035 (0.8205)
Military component*D1903	-1.3917 (1.6286)		-1.3085 (1.6483)	-1.3291 (1.6374)	-1.8859 (1.6631)	-1.8576 (1.6702)	-0.6713 (1.6361)	1.5215 (2.907)	-0.133 (2.8988)
GDP gap			0.000008 (0.000006)						
GDP gap *D1903			-0.00001 (0.00001)						
GDP cycle				0.000008 (0.000006)					
GDP cycle*d1903				-0.00001 (0.00001)					
Military spending		-0.5501* (0.322)							
Military spending*d1903		-0.4396 (0.5722)							
max (o, dt*-d)					0.0341 (0.0273)				
(dt*-d)^2						0.0283 (0.0245)			
Time trend							-0.0005* (0.0003)		-0.0009* (0.0005)
s.e	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.02	0.02
Adj. R-squared	0.54	0.55	0.54	0.54	0.53	0.52	0.57	0.32	0.37
Observations	40	40	40	40	40	40	40	40	40
DW	1.26	1.24	1.42	1.44	1.40	1.37	1.41	1.28	1.46

*, ** and *** mean $p < 0.1$, $p < 0.05$ and $p < 0.01$, respectively.
Standard errors in brackets ()

Source: my own estimation based on the data explained above

Table 5 presents the results of the estimated fiscal policy function. The standard errors are consistent with heteroskedasticity. The first column shows the results from the baseline model, which uses the following regressors: the debt ratio over GDP, the GDP gap as measure of temporary output, and the difference between the actual defence spending/GDP and AR(2) estimation of defence expenditure over GDP component as a measure of temporal public

expenditure (Bohn, 2007).⁴⁰ The second column estimates the same model taking the military spending/GDP instead of the main measure for this variable. The third column runs the estimation adding GDP as another control variable. The fourth column uses the cyclical GDP component as a temporal output, obtaining the same results. Following D’Erasmus et al. (2016), the fifth column introduces a spline coefficient when the debt is greater than the mean.⁴¹ The sixth column adds the squares mean deviation of the debt ratio. The seventh column adds the time trend to the main regression. The eighth column lays out the regression of the first column but considering seigniorage since 1874, i.e., removing the *Banco de España*’s transfers to the Treasury. In this way, it is possible to check whether the debt was sustainable thanks to seigniorage or not. This has been done in order to take seigniorage into account later on.⁴² Thus, the eighth column uses the same variables as the main model taking as a dependent variable the deficit that considers seigniorage instead of the official deficit. Lastly, the ninth column adds time trend to the eighth column.

When negative, this p coefficient indicates there is no debt sustainability. p_1 , the coefficient for public debt between 1874 and 1902, is always negative and significant in all regressions, showing the lack of fiscal solvency during those years even considering seigniorage. The hypothesis of the sustainability of Spain’s fiscal policy can therefore be rejected. These results are in line with the historiography. Three debt restructurings were made in those forty years, those of Salaverría, Camacho and Villaverde. If the three conversions had not been made, the debt could not have been sustained, leading the country to default. Therefore, not even seigniorage allowed the debt to be sustainable. Despite monetization, Spain had to restructure the debt in order to move forward. The results found corroborate what it is shown in figures 1 to 4. The temporary expenditure component and GDP gap component have the expected signs, negative and positive respectively. Temporary expenditure appears as a significant variable for the period 1874-1903 when seigniorage is not considered except for the debt squared and asymmetric response cases; in other cases, they are insignificant, in agreement with the tax smoothing theory.

Otherwise, Spanish debt became sustainable at some point due to the policies adopted by Fernández Villaverde. Independently of whether we consider seigniorage, the values of p_2 are always positive and statistically significant, implying a structural change in the year indicated by Chow test. The coefficient for the public debt is positive and significant, which means that the debt is sustainable. The change from the p_1 to p_2 coefficient shows a change in government’s

⁴⁰ I estimate an AR(2) for the fitted values as Bohn (2007) does. Results do not change if I use Comin (2005) data on military expenditure.

⁴¹ More on its construction in D’Erasmus et al. (2015).

⁴² We estimate the equation excluding seigniorage with different measures of expenditure and considering different variables and the yields are the same.

attitude towards fiscal policy. Moreover, this is shown in figure 1, 2 and 3 where we find that debt over GDP decreases, the fiscal balance improves and fiscal balance over public expenditure also falls. Thus, the fiscal situation in Spain improved at the start of the twentieth century. Spain could have entered the gold standard from 1903. However, it did not. Villaverde's policies improved Spain's economic situation. If Spain had entered the gold standard, the country might have had to suspend convertibility due to the participation in the occupation of Morocco, but this issue will need further research, as do other questions suggested by the results presented here: what benefits would Spain have obtained from spending six years in the gold standard? Would the gold standard have improved Spain's situation, given that the country lacked the political stability of a country like Japan? ⁴³

There are no observable changes when adding variables to check the robustness of the analysis. The results show that debt was unsustainable independently of its monetization.⁴⁴ The results highlight that the debt was not sustainable and that this prevented Spain from considering joining the gold standard until the beginning of the twentieth century. As we have seen, the levels of debt were even higher than those of Italy. Spain was not fiscally sustainable. When seigniorage is taken into account, the debt remains unsustainable. In this way, we could say that Spain was unable to access the fixed exchange rate monetary system.

VI. Impulse-response function

As a further robustness check, I present additional results from the “forward looking approach” following Canzoneri et al (2001), Afonso (2008) and Afonso and Jalles (2011 and 2017). Specifically, I run the impulse response function of the first differentiated debt to GDP ratio to shocks in the first differentiated government budget primary balance to GDP ratio by estimating a VAR. I again consider the debt multiplied by dummy that takes the value of 1 from 1903 to 1913 and the debt without the dummy that explains the fiscal situation from 1874 to 1902 due to the structural change found.

According to Bohn (1998), an increase in debt leads to a subsequent increase in the fiscal balance to control the debt. Canzoneri, Cumby and Diba (2001) consider that the negative response of the debt to a positive shock in the fiscal balance is related to a Monetary Dominant (MD) regime while a non-Ricardian regime (Fiscal Dominant, FD) is associated with the lack of independence of central banks and with fiscal dominance. Money and prices adapt to the country's level of debt

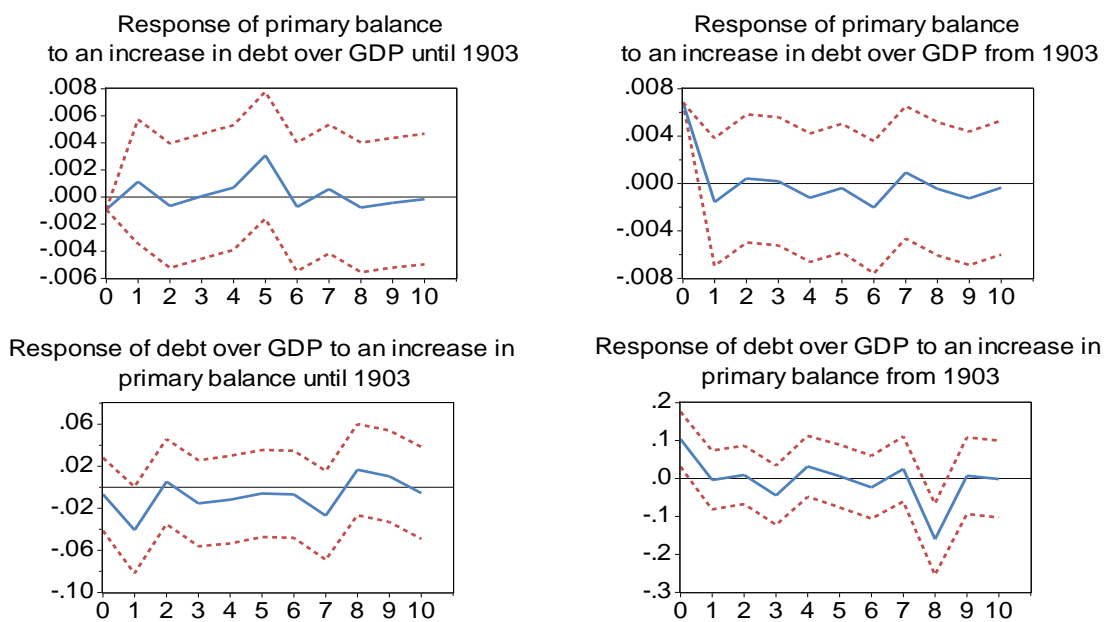
⁴³ More on the relationship between Japan and the UK in Pittaluga and Seghezza (2016).

⁴⁴ Because Pittalunga and Seghezza (2016) and others (Bohn, 1998, and D'Erasmus et al, 2008) divided the sample into shorter periods, I do the same. The results do not differ from those obtained using dummy analysis.

in order to sustain fiscal policy. My hypothesis is that Spain had a non-Ricardian regime, in view of the articles on fiscal dominance (Sabaté et al., 2006, Escario et al., 2012 and Sabate et al., 2019)

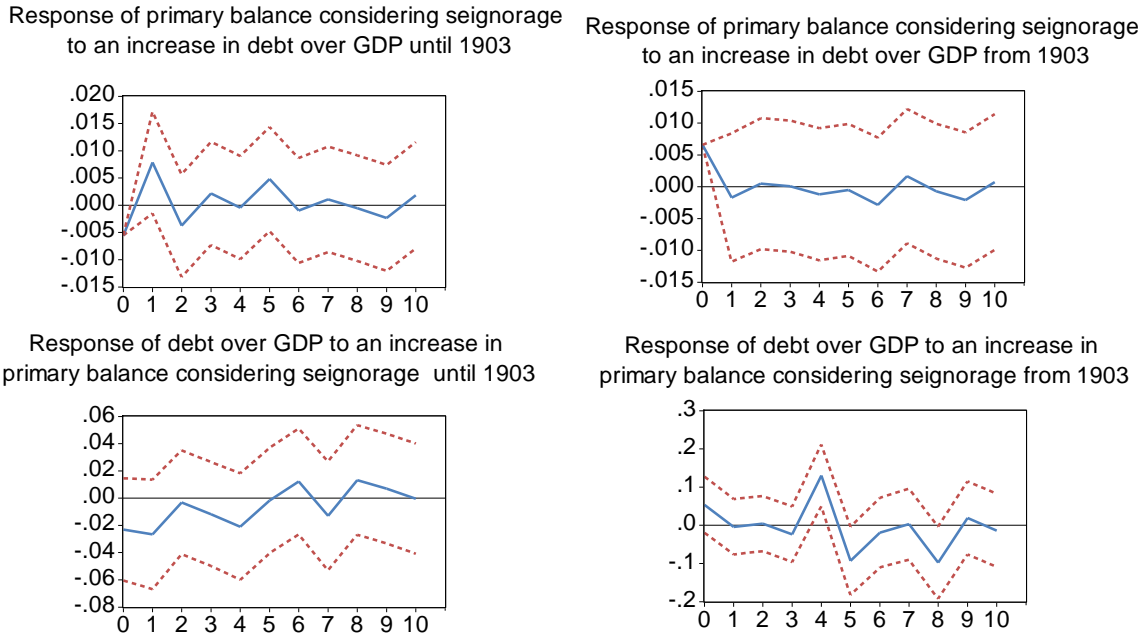
Due to the number of observations, I estimate the local impulse response function following Jordà (2005). This section lays out the local impulse-response function of the debt-to-GDP ratio (dt) to shocks on the ratio of the budget balance to GDP (st). The dotted red lines indicate error bands that correspond to two standard deviations. The dotted (red) lines are the error bands. I use conditional error bands for local impulse response because they help to remove the variability caused by serial correlation. Following, Jordà (2009), error bands are consistent with the joint null of significance and they are more sensitive to the significance of individual responses. If there is no correlation between the impulse response coefficients, conditional and marginal bands would be similar. As can be seen in figure 6, the debt-to-GDP ratio exhibits a negative and significant response following a shock in the primary balance ratio from 1874 to 1902 and a positive and significant shock in the budget balance response from 1903 to 1913. This approach, therefore, would also say that an FD regime has prevailed through the years under study. However, when seigniorage is considered (figure 7), the results do not change. A rise (an innovation) in debt-to-GDP ratio generates a decrease in the budget balance from 1874 to 1902, which runs counter to a Ricardian system and fits a system where the monetary policy is passive, fiscal dominance exists and the debt generates larger deficits (first graph in figure 6 and 7). Therefore, there is no response from the government. Otherwise, between 1903 and 1913, the response of primary balance to a shock in debt-to-GDP ratio is positive. This result is related to the results obtained in the previous section in the calculation of the fiscal response function.

Figure 6. Local impulse response function (blue) for primary balance.



Source: My own estimation from the data explained above.

Figure 7. Local impulse response function (blue) for primary balance considering seigniorage.



Source: My own estimation from the data explained above

VII. Conclusion

This paper is the first study on fiscal sustainability in Spain for the period 1874-1913, when the dominant monetary system was the gold standard. The results leave no room for doubt that Spain's debt was unsustainable until 1903. This would explain why the country was not able to adopt the gold standard and why it experienced greater instability than its European neighbours until the beginning of the twentieth century. This quantitative study shows that Spain's public debt became sustainable around 1903 due to the new fiscal policies introduced by Villaverde; at this point, Spain was in a position to join the gold standard. This change in 1903 has not been reported previously. Moreover, the evidence shows that seigniorage was not as important as could be expected. The sustainability or unsustainability of the debt did not depend on seigniorage between 1874 and 1913. More research is needed into the causes of Spain's failure to adopt the gold standard. New quantitative research on Spanish debt and the impact of the policies adopted by Villaverde on the real economy would also be useful. Finally, the socioeconomic impact of this unsustainable debt should be analysed.

Chapter 3: “Spain and the classical gold standard. short- and long-term analyses”.*

Abstract

This paper seeks to link the two theories put forward to explain the consequences of Spain’s non adoption of the gold standard in the late nineteenth century, and does so by comparing the outcomes of short- and long-run approaches. The empirical results obtained from applying an autoregressive distributed lag model (ARDL) framework are reported. This ARDL analysis reveals that the expansionary monetary policies implemented had a positive impact on Spain’s output in the long-run. Exchange rate had a positive impact on Spanish output in the short-run but not in the long-run. This paper provides new empirical evidence for the core-periphery debate through an analysis of the impact of being or not being in the gold standard by dividing the analysis between the short- and the long-run. Thus, it sheds new light on the developments in Spain at the time of the classical gold standard.

Key words: Classical Gold Standard, Spain, Exchange Rate, ARDL, Monetary Policy

JEL codes: E42, E52, E63

* I wish to thank Francisco Comín for sharing his data with me. I would like to express my gratitude to Professor Jordi Catalan and Matthias Morys. I am also grateful to my department colleagues and specially those who are in my research project. This paper has been presented in different workshops, seminars and conferences. I would like to thank the following scholars for their comments: Rui Esteves, Isabel Sanz, Marcela Sabaté, José María Serrano Sanz, Alejandro Ayuso, Masato Shizume, Jonas Ljunberg, Anders Orgen, This article has received funding from the Ministry of Economics and Competitiveness and from FEDER through research project HAR2015-64769-P. Naturally, I am responsible for the remaining errors.

“(...) in no way does the fall of the peseta seem to me synonymous with weakness. The freedom to allow a certain moderate slackening in the exchange rate in times of general depression affecting the rest of the world can be a valuable measure to maintain internal stability, which would otherwise be impossible.”

*J. M. Keynes, interviewed in El Sol by
Luís de Olariaga, 10 June 1930*

I. Introduction

Interest in the gold standard has grown in recent years because of the parallels that can be drawn with the euro crisis and the questions that have been raised by relinquishing monetary sovereignty (Stiglitz, 2016, p. 12). Indeed, the euro has generated the same rigidities in Europe that the gold standard once imposed on the world (Bordo and James, 2014), when the countries in Europe’s southern periphery were unable to remain in that monetary system¹. These are the same countries that today are struggling to overcome the recent economic crisis that has been played out against the broader background of the single currency (Eichengreen, 2014, pp. 12, 13 and 93).

According to Bordo and Rockoff (1996, p. 394), adherence to the gold standard was a very difficult objective to achieve for the countries of southern Europe; their experiences were characterised by higher rates of growth of the money supply, fiscal deficits, and higher inflation than other countries. Outside the gold standard, however, they were able to use fluctuations in the exchange rate to cushion the impact of economic shocks (Bordo and Rockoff, 1996, p. 416). The differences between the north and the south (core and periphery) in fiscal and monetary terms may have affected the adherence to the gold standard (Bordo and Schwartz, 1986).² Those authors found that southern European and South American economies suffered from higher demand shocks, and that as a result they used more discretionary fiscal and monetary policies.

The gold standard was actually less rigid than believed (Bloomfield, 1959; Dutton, 1984; Pippenger, 1984; Giovaninni, 1986; Davutyan and Parke, 1995; Jeanne, 1995 and Reis, 2007). According to Martín Aceña et al. (2011), although it is known that many economies were on the gold standard without introducing money convertibility, they were nevertheless able to maintain the stability of their exchange rates. In contrast, a large proportion of the countries on the periphery experienced major exchange rate fluctuations and instability (Triffin, 1985, p. 128).

¹ For the Italian case, see Fratianni and Spinelli (1984), Cipolla (1995), Tattara (2000 and 2003), Bordo (1999, p. 328) and Fratianni and Spinelli (2012). For the Portuguese case, see Mata (1987), Reis (1996, 2000 and 2007), Valerio (1998) and Bordo (1999, p. 329).

² More about core and periphery in Bordo and Flandreau (2003).

The exchange rate of the peseta fluctuated against gold and against other currencies. Moreover, the balance of payments deficits made it difficult to remain in the international monetary system.

This paper covers the period known as the classical gold standard era, during which Spain operated a *de jure* bimetallic standard. Having said that, in the late 1880s, the country is regarded as operating a *de facto* fiduciary system, insofar as the real value of silver was lower than its face value and there was a constant outflow of gold.

The debate on Spain's decision not to adopt the gold standard is far from being resolved.³ Some economists and economic historians claim that policies that the country was able to apply because it was off the gold standard served to stimulate the economy. It is stressed that adherence to the gold standard would have tied the government's hands and prevented it from taking any monetary, fiscal or exchange rate actions.⁴ The main proponent of this school of thought, the "classical thesis", is Joan Sardà. I consider that its arguments are more short-term than long-term explanations.⁵ According to Sardà (1987, pp. 196-198), the favourable evolution of the Spanish economy during the final years of the nineteenth century was largely due to the country's absence from the gold standard.⁶ Solé Villalonga (1967) and Tortella (1981 and 1994a) support Sardà's position with arguments that are more sensitive to the long term. Sardà (1987, pp. 196-98 and 252), Solé Villalonga (1967, pp. 41-43) and Tortella (1970 and 1994b) consider the non-convertibility of the peseta to have been positive for the Spanish economy: having a flexible exchange rate and applying expansionary monetary and fiscal policies had a positive effect on Spanish GDP.

More recently, this belief has been supported by Cubel et al. (1998), Catalan et al. (2001), Cubel (2001), Llona (2001), Ródenas et al. (2001), Sabaté et al. (2001), Carreras and Tafunell (2004, pp. 219-20), Serrano (2004) and Ródenas and Bru (2006).⁷ Despite this, the results of previous work, published in *Peseta y Protección* (Sudrià and Tirado, 2001) are not conclusive. Before of these studies, Herranz and Tirado (1996, p. 28) stress the difficulties Spain would have had by keeping a fixed exchange rate. Serrano et al. (1998) consider that the use of the interest rate was

³ A summary of different positions can be found in Roldan (2017).

⁴ For example, following Sardà (1987, p. 176), the situation in 1883 could only be resisted by increasing the money stock thanks to a fiduciary system. Moreover, the monetary expansion eased the impact of the international depression and made it possible to finance the exaggerated deficits of the Spanish economy while paying lower interest rates than those that would have been applied by foreign lenders.

⁵ According to the methodology used in this paper, short run is what happens between two years and long run is what happens until Spain reaches the equilibrium (the cointegration relationship). For more details, see methodology section.

⁶ Moreover, Tortella (1994a, pp. 323-24) equated the advantages of the gold standard with those later associated with the European Monetary System, highlighting that with these monetary systems no corrective measures could be taken and this forced to accept undesired situations such as gold outflows.

⁷ More about rigidity in Morys (2007).

not enough to maintain gold convertibility. It should have had an impact on the money supply, which would have caused a notable recession. Moreover, the interest rate of the peseta when it was convertible was higher than when it was not convertible. Serrano et al. (1998, p. 85), point out that Spain's unique monetary option had no effect on long-term trade flows. Finally, Llona (2001, pp. 164-169) points out that having maintained a stable exchange rate bolstered the level of economic activity by reducing the price of non-tradable goods.

Pablo Martín Aceña (1981, 1985, 1993, 1997, 2000 and 2017) questions the validity of this thesis and his works seem to adopt a long-term analysis. Martín Aceña upholds a “critical thesis”, considering it a mistake on the part of the Spanish government not to have adopted the gold standard. He considers that having a fiduciary system harmed the Spanish economy, causing the isolation of international capital flows and reducing investments. Martín Aceña claims that the country's growth would have been much greater under the gold standard. In his view, the flexible exchange rate, the application of an expansionary monetary policy and the lack of fiscal discipline had a negative impact on Spanish economy (Martín Aceña, 1981, p. 267). At this point, it is important to ask whether all countries were equal and had the same needs or, whether the effects of the monetary system differed from country to country. Fraile (1991), Tena (1992), and Prados de la Escosura (1997) all highlight the negative consequences of Spanish protectionism and the depreciation of the peseta for the allocation of resources in the long term. Martín Aceña et al (2011), Martínez Ruíz and Nogués Marco (2014), and Martínez-Ruiz and Nogués Marco (2018) stress that the *Banco de España* (Bank of Spain) was responsible for the country's absence from the gold standard.

In my view, while the classical thesis focuses on the short-run, the critical thesis analysis is characterised by what is primarily a long-run approach. I intend to test it. The effects, both positive and negative, of Spain's absence from the gold standard depend largely on the time scale of the analysis. Thus, while the impact of certain instruments of economic policy may be null or negative in the long term, they may be significant and positive in the short term. Hence, the results of my analysis will depend on whether we focus on the long run or on the short run.

Martín Aceña (1981 and 1993) also thinks that movements in the exchange rate were mainly due to changes in expectations. However, researchers closer to the classical thesis (Sabaté et al., 2006) defend that Spain suffered fiscal dominance. Could the exchange rate have been affected by the increase in the money supply? Or was the exchange rate caused, or explained, by changes in expectations due to constant deficits and huge debt accumulation? This paper also aims to answer these questions.

In the light of the above, my aim in this study is to test and compare the critical and the classical theories in order to determine which theory provides a more faithful reflection of the

repercussions of not adopting the gold standard, considering a new perspective. In so doing, I study the short-term and the long-term separately in an effort to establish a point of union between the two theories. Finally, I aim to examine causality between the three macroeconomic policies under study. This will allow me to understand if the path followed by exchange rate was due to expectations, due to the monetary policy among other explanations. Moreover, I will be able to check in different way what was underlined by Sabaté et al. (2006), Escario et al. (2011), Escario et al. (2012) and Sabaté et al. (2014). This paper is also part of the debate on the positive or negative effects of depreciation in the long term.⁸ To do this I use time series methodology that permits me to distinguish between the short and the long term: ARDL (autoregressive distributed lag) model.

Spain was the only western country that never joined the gold standard. There are no quantitative or empirical studies of the impact of being outside the gold standard on Spain's economic output at the end of the nineteenth century and the beginning of the twentieth. This is what I intend to provide in this paper, by unifying the two existing theories on the matter. The importance of this research topic has been underlined by various economic historians, among them Martín Aceña et al. (2000, p. 3), who state that "*the debate on the feasibility and the costs and benefits for peripheral economies of being on the gold standard is still far from closed*", Serrano (2004, p. 20) highlighting that it is necessary to study "*the effect that the monetary strategy adopted by Spain could have had on development during the Restoration (...)*" and Pedro Lains (2006, p. 185). For García-Iglesias (2005), neither theory can be confirmed or rejected. Martín Aceña et al. (2011) underline that the cost of having a different monetary system needs further research. Recent papers and books on the subject include Martín Aceña (2017 and 2018) and Martínez Ruiz and Nogués Marco (2018). For example, Martín Aceña (2018) says that the non-adoption of the gold standard was negative unless the opposite can be demonstrated, thus leaving the door open to further research.

The study confirms how adjustments to the exchange rate played a prominent short-run role in Spain's economic development. However, in the long run, the exchange rate had non-significant impact or negative and significant effect on Spanish GDP, depending on the specification. Thus, both theories seem correct if a distinction is made between the long and the short term. It is important to stress that it is not my purpose to analyse if it was better to adopt the gold standard or not. I only intend to analyse what happened, and to assess the impact of the presence of a fiduciary system (thus, of having a flexible exchange rate) on the Spanish economy, in both the short and the long run.

⁸ More in discussion section.

The rest of the paper is organised as follows: section 2 describes the historical context; section 3 presents the theoretical framework and the methodology employed; section 4 explains the data; section 5 reports the empirical results and the robustness check; section 6 discusses these results in relation to the previous literature; and, finally, section 7 offers my conclusions.

II. The Spanish economy during the classical gold standard

The decree of October 19, 1868, with Laureano Figuerola as finance minister, unified the monetary system. The peseta was chosen as the official currency of Spain because of its similarity to the franc. The objective was to align the national system with that of the countries with which Spain maintained the greatest volume of trade. Spain adopted the operating requirements of the Latin Monetary Union, but never formed part of it. The Echegaray Decree of March 19, 1874 granted the monopoly of the *Banco de España's* issuance of notes due to the treasury's financial difficulties at the time. From 1874, the state was able to increase the number of banknotes in circulation (Figure 1) to solve its treasury problems (Sardà, 1987, p. 180).

There was certainly an interest in Spain in adopting the gold standard. The possibility was officially raised in 1876 by the Consultative Board of the Currency (Serrano, 2004). At the beginning of the twentieth century a further attempt was made. However, there was a constant fear that the country would not be strong enough to stay on the gold standard and, together with problems concerning the budget balance and the balance of payments, this led to not adopting the monetary system. A wait-and-see policy was applied (Serrano, 2004) or, in the words of García-Iglesias (2005), a policy of low risk and low profitability. Spain defended the wait-and-see policy, using two main arguments. First, it was difficult to predict the international monetary scenario. On the other hand, during the 1880s the value of the peseta was maintained with respect to the lira. In this way, the stability of the exchange rate offered some respectability (Serrano, 2004, p.67). The government did not demand any guarantee of convertibility. For its part, considering that the conversion was an exclusively internal matter, the *Banco de España* rationed the cash it had in its coffers (Serrano, 2004). The bank never had an obligation to convert banknotes into gold; in fact, it never had to give explanations to anyone (Serrano, 2004).

The issue of banknotes increased notably after 1879 (Sarda, 1987, p. 175 and Tortella, 1994a, p. 177). In 1882, the Finance Minister Camacho converted the Spanish debt, due to the impossibility of facing payments (Comin and Martorell, 2006, pp. 389-391). The *Banque de Lyon et de la Loire* collapsed in 1882 and the Spanish banks were exposed to cash withdrawals, outright failure, and dwindling gold reserves. The crisis in France affected Spain, draining the gold reserves and precluding the conversion of Spanish banknotes into gold (Sardà, 1987, p. 179; Martín Aceña, 1993, pp. 135, 137 and 189; Tortella, 1994a, pp. 139, 177 and 480-481; Bordo and Schwartz, 1999, p. 32; Martín Aceña et al., 2011, p. 3 and Catalan and Sánchez, 2013, p. 96). There were

also constant outflows of gold (Martín Aceña, 2017). In 1883, Spain had a de facto fiduciary system with a flexible exchange rate. The effect of Gresham's law left the Spanish economy without any gold: between 1891 and 1892, gold disappeared from circulation (Sardà, 1987, p. 183). Martínez Ruiz and Nogués (2014, p. 24) considered that Spain was in the shadow of the gold standard until the early 1890s, despite its de facto fiduciary system. At that point, a flotation stage began. The exchange rate broke the band of gold points in 1889 and began a more pronounced upward trend in 1891.⁹ Due to insufficient resources rather than to a lack of will, the peseta became a floating currency (Serrano, 2004); the floating exchange rate was an automatic mechanism for correcting economic cycles. Moreover, the agricultural depression compounded the financial slump and made the crisis the longest one of the period.

The decree of July 14 1891 raised the limit on the issue of banknotes to 1500 million pesetas (Sardà, 1987, p. 180). In 1891, the peseta depreciated, coinciding with the application of the Cánovas tariff and improving the economic situation (Carreras et al., 2005, p. 1341). In 1892, with the earlier crisis still not entirely overcome, a new economic crisis emerged: the Cuban insurrection again increased the deficits from 1895, causing debt to rise from 800 million to 3000 million pesetas. This debt was monetized, thus increasing the money supply in circulation. Between 1893 and 1898, the depreciation of the peseta was the highest in the period (Figure 1) because of the constant deficits and the strong increase in debt. Subsequently, in 1898, the issue limit was again increased, this time to 2500 million pesetas¹⁰. This was an economic crisis of considerable breadth (Sardà, 1987, p. 223). Until 1896, the slight growth of the money supply acted in a preventive manner against further depreciation (Martín Aceña, 1993, p. 141). Moreover, the Méline tariff levied by the French placed insurmountable entry conditions on alcoholic beverages from the Iberian Peninsula, curtailing all wine exports (Serrano, 2011, p. 641). The loss of the French market intensified the slump, and the outbreak of phylloxera throughout the Iberian Peninsula exacerbated the situation still further. Sardà (1987, pp. 196-98) thinks that the favourable evolution of the Spanish economy in the final decade of the nineteenth century was, in part, thanks to the fact that the country stayed off the gold standard.

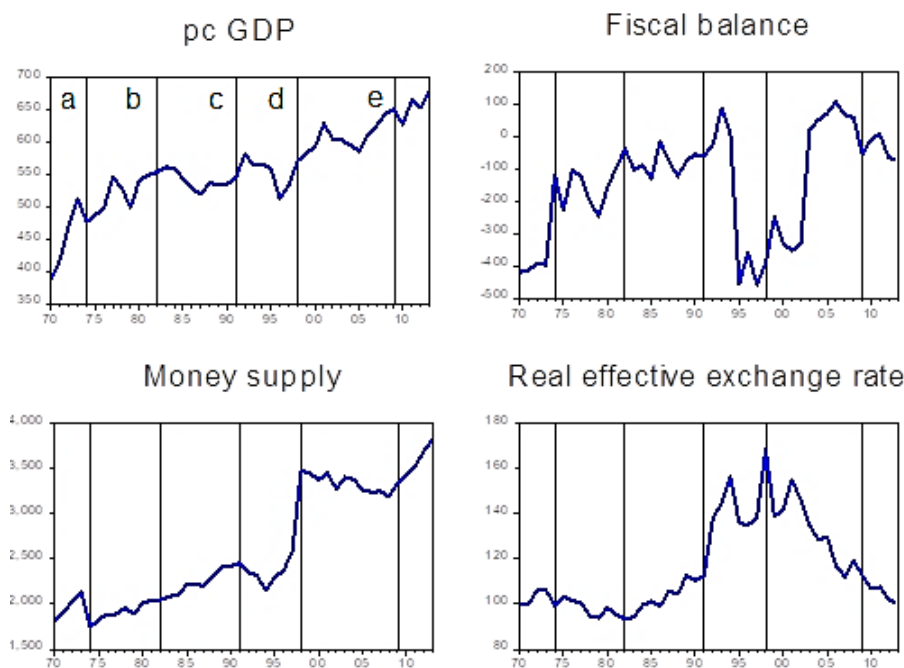
With the approval of the Law of budgets of 1899-1900, the situation of the Treasury was restored until 1909 and the limit on the issue of banknotes was lowered. These measures achieved a budget surplus and for a few years the State was able to finance itself without having to issue banknotes. Finally, in a last attempt to improve the price of the peseta on the international market and reduce public debt, the limit was lowered to 2000 million pesetas because of a more

⁹ Martín Aceña (1993, p. 140) underlines that there was not depreciation after 1883 and peseta's value remained stable during some years.

¹⁰ The Cuban uprising forced the Ministry of Overseas Territories to resort to the issue of banknotes, Sardà (1987, p. 190).

contractionary monetary policy than in the preceding years¹¹. Between 1902 and 1906 Spain entered another period of crisis, when pc GDP fell twice as a consequence of swingeing budget adjustments. The effects of this restrictive policy can be judged as positive even though the economy showed symptoms of depression (Sardà, 1987, p. 207). In this period it could have entered into the gold standard but did not do so, because it wanted to return to the parity of 1868 instead of entering at a depreciated parity (Serrano, 2004).

Figure 1. The evolution of Spanish economy.



- a. Banco de España monopoly on the issue of banknotes
- b. Lyon stock market crisis occurred
- c. Baring crisis and the Méline tariff
- d. Armed conflict against the US ends
- e. Conflict with Morocco started

Source: see main text.

Martín Aceña (1993, p. 160), thinks that the authorities took the wrong decision at a crucial moment; in his view, the only way to fully benefit from the expansion in world trade and international investment of the late nineteenth and early twentieth centuries was to be on the gold standard. The authorities did not like the floating exchange rate, but they did not carry out an independent monetary policy either. According to Olariaga (1977, p. 133), monetary policy

¹¹ These tighter policies are associated with Raimundo Fernández Villaverde, finance minister in 1899-1900 and 1902-1903 and later prime minister in 1903 and 1905. His policies involved financial restructuring to put the system on a sound footing again and to halt the depreciation of the currency. In 1908, these policies were abandoned when signs of domestic slump appeared (Sardà, 1987, p. 202).

consisted of an ad hoc policy rather than a conscious control aimed at regulating the economic cycle and the volume of credit. Tortella (1994a, p. 175), also supports this idea considering that it was a series of measures that related to the fiscal sphere. The money supply expanded and contracted depending on the position of the Treasury with the *Banco de España*, which depended on the size of the budget deficit (Martín Aceña, 1993, p. 150).

The monetary policy of this period was characterized by a lack of national objectives and a constant tension between the government and the *Banco de España* (Martínez Ruiz and Nogués Marco, 2014, p. 21). It was unclear which of the two institutions was in charge of exercising the functions of monetary authority. According to Sardà, the monetary policy was not as expansive as might be imagined since in part the outflows of gold were replaced by banknotes. Despite having a fiduciary system, governments endeavoured to maintain a certain discipline in macroeconomic policy. For Tortella (1994a, p. 177), these were years of slow but steady growth in the Spanish economy.

III. Data

Due to the absence of quarterly or monthly data for some of the variables, I draw on a sample of annual data between 1870 and 1913.¹² The data come from secondary sources as follows: the y_{pcr}_t is real pc GDP measured using GDP calculations from Prados de la Escosura (2003) and population statistics from Nicolau (2005) deflated by GDP deflator (Prados de la Escosura, 2003), f_t is the fiscal balance obtained from Comín (2017)¹³ and deflated by GDP deflator from Prados de la Escosura (2003), $lmsn_t$ is the money supply measured by Martín Aceña (2018) and $lreer_t$ is the real effective exchange rate calculated by me. Here all the variables have been converted into logarithms except for the fiscal balance.¹⁴ l is the logarithm of the variables.

The real effective exchange rate considers the average weight of the exchange rate against the pound sterling, the French franc and the US dollar. I have calculated real effective exchange rate as follows. The calculation of the real effective exchange rate draws on the GDP deflator reported by Prados de la Escosura (2003) for Spain, the deflators reported by Toutain (1987) for France, Balke and Gordon (1989) for the US and Thomas and Dimsdale (2017) for the UK, and the peseta exchange rate from Martín Aceña and Pons (2005) and Martínez Ruiz and Nogués Marco (2014).¹⁵ The series of real effective exchange rates calculated both using CPI and GDP deflator

¹² I can start on 1870 thanks to the work done by Martín Aceña (2018) who constructed a new money supply series for the years before the *Banco de España* monopoly of issuing.

¹³ I am extremely grateful to Francisco Comín who has shared his data with me improving the quality of this analysis and making possible compare the results obtained with the two existent series for fiscal balance.

¹⁴ This is the same procedure followed by Shibamoto and Shizume (2014). Because the fiscal balance has negative values, it cannot be converted into logarithms. As a result, the variable is used without conversion.

¹⁵ I use GDP deflator from Prados de la Escosura as Serrano et al. (2017) did.

can be found in Annex 1. Results do not change if we use CPI from Maluquer (2013) and CPI from Mitchell (2007) instead of GDP deflator (see Annex 2, figure 3). The weight of foreign trade to the respective countries is obtained from Prados de la Escosura (1982, p. 42), using fixed weightings updated every five years. The weightings account for more than 60% of total foreign trade over the entire period.

IV. Theoretical framework and methodology

Different studies have used similar methodologies with similar goals. To test my hypothesis, I will follow the theoretical approach developed in Kandil and Mirzaie (2002) and Bahmani-Oskooee and Kandil (2010).¹⁶ The cited papers find that real output depends on movements in the exchange rate, money supply and government spending.¹⁷ But, instead of using government spending as a dependent variable I opt to use the fiscal balance.¹⁸ First, because while a state may have high expenditure, its taxes may also be high, yet by only considering public spending, we cannot take into consideration the whole of the state's fiscal policy. Second, by focusing on fiscal policy it will be possible to verify the causalities between macroeconomic policies that have been studied elsewhere in the literature (most notably by Sabaté et al., 2006, pp. 310, 321 and 328 and by Escario et al., 2011, pp. 271-272, Sabaté et al., 2019).

Following Kandil and Mirzaie (2002), Bahmani-Oskooee and Kandil (2010) and Shibamoto and Shizume (2014), I employ four macroeconomic variables: pc GDP, budget balance, money supply (M1) and real effective exchange rate. Real output is $lypcr$ which varies according to the three policy types. The money supply is $lmsn_t$ and this approximates the monetary policy. Fiscal policy, f_t , is measured by the fiscal balance and the real effective exchange rate is denoted by $lreer_t$. An increment in the exchange rate results in depreciation. If the exchange rate coefficient presents a positive sign, depreciation helps raise GDP. Otherwise, if the effect is contractionary, the sign is negative.¹⁹

The econometric tools used are also in line with Bahmani-Oskooee and Kandil (2010), who analyse the effect of exchange rate fluctuations on real output growth, controlling for monetary and fiscal policies for the case of Iran using a vector error correction (VEC) framework that

¹⁶ This approach is used today to understand the role of exchange rate on developing economies. I think Spain during the end of the nineteenth century can be considered as a developing country.

¹⁷ One can find all the theoretical development in the two references quoted.

¹⁸ My results do not change if I use the government expenditure instead of the fiscal balance.

¹⁹ For more about the impact of exchange rates see Alexander (1952), Dornbusch, Krugman and Cooper (1976, p. 551), Krugman and Taylor (1978), Bahmani-Oskooee and Anker (2001), Bahmani-Oskooee and Kandil (2010). For the effects of monetary policy, see Mishkin (1995). Taylor (1995) emphasizes the importance of the exchange rate channel of monetary transmission. Taylor (1995) stresses the effects of monetary policy on the economy (Mishkin, 1995, p. 5). For fiscal effects on economic growth, see Blanchard and Perotti (2002).

distinguishes between the short and the long run.²⁰ We can find more papers using the similar time series methodology. Matesinni and Quintieri (1997) analyse the impact of macroeconomic policies on Italian GDP to understand the recovery from the Great Depression through a VAR. Cha (2003) conducts the same analysis for Japan, using a structural vector autoregressive (S-VAR). Shibamoto and Shizume (2014) study how three macroeconomic policies (monetary, fiscal stimulus and exchange rate adjustment) and expected inflation affected Japanese GDP during the Great Depression. De Castro and Fernández-Caballero (2011) analyse the impact of fiscal shocks on the Spanish effective exchange rate over the period 1981-2008 using a similar methodology. Choudhary and Chaudry (2007) study whether a devaluation of the currency affects output positively or negatively through a VECM for Pakistan between 1975 and 2005.²¹

The main objective of this paper is to distinguish between the short and the long run. As such, my paper seeks to verify the respective claims of Martín Aceña (1981, 1993, 2000 and 2017) and Sardà (1948). Due to the number of observations, I run an ARDL model. I compare the short results obtained from ARDL model with those shown by local projections. ARDL is a time series model that allows the adoption of a similar approach to that of the VEC model by analysing the two different temporal approaches while obtaining better results for a small sample, in this instance 44 observations. The ARDL model uses a single equation (Pesaran and Shin, 1995).²² It does not deal with problems of endogeneity. It is unlikely that this problem will arise as long as the errors are not serially correlated because regressors tend to be lagged in levels or differences.²³ If there is cointegration, OLS is a consistent estimation. One can expect significant correlation among variables if you use non-stationary series. However, ARDL is a robust and dynamic method designed for that purpose and can therefore deal with these cases successfully. A further advantage of ARDL is that the variables can be $I(0)$ or $I(1)$: they do not have to be integrated of order 1.

²⁰ Similar studies can be found in Bahmani-Oskooee et al. (2002), Kalyoncu et al. (2008), Bahmani-Oskooee and Kutan (2008), Narayan and Narayan (2011), Bahmani-Oskooee and Gelan (2013) and Bahmani-Oskooee et al. (2016).

²¹ There are different studies concerned about the effect of having a flexible exchange rate on output. Nowadays, these studies are focused on developing countries. My point of view is that analysing an economy such as Spain during the 19th century is close to what means today analysing a developing country. Considering this, I decided to use similar methodologies. Other economic historians like Shibamoto and Shizume (2014) also decided to use VAR models in order to study the impact of macroeconomic policies (including exchange rate adjustments) on output using similar theoretical approach.

²² Simple equation methods, such as fully modified and dynamic ordinary least squares (FMOLS and DOLS), have been used to analyse the long term and cointegration between variables, producing similar results. Here, the results of ARDL, DOLS and FMOLS were also very similar.

²³ Moreover, I have lagged values of the variables on the right-hand side of (1).

The bound test procedure developed by Pesaran et al. (2001) is based on the estimation of the unrestricted error correction model (ECM) by OLS, which can be applied to regressors with I(0) or I(1). To implement the bounds testing procedure the following ARDL model is estimated.

$$(1) \Delta lyprcr_t = \alpha_0 + \sum_{i=1}^n \phi_i \Delta lyprcr_{t-i} + \sum_{i=1}^p \vartheta_i \Delta f_{t-i} + \sum_{i=1}^l \partial_i \Delta lmsn_{t-i} + \sum_{i=1}^m \varphi_i \Delta lreer_{t-i} + \lambda_1 lyprcr_{t-1} + \lambda_2 f_{t-1} + \lambda_3 lmsn_{t-1} + \lambda_4 lreer_{t-1} + e_t$$

where all variables are as previously defined, Δ is the difference operator and e_t is the error term. The next step involves estimations of the long-run relationship coefficients and of the error correction term of the ARDL model, determining the speed of adjustment to equilibrium. ECT is the residual obtained from the estimated cointegration model of equation 2. ECT is the residual of $\lambda_1 lyprcr_t - \lambda_2 f_t - \lambda_3 lmsn_t - \lambda_4 lreer_t$, the long-term component of eq. (1). If the null hypothesis of no cointegration is rejected, we can estimate the following short run ARDL error correction model. For the specification above, the error correction versions of the ARDL model in the variables $ypcr_t, f_t, msn_t$ and $reer_t$ are given by:

$$(2) \Delta lyprcr_t = \alpha_0 + \sum_{i=1}^n \phi_i \Delta lyprcr_{t-i} + \sum_{i=1}^p \vartheta_i \Delta f_{t-i} + \sum_{i=1}^l \partial_i \Delta lmsn_{t-i} + \sum_{i=1}^m \varphi_i \Delta lreer_{t-i} + \delta ECT_{t-1} + \mu_t$$

The cointegration coefficients characterize long-run relationships between levels and variables, and the ECM coefficients describe changes that help to restore an equilibrium position. After estimating the ARDL model, Toda and Yamamoto (1995)'s approach to the Granger causality test is carried out. The Granger causality test presents problems when the series integrated are of different orders (as happens in this study). Toda and Yamamoto (1995)'s approach to Granger causality does not depend on the order of integration or on cointegration properties, but is based on the Granger non-causality equation. Their procedure consists in estimating an augmented VAR model ($k + dmax$) where k is the optimal lag on the first VAR model and $dmax$ is the maximum integrated order of the variables. Thus, the number of lags should be increased by the maximum order of integration of the variables for Toda and Yamamoto's causality testing procedure. After that, the augmented VAR is estimated. The asymptotic distribution of the Wald statistic is guaranteed. The lag length, considering the Akaike Information Criterion (AIC), is determined to be 2.

V. Empirical results

This section describes the results obtained from the estimation of the ARDL. I proceed in three stages. The first considers the order of integration of the variables; the second examines whether the variables are cointegrated and studies the short- and long-term approaches; and the third carries out the Toda and Yamamoto causality test.

Unit root test

The first step is to test the stationarity of the variables, considering both the Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. Many economists consider that unit root tests are problematic, and for this reason stationarity tests such as the KPSS have been developed (Kwiatkowski et al., 1992). KPSS can be used to test the null hypothesis of stationarity against the alternative of non-stationarity. Kwiatkowski et al. (1992) underlines that their test aims to complement the unit root test. They stress that “(...) *we can distinguish between series that appear to be stationary, series that appear to have unit root, and series for which the data (or the tests) are not sufficiently informative to be sure whether they are stationary or integrated*”. Thus, the KPSS test helps to complement unit root tests such as the Dickey-Fuller tests. The ADF null hypothesis to determine the maximum order of integration is non-stationarity, while the KPSS null hypothesis is stationarity. These two tests permit the assessment of the order of integration from two different perspectives. As shown in Table 1, the variables of real effective exchange rate and money supply tested with constant are non-stationary at levels for both tests, but stationary at first difference.²⁴ The null hypothesis of having a unit root is not rejected in the ADF test (probability over 10%) and the null hypothesis of being stationary is rejected in the KPSS test (probability under 10%). However, money supply seems to be I(1) for ADF and I(0) for KPSS test when trend is considered. Exchange rate remains non stationary when it is tested with trend. pc GDP is stationary except when it is tested with constant using KPSS. According to economic theory, the variable fiscal balance should be stationary. The results obtained from the KPSS tests suggest that it is stationary with constant and constant and trend while the ADF test evidences that the series is not stationary with trend but stationary with constant.

²⁴ According to the theoretical framework, the budget balance and the exchange rate should be stationary variables, This can be attributable to the fact that Spain was a country with a tendency to budgetary deficits during the entire period studied, only achieving a period of surplus during the first years of the twentieth century. The exchange rate suffered a general depreciation (increase) after 1883 and specially from 1891, reaching a maximum in 1898, depreciating by around 40%.

Table 1. Unit root test

Null hypothesis:	LYPCR has a unit root		D(LYPCR) has a unit root		F has a unit root		D(F) has a unit root	
	constant	trend	constant	trend	constant	trend	constant	trend
ADF statistic	-2.887691	-4.564626	-7.618	-6.237	-2.759514	-2.764238	-7.173	-7.127
Prob.	0.0551	0.0037	0.000	0.000	0.0726	0.2178	0.000	0.000
	LYPCR is stationary		D(LYPCR) is stationary		F is stationary		D(F) is stationary	
KPSS statistic	0.799876	0.110797	0.228	0.100	0.24068	0.084776	0.088	0.071
Prob.	<0.01	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
Null hypothesis:	LMSN has a unit root		D(LMSN) has a unit root		LREER has a unit root		D(LREER) has a unit root	
	constant	trend	constant	trend	constant	trend	constant	trend
ADF statistic	-0.529619	-2.560589	-6.386	-6.348	-1.457475	-1.081352	-7.312	-7.439
Prob.	0.8752	0.2994	0.000	0.000	0.5453	0.9205	0.000	0.000
	LMSN is stationary		D(LMSN) is stationary		LREER is stationary		D(LREER) is stationary	
KPSS statistic	0.792921	0.093086	0.055	0.040	0.368416	-1.793	0.285	0.102
Prob.	<0.01	>0.1	>0.1	>0.1	<0.1	<0.1	>0.1	>0.1

Source: own elaboration

Selection of lag length

ARDL models may have a different number of optimal lags for each variable (Pesaran and Shin, 1998). Pesaran and Shin (1999) and Narayan (2004) state that the maximum lag length for annual data is two lags. The optimal number of lags is determined by Schwarz Criterion. Moreover, we need to rule out the possibility of serial correlation. The SCB indicate (1,1,0,1) as being optimum for the main model.²⁵

Cointegration test and long-run relationship

The cointegration test shows if there is a long-run relationship between the variables. To test for the existence of cointegration in an ARDL, I use an estimation procedure developed by Pesaran and Shin (1999). Bounds testing approach is used to estimate the long-run relationship between the variables and Narayan (2004) critical values for a small sample. The null hypothesis is the non-existence of the long-run relationship between $ypcr_t$, f_t , msn_t and $reer_t$ ($\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$). The alternative hypothesis is defined by $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$. The F-statistics calculated for testing the joint null critical value bounds are shown in Table 2. The upper critical bounds are the critical values for I(1) and the lower critical values are for I(0). If the F-statistic value is below the lower critical bound, then the variables do not have a cointegration relationship. If the upper critical bound is lower than the F-statistic calculated, the no-cointegration hypothesis is rejected. Following bound test, there is a cointegration relation between the variables. Table 2 shows that the null hypothesis of there being at most one cointegrating vector can be rejected at the 1% level of significance.

²⁵ Results do not change by considering AIC (Akaike Information Criteria).

Table 2. Cointegration test

F-Bounds Test			
Null Hypothesis: No levels relationship			
F-statistic = 9.634846			
Actual Sample Size n=43	Signif.	I(0)	I(1)
Finite Sample: n=45	10%	3.74	4.78
	5%	4.45	5.56
	1%	6.053	7.458
Finite Sample: n=40	10%	3.76	4.795
	5%	4.51	5.643
	1%	6.238	7.74

Source: own elaboration

Having established that an ARDL long-run cointegration relationship exists, the next stage of the procedure is to examine the coefficients of the long-run relationship among the variables. The long-run coefficients are shown in Table 3.

The exchange rate had a non-significant impact in the long run on GDP while monetary policy and fiscal policy had a positive and significant effect. Exchange rate appears as negative and significant in the long-run when old data on fiscal balance (Comín and Díaz, 2005) is used. This would mean a depreciation of the currency had negative effect on Spanish GDP in the long run. When estimation is run by using nominal effective exchange rate, fiscal balance and money supply shows positive sign and it is significant in the long-run (see Annex 2, figure 1). Exchange rate variable remains as non-significant. The exchange rate is negative and significant when the estimation is run considering fiscal balance data, based on Comín and Díaz (2005) (Annex 2, figure 2).

Table 3. Long-run relationship

ARDL	
Levels Equation	
	LYPEER
F	0.0001 [0.0001]
LMSN	0.3897*** [0.0591]
LREER	-0.1065 [0.0886]

Std. Error in []
*, **, *** are probability
of 10, 5 and 1%,

$$EC = LYPEER - (0.0001*FCR + 0.3897*LMSN2 - 0.1065*LERDEFL1)$$

Source: own elaboration

One of ways a currency depreciation can have a negative effect on GDP is the following. The effect of currency depreciation on the cost of production results in a decrease in real growth in the long run. This means that there is an increase in import costs in the long term. We will discuss more in section VI. The estimation passes the different diagnostic tests. The absence of serial correlation is reported in Table 6. As such, the ARDL estimations are reliable.

Short-run relationship

To further confirm the long-run relationship, I estimate the error correction model. The error correction coefficient presents the expected negative sign and is highly significant. Hence, cointegration is further confirmed. The existence of a long-term stable relationship is further confirmed if the error correction term is highly significant. The ECM coefficient is -0.4032 which implies that deviation from the long-term growth rate in GDP is corrected by 40.32% after 1 year.

In Table 4 significant coefficients for the differenced values indicates that the real effective exchange rate was an important determinant of fluctuations in real per capita output. Depreciation of the real effective exchange rate has a positive effect on real output in the short-run. It is possible, that producers (in the short-run) take advantage of the real depreciation reflected in the increase in profits in domestic currency and so have greater incentives to produce and promote exports. Transitory currency depreciation increases the output in the short run. Results remain when estimation is done with old data on fiscal balance (Comín, 2005). Results for different specifications can be found in Annex 2.

Table 4. Short run relationship

ECM Regression	
Variable	Coefficient
C	0.769*** [0.116]
Trend	-0.0022*** [0.0005]
D(F)	-0.00003 [0.00004]
D(LREER)	0.1334** [0.0651]
CointEq(-1)*	-0.4032*** [0.0623]
Adjusted R-squared	0.55
Durbin-Watson	2.08
Std. Error in []	

*, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

To understand the responses of the variables in the short run, we analyse the effects of structural shocks. Variables with no long-term effects on output may have large-scale temporary impacts on pc GDP. I compare the results of the local impulse response projections following Jordà (2005) with the short run results obtained from ARDL model in order to analyse the dynamic characteristics of our model. Local projections measure the reaction of the system to a shock of one of the variables. They trace the effect of a shock on the current and future values of the endogenous variables, causing them to increase or decrease before finally stabilising.²⁶ I use Generalized method for the VAR model because it is invariant to the ordering of the variables (Lütkepohl, 2005). Pesaran and Shin (1998) present the approach for a cointegrated VAR model, and show how the maximum likelihood structure of the generalized impulse response is t-consistent and asymptotically normally distributed.²⁷

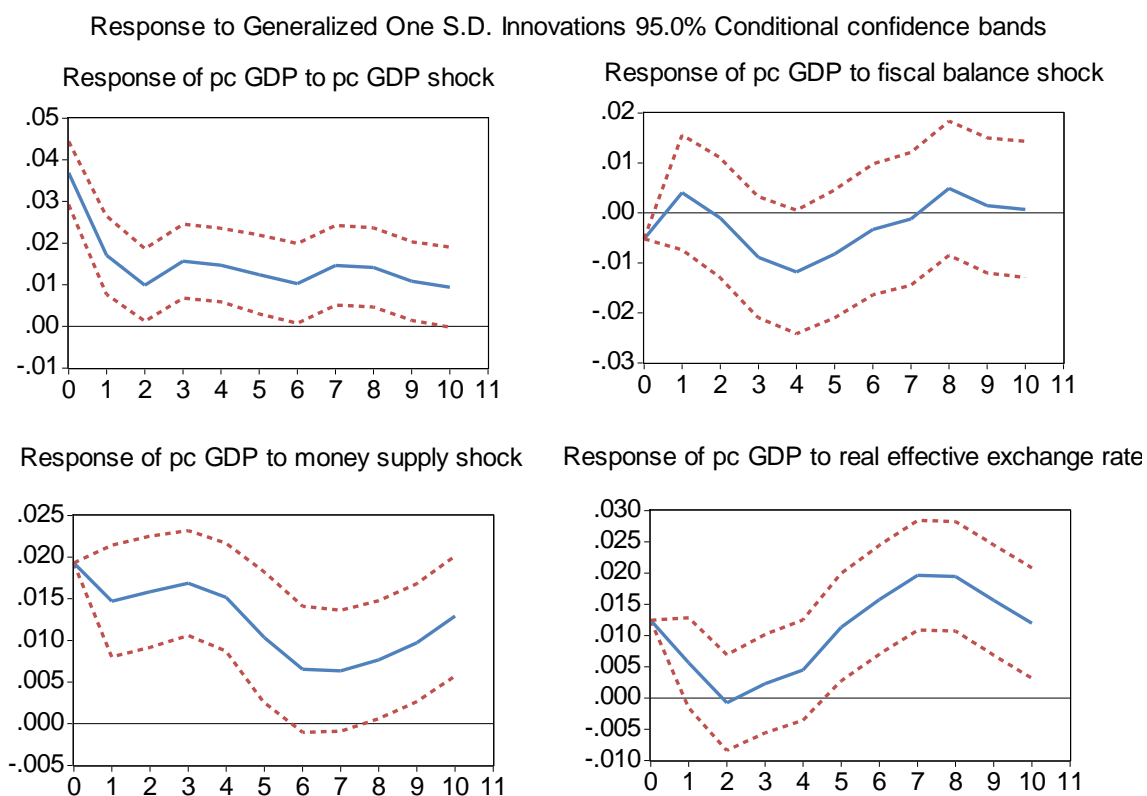
Figure 2 sets out the impulse response functions for each variable following Pesaran and Shin (1998) and the local impulse response following Jordà (2005).²⁸ The graph shows the responses of GDP to shocks on each variable. The dotted (red) lines are the error bands. I use conditional error bands for local impulse response because they help to remove the variability caused by serial correlation. Following Jordà (2009), error bands are consistent with the joint null of significance and offer a better sense the significance of individual responses. If there is no correlation between impulse response coefficient, conditional and marginal bands would be similar.

²⁶ A shock is considered as a positive impact. Standard deviations are preferred because they offer the responses in the correct order of magnitude.

²⁷ Impulse response coefficient can suffer from serial correlation that lead to a wider marginal bands. Conditional error bands help to remove the variability caused by serial correlation. Conditional error bands are consistent with the joint null of significance and give better sense about the significance of individual responses. Because of this, I use conditional error bands. When Cholesky decomposition is used all the figures show the same pattern. The results coincide with GIRF. The response of pc GDP to an exchange rate innovation is lower than GIRF response but it is still positive.

²⁸ I test the results with generalized impulses and with Cholesky factorization and observe that the results do not change.

Figure 2. Local projection estimation



Source: own elaboration

According to the local projections, both monetary policies and exchange rate had a positive and significant effect on GDP. With an expansionary monetary policy, GDP rose.²⁹ A depreciating exchange rate implied an increase in pc GDP. When the budget balance decreased, the GDP rose according to local projections results. According to this, when the fiscal balance improves, the GDP decreased a little and after that, it increases again.

Toda and Yamamoto approach to Granger causality

The causal link between the variables is examined using Toda and Yamamoto (1995) causality test as has been explained before. Correlation is not an indication of causality, which is why the Toda and Yamamoto causality test is estimated. If X helps in the prediction of Y, then Y is said to be caused by X (that is, the coefficients of the backward estimation are statistically significant). The null hypothesis is that X does not cause Y. In the specific case of the Spanish economy, we expect monetary policy to respond to fiscal needs (Escario et al., 2011, pp. 271-272 and Sabaté et al., 2006).

²⁹ Peripheral countries used depreciation recurrently in order to overcome crises. Matthias Morys (2013, p. 221), shows that these countries paid little attention to variations in the exchange rate and a great deal of attention to the bank coverage ratio.

The estimation results of Toda and Yamamoto causality test are presented in Table 5. Causality runs one-way from the money supply to pc GDP at the 5% level of significance. Thus past values of monetary policy help to explain the present values of output. There is causal relationship between money supply and fiscal balance at the 10% level of significance from money supply to fiscal balance and at 10% from fiscal balance to money supply. The Granger causality analysis of the variables shows, monetary policy accommodate the state's fiscal needs (Escario et al., 2011, pp. 271-272 and Sabaté et al., 2006, pp. 310, 321 and 328). In short, there was fiscal dominance and, so, Spain's monetary policy was affected by the fiscal needs of its government. Causality runs from GDP to money supply at 5% level of significance underlining the relationship between Spanish economy (government) and the increases in money supply.

When we estimate the Toda and Yamamoto causality test with the nominal effective exchange rate or the real effective exchange rate estimated through CPI, we find similar results. The fiscal policy seems to cause nominal exchange rate (see Annex 2, table 1). Thus, changes in the expectations that the different fiscal decisions generated did appears as important as it was said by Martin Aceña (1981, 1987,1993, 2000 and 2017). Thus, the past values of fiscal balance did not affect the present values of nominal effective exchange rate. Nevertheless, the relationship between fiscal behaviour, expectations and exchange rate will need further research; the present study is merely an initial approach to the discussion.

Table 5. Toda and Yamamoto causality test

Dependent variable: LYPCR			Dependent variable: LMSN		
Excluded	Chi-sq	Prob.	Excluded	Chi-sq	Prob.
F	0.291	0.864	LYPCR	6.369	0.041
LMSN	6.656	0.036	F	4.722	0.094
LREER	3.053	0.217	LREER	0.509	0.775
All	11.481	0.075	All	11.725	0.068
Dependent variable: F			Dependent variable: LREER		
Excluded	Chi-sq	Prob.	Excluded	Chi-sq	Prob.
LYPCR	1.670	0.434	LYPCR	2.254	0.324
LMSN	5.146	0.076	F	0.980	0.613
LREER	0.607	0.738	LMSN	2.232	0.328
All	5.994	0.424	All	4.394	0.624

Source: own elaboration

ARDL robustness check

ARDL was subjected to several diagnostic tests. The diagnostic test in Table 6 shows that there is no evidence of autocorrelation in the model. The null hypothesis of no correlation in the Breusch-Godfrey test cannot be rejected. The equations are in their correct functional form (Ramsey RESET test).

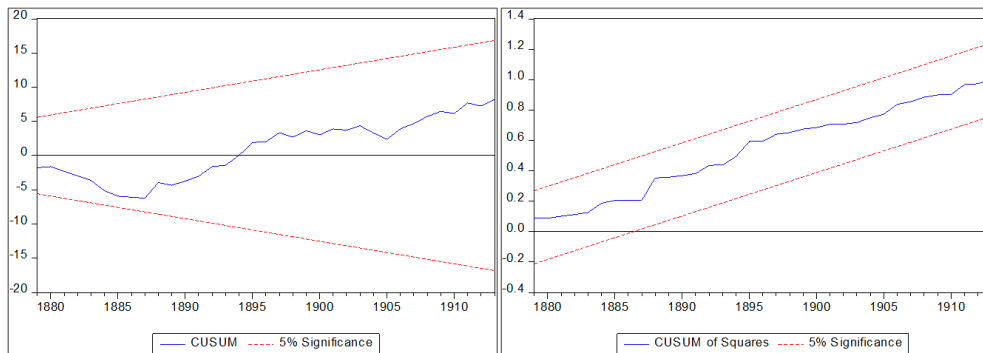
Table 6. Autocorrelation and heteroscedasticity test.

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.99	Prob. F(10,25)	0.48
Obs*R-squar	12.17	Prob. Chi-Square(10)	0.27
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.56	Prob. F(7,35)	0.78
Obs*R-squar	4.32	Prob. Chi-Square(7)	0.74

Source: own elaboration

To analyse the parameter stability of the ARDL model, we employ the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) statistics based on the recursive regression residuals (Pesaran and Pesaran, 1997). They are plotted against the critical bound of the 5% significance level. When the graph of these statistics remains within the critical values of 5% significance, the estimated coefficients are stable. Neither CUSUM nor CUSUMSQ plots cross the critical bounds, indicating no evidence of any significant structural instability (Figure 3). The parameters of the equation are stable enough to estimate the long-and short-run causalities in the study.

Figure 3. CUSUM and CUSUMSQ



Source: own elaboration

I have considered different definitions of the money supply to determine the relationship between money stock and real output. When the estimation is made with the number of banknotes in circulation (mbn_t) as a proxy for monetary policy (Annex 2, figure 6), the results are for the most part the same. However, the real effective exchange rate appears as negative and significant. The same happens when the estimation is run considering fiscal balance over GDP instead of real fiscal balance. Likewise, the results remain practically the same if real government expenditure (gr_t) is used, in line with Bahmani-Oskooee and Kandil (2010). The results here are unchanged

when estimating the model with total GDP. The signs of my results do not change when plotting the following four measures of the exchange rate: the real effective exchange rate ($reer_t$) using CPI (Maluquer, 2013) and the nominal effective exchange rate ($neer_t$).³⁰ The results also still the same when real exchange rate is calculated with WPI from Sardà (1948, pp. 302-305). More details can be found in Annex 2.

The results obtained by Cha (2003) and Shibamoto and Shizume (2014) vary depending on whether or not the dynamics of prices are included in the SVAR model. For this reason, the same analysis has been repeated with the prices variable (CPI from Maluquer, 2013) in order to observe whether any changes occur. Prices responded positively to a output shock. Price shocks had a positive impact on GDP following ARDL. The main findings of this study were not altered by the addition of the variable prices (for more information, see Annex 2 (figure 4)).

Running the estimation with the addition of the capital flows variable, the significance and signs of the coefficients do not change. All the coefficients remain with the same sign and the exchange rate remain significant and positive in the short run. The coefficient of capital flows variable appears as negative and significant in the long-run analysis. We stress that at the start of the 20th century, Spain received capital flows while outside the gold standard. Studies by Clemens and Williamson (2000) considered that the gold standard was not the key variable for explaining UK investments during the classical gold standard era. In this regard, Carreras and Tafunell (2004) find it difficult to believe that Spain would have received more investment in the gold standard because it had received too much in the years before.³¹ For more information on the capital flow results, see Annex 2 (figure 5).

VI. Discussion

In the period under study, the gold standard was linked to prosperity. As such, the system was not readily applicable to countries on the southern periphery of Europe, such as Spain. One of the main causes of the internal instability experienced up to 1913 in these countries under the classical gold standard was largely a result, therefore, of the subordination of their economic policies to external objectives. Spain was never in the gold standard. Therefore, its policies did not depend on the stability of the exchange rate. Spanish policies in the late nineteenth and early twentieth centuries were not devised strategically, but were adjusted in accordance with circumstances³².

Martín Aceña stresses that using an expansionary monetary policy has no long-term implications, since changes in the quantity of money have insignificant effects on long-term real income

³⁰ Results can be found in Annex 2.

³¹ More in Roldan (2017).

³² Olariaga (1933/1977, p. 137) takes the view that Spain's policy was ad hoc rather than consciously designed to regulate the economic cycle.

growth.³³ It is found that the monetary policy applied in this period had a positive effect on GDP. According to the results, the role played by the monetary policy is not the one described by Martín Aceña, and is more closely in line with the thesis defended by Sardà. According to Sardà (1987, p. 218), the fiduciary expansion brought about by pressure from the Spanish treasury was able to sustain the country's economic progress. Monetary policy was one of the most powerful tools to affect the real economy. The positive coefficient obtained for monetary policy shows that this policy helped increase Spanish output in the long run.³⁴ As Sabaté et al. (2006), Escario et al. (2012), Sabaté et al. (2019) and my results stress, there was fiscal dominance. I have found that money supply was caused by the fiscal balance. Thus, the positive sign in the long run could be explained by seignorage. It seems that Spanish growth was sustained by monetary policy, which was the Treasury's response to the economic problems that arose. This, in turn, could affect the exchange rate. Exchange rate shows a long-term non-significant impact with the new fiscal data (table 3). However, the effect is negative and significant when data from Comín and Díaz (2005) is used (figure 2 in Annex 2). There were also financial innovations during the late 19th century. As it was said by Castañeda and Tafunell (1993) and Castañeda (2001) comparing the volume of transfers with respect to the Spanish GDP, this importance is highlighted. In 1885, transfers accounted for 6% of GDP and in 1900, for 31% of GDP when the estimation uses. Moreover, it is said that moderate inflation can cause wealth redistribution.³⁵ Monetary policy measured in terms of the number of banknotes in circulation (Martín Aceña, 2018), it is also positive and significant, which reinforces the results obtained (see Annex 2).

Local projections evidence a positive impact in the short term as well. It is expected that monetary policy will positively affect real GDP because an increase in the amount of real money causes an increase in equilibrium output through a variety of mechanisms such as the exchange rate, through which monetary policy could have an effect on the real economy. That is we have found in the local projections and in the ARDL long-run relationship. It should be stressed that the positive impact of money supply on the pc GDP in the impulse response function and long term ARDL coefficient can be explained by Sarda (1987).

In contrast, Martín Aceña (1881, 1887 and 1993) could be right to say that having a flexible exchange rate could have damaged the Spanish economy. Martín Aceña (1981) rightly considered that the effects of a depreciation would not be long-term effects. My results show how the fluctuations of the exchange rate had non-significant long-term impact on pc GDP (main model). When the estimation is run considering old data on the fiscal balance, the results show a negative and significant impact of a depreciation in pc GDP (Figure 2, Annex 2). My result of a non-

³³ Martín Aceña (1981, pp. 284-285), in an argument based on Friedman (1970, p. 217).

³⁴ That is, when we dispose of sufficient lags to study the coefficients.

³⁵ For example there is a study by Doepke and Schneider (2006).

significant or significant and negative impact of a depreciation was also found by Upadhyaya (1999) who found a non-significant long-run effect for four out of six Asian economies and a contractionary impact for the other two; by Bahmani-Oskooee (1998) who found no long-run effect for their sample; by Bahmani-Oskooee et al. (2002) who underlined that depreciation had a negative impact for many Asian countries, and by Christopoulos (2004) who found both positive and negative effects in their sample. Therefore, the debate on contractionary effects of a depreciation is still open.

While depreciation increases exports, it also raises production costs by increasing import prices. Depending on the effects of these two actions on the economy, depreciation will have either a positive or negative impact. A depreciation is considered successful when it succeeds in modifying demand and quantity in the right direction (Guitian, 1976; Dornbusch, 1988). Its success also depends on the ability of the economy to meet additional demand by producing more goods. There have been many studies on the topic from different perspectives, such as Meade (1951) and Dornbusch (1978). The structuralist school emphasizes the contractionary effects of devaluation (Meade, 1951). The article written by Alexander (1952) changed the theory of the effects of the exchange rate on a country's economy. The classic history about the depreciation underlines that a devaluation increases the price of foreign goods relative to domestic goods and raises domestic demand. Most scholars agree that the immediate impact of devaluation is to raise the demand for domestic goods; the disagreement lies in how the economy reacts to this increase in demand. However, some studies such as Cooper (1971a and 1971b) and Díaz-Alejandro (1963) suggest that a devaluation can reduce the aggregate demand. It is true that devaluation can redistribute income from wages to profits. Nevertheless, a contractionary effect is more frequent than one might expect (Dornbusch & Krugman, 1976; Krugman and Taylor, 1978; Kamin, 1988; Edwards, 1989 and Lizondo and Montiel, 1989). Dornbusch and Krugman (1976) considers that when there is trade deficit, devaluation can be contractionary. When foreign currency expenditure surpasses foreign currency revenues, the prices of traded goods increase while domestic real income is reduced. It is said that the greater the trade deficit, the greater the contractionary effect. As Spain had problems in its balance of payments and suffered trade deficits, Krugman's (1976) argument appears to fit my results. In the short term, the exchange rate coefficient was positive and significant, meaning that a depreciation could generate an increase in domestic income. In the long run, the impact was negative and significant when the estimation is run considering Comín (2005)'s data on the fiscal balance. This may be consistent with some of the literature focusing on the contractionary effects of devaluation. Krugman (1976) also stresses that this is more frequent in less developed countries. From the supply side, depreciation can be contractionary when the economy is semi-industrialized and inputs are basically imported. Then, manufacturers' costs increase after a depreciation. Several recent studies have tested whether the

impact on the economy was positive or negative (Gylfason and Schmid, 1983; Gylfason and Risager, 1984; Bahmani-Oskooee et al., 2002; Kalyoncu et al., 2008; Bahmani-Oskooee and Kutun, 2008; Narayan and Narayan, 2013; Bahmani-Oskooee and Gelan, 2013 and Bahmani-Oskooee and Mohammadian, 2016)

However in the short run, a flexible exchange rate helped the economy. The flexible exchange rate is an important element of transmission of monetary policy. Taylor (1995) and Taylor (2001) emphasize the importance of the exchange rate channel of monetary transmission. The positive and significant impact of exchange rate remained the same when estimation is done with old data on fiscal balance (Comín and Díaz, 2005). Serrano (2004, p. 163) concludes that “*the exchange rate acted as an occasional alarm by exerting an impulse towards moderation and a return to equilibrium that prevented great divergences*”. Cubel (2001, p. 187) indicates that not being on the gold standard allowed Spain to reduce the disturbances in its economy; the cost of staying on the gold standard would have been too high for a backward country (in the short-run). Llona (2001, p. 172) stresses that the Spanish authorities were forced to adopt a flexible exchange rate that would accelerate the adjustment to equilibrium. Martín Aceña (1981) accepts that the depreciation of the peseta between 1890 and 1905 could have improved the terms of trade in a way that would have encouraged exports and accelerated the process of import substitution. In this way the independence of the gold standard would have had its compensations. The depreciation of the peseta seems to be crucial in increasing output in the short run during the period under study.³⁶

The accumulation of deficits had a negative impact on Spanish economy in the long run, and fiscal discipline had a positive effect on pc GDP, as Martín Aceña had underlined (1981, 1993 and 2000). An improvement in the budget balance represented an increase of GDP, while a worsening of the budget balance generated a decline in output in the long-run. However, looking at local projection estimations, a negative (but non-significant) sign can be seen in short-run estimations and a negative impact on pc GDP. Thus, fiscal policy may have a countercyclical effect in the short run but not in the long run, when fiscal discipline matters.

The Spanish Treasury obtained the financing it needed by monetising public debt (Sardà, 1987, pp. 186, 190 and 199; Escario et al., 2011, pp. 271-272 and Sabaté et al., 2006, pp. 310, 321 and 328). The causality between fiscal and monetary policy is not only shown by the real effective exchange rate results of the Toda and Yamamoto causality analysis but also by the nominal effective exchange rate (see Annex 2, table 1). As the impulse response function shows, this

³⁶ For more on the Spanish case, see Olariaga, (1933), Tortella (1974), Sardà (1987), Martín Aceña (1981, 1993, 1997 and 2000), Catalan et al. (2001) and Catalan and Sánchez (2013). For other cases, see Temin (1995), Eichengreen and Temin (2010), Bordo and Rockoff (1996), Shibamoto and Shizume (2014), Eichengreen and Sachs (1986).

policy accommodated the state's fiscal needs (Escario, Gadea and Sabaté, 2011, pp. 271-272 and Sabaté et al., 2006, pp. 310, 321 and 328). These scholars stress that seigniorage was essential to safeguarding the state's long-term solvency. The Spanish treasury was in need of money, which it obtained by monetising public debt (Sardà, 1987, pp. 186, 190 and 199). We do not find that the past values of macroeconomic policies in the model helped to explain the present values of the real effective exchange rate. However, nominal effective exchange was caused by fiscal policy underlining what was highlighted by Martín Aceña (1981 and 1993). He considered that exchange rate was affected by expectations and those expectations could be explained by our lack of fiscal discipline. This result should be considered as preliminary and the determinants of both nominal and real exchange rates will need further research.

VII. Conclusion

The paper analyses the Spanish economy between 1870 and 1913. By conducting both short- and long-run analyses, I have been able to combine the classical and critical theories, even though they appear to be incompatible. The ARDL analysis reported here shows that exchange rate adjustments played an important role in the short run. This suggests that the real exchange rate was a useful policy tool in the short term, as Sardà claimed in 1948. However, the results obtained support Martín Aceña's proposals that having a flexible exchange rate could have had a negative impact on long-term output. The study also finds a link between monetary policy and fiscal policies. I show how the past values of fiscal policy were able to affect the present values of nominal effective exchange rate, probably due to the lack of fiscal discipline. The results presented in this paper provide new empirical evidence for the debates on the core-periphery relationship and the effects of depreciation on output at the time of the classical gold standard. Both schools of thought are therefore correct if we consider the temporal approaches taken: the tools of macroeconomic policy were positive for the Spanish economy in the short term, but they may have had detrimental effects in the long run.

Chapter 4: “Did the non-adoption of the gold standard benefit or harm Spanish economy? A counterfactual analysis between 1870-1913”. *†

Abstract

This paper is an attempt to draw an overall picture of what would have happened if Spain had kept its exchange rate stable (and if there had been no exchange rate shocks affecting economic growth) between 1870 and 1913. It is said that in the face of dramatic economic shocks, the rigidities of the monetary system inhibited recovery, particularly in countries on the periphery. Would the impact of business cycles on Spain have been much greater if the country had kept its exchange rate stable? To answer this question, I present a counterfactual analysis based on the SVAR framework. The study also intends to highlight the importance of macroeconomic policies (run outside the gold standard) to explain economic growth fluctuations. Via an analysis of the historical decomposition of the variables I aim to identify the ones that helped to increase growth and the ones that harmed the economy. My analysis sheds new light on the discussion of Spain’s non-adoption of the classical gold standard. Having a fixed exchange rate would have made growth declines deeper until the beginning of the 20th century; from that point on, the adoption of the gold standard would have been a good decision. The results presented in this paper provide new empirical evidence for the core-periphery debate addressing the period of the classical gold standard.

Key words: Classical Gold Standard, Spain, Exchange Rate, Counterfactual, SVAR.

JEL codes: E42, E52, E63, N10

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“(...) nothing could be farther from the truth than the idea that the economists of that period as a body worshipped the golden calf—and, second, that these opinions received but qualified support from those leaders of scientific economics who actually worked in the field. As we shall see, neither Jevons, nor Walras, nor Marshall, nor Wicksell, nor Wieser, nor Fisher can, without qualification, be called either theoretical or practical gold monometallists.”

Schumpeter (1954, p. 1040)

I. Introduction

The aim of this study is to understand what would have happened if Spain would not have suffered from exchange rate shocks. This paper explores how would have been Spanish economic growth if exchange rate would have been fixed. As far as I know, for the Spanish case, this type of study (focus on estimating a counterfactual analysis) has no precedents for the period spanning the late nineteenth and early twentieth century's.¹ I find this analysis extremely useful considering the recent euro crisis. During the classical gold standard, Spain did not suffer the “golden fetters” and broke them when it was necessary to increase its money supply and to overcome economic shocks. Otherwise, Spain decided to be part of the euro and nowadays it is linked to “paper fetters” (no possibility of running fiscal and monetary policies).²

I find very relevant to understand what would have happened in Spain's economy if it would have kept the exchange rate stable. Moreover, the two periods with higher average of crises depth (understood as a cumulative loss of GDP) are the two globalization periods, 1880-1913 and 1973-2000, (Betrán and Pons, 2013). It seems very interesting for me to focus on the first period. Serrano (2004, p. 16) stresses that *"Examining the monetary issue at that time also places us in a particularly interesting perspective (...) the politics of money has multiple facets: ideological arguments and power relations, economic conditions and external reflexes. The results are not only sensitive to the economy, but also to the very fate of society, so that we are facing an objectively "greater" issue "*. Martín Aceña et al. (2011) underline that *"Spain's historic detachment from the world monetary system cost the country dearly in terms of both its debt burden and GDP growth, two questions that warrant further research"*. This paper focuses on the second question. There is a need of a counterfactual study following Martín Aceña (2017, p. 35): *"Remaining outside the gold standard was unwise, to say the least, unless it could be proven that*

¹ There are some counterfactual analysis for other cases such as Shibamoto and Shizume (2014) for Japan or Bordo, Lane and Redish (2004) for the US among others.

² More about golden fetters and paper fetters can be found in Eichengreen (1992) and Eichengreen and Temin (2010).

its adoption would have been catastrophic for the national economy (...).” This article shows the first counterfactual analysis to this never ending debate.

One of the successes of the gold standard was to preserve stability across much of the world and to generate economic growth. The advanced economies were benefited from this monetary system while many countries on the periphery experienced major exchange rate fluctuations and instability³. Southern European economies did not succeed in remaining within the rules of the classical gold standard.⁴ When the economies of the periphery joined the gold standard, they were required to make a sacrifice to adjust their economies. The structural problems of their economies prevented them from bringing their money supply under control and keeping their exchange rate stable. There were many countries that did not follow the rules of the game (Bloomfield, 1959). However, they were committed to long-term gold standard objectives. According to Keynes (1913), the monetary regime called the gold standard comprised multiple national variants. It was difficult to establish who was and who was not and when.

The adoption of a system of fixed exchange rates and free movement of capital causes the loss of monetary autonomy (Obstfeld et al., 2005). Countries outside the gold standard used fluctuations in the exchange rate to cushion the impact of economic shocks (Bordo and Rockoff, 1996, p. 416 and Bordo and Flandreau, 2003, p. 419). There is no consensus over whether the non-adoption of the gold standard benefited or harmed Spain’s economic growth.⁵ The proponents of a fixed

³ For the core-periphery discussion, see De Cecco (1974), Hallwood et al. (1996), Bordo and Flandreau (2003, p. 420), Morys (2013, p. 205) and Mitchener and Weidenmier (2015, p. 54). More on this can also be found in Triffin (1985, p. 128), Braga de Macedo (1996, p. 243), Martín Aceña et al. (2000, p. 2) and Sabaté et al. (2019).. More on speculative attacks to currencies in Eichengreen (1996, pp. 46-49), Bordo and Jonung (2001, p. 14), and Bernanke (2015, p. 26). For withdrawals effects, see De Cecco (1974), Temin (1995, p. 28), and Bordo and Flandreau (2003, p. 420). More about credibility and interest rates during the gold standard can be found in Hallwood et al. (1996, p. 129), Bordo and Flandreau (2003, p. 446), Bordo and MacDonald (2005, p. 326) and Mitchener et al. (2010, p. 54). For trade benefits, see Lopez-Cordova and Meissner (2003). For additional information on the main characteristics of the gold standard, see, for example, Eichengreen (1992), Temin (1995, p. 25), Officer (1996), Eichengreen and Flandreau (1997) or Bordo (1999).

⁴ For Italy, see Fratianni and Spinelli (1984), Cipolla (1995), Tattara and Volpe (1997), Tattara (2000 and 2003), Bordo (1999, p. 328) and Frattiani and Spinelli (2012). For Portugal, see Mata (1987), Reis (1996, 2000 and 2007), Valerio (1998) and Bordo (1999, p. 329).

⁵ On one hand, Sardà (1987), Solé Villalonga (1964 and 1967) and Tortella (1981 and 1994a) defended a position contrary to the gold standard. Their argument is based on the impossibility of taking monetary and fiscal policy actions under the gold standard. More recently, this stance has been defended by Cubel et al (1998); Catalan et al. (2001); Cubel (2001); Llona (2001); Ródenas, Brú and Almenar (2001); and Sabaté et al. (2001), Carreras and Tafunell (2004, pp. 219-20), Serrano (2004) and Ródenas and Bru (2006). This school of thought is called the “classical thesis” and is associated with Professor Joan Sardà. On the other hand, Martín Aceña (1981, 1993, 1997, 2000, 2017) defends the critical thesis, viewing it as a mistake not to have adopted the gold standard. Martín Aceña, professor at the University of Alcalá, holds that Spanish growth would have been greater under the gold standard. In an intermediate position in the debate, we can find García Iglesias (2005) and Prados de la Escosura (2003). A summary can be found in Roldan (2017).

exchange rate stress that growth would have been greater under the gold standard keeping the exchange rate stable and bringing the fiscal policy under control. However, keeping a flexible exchange rate and running fiscal and monetary policies could succeed in dampening the economic fluctuations by making them less deep during the classical gold standard.

For this reason, the main purpose of the present study is to establish what would have been better for Spanish economy. Spain made several attempts to adopt the monetary system. What would have happened if one of these attempts had succeeded? The case of the Spanish economy offers an opportunity to estimate a counterfactual analysis in a country that never adopted the gold standard.⁶ Because of this, I run a counterfactual analysis of what would have happened if Spain had kept its exchange rate stable like other European economies. To do this, I construct an SVAR (structural vector autoregression)⁷. This study also sets out to assess the importance of the instruments of monetary and fiscal policy and the exchange rate in explaining Spain's economic growth.

The paper shows a counterfactual analysis on the effects of the non-adoption of the gold standard for Spanish economic growth between 1870 and 1913, distinguishing between a stage where the depreciation of the exchange rate had positive effects making the crises less profound and the decade before the Great War where it would have been possible for the economy to incorporate the peseta into the gold standard. The article shows the growth gains and losses due to the flexible exchange system.

It is found that exchange rate adjustments were important to explain the evolution of economic growth. Following the results, having a flexible exchange rate seems to be significant to make crises less deep until the beginning of the twentieth century. Before the 20th century, fixed exchange rate would have generated bigger falls in GDP than flexible exchange rate. Expansionary monetary policy was another policy that helped more to understand pc GDP behaviour. The effects of fiscal policy were not very relevant. It can be said that, after the beginning of the 20th century, membership of the gold standard was a possibility for Spain and the counterfactual analysis suggests that its economic growth would have been higher under a fixed exchange rate system. Considering results from counterfactual analysis, had the peseta exchange rate not been permitted to separate from its historical parity, the Spanish growth would have outpaced the actual growth at the beginning of the 20th century.

⁶ Sardà (1987), Martín Aceña (1981, p. 267), Martín Aceña (1993, p. 135), Tortella (1994a, p. 323), Serrano (2004, p. 155), García Iglesias (2005, p. 62), Sabaté, Gadea and Escario (2006, p. 310), Martín Aceña et al. (2011, p. 3), Martínez Ruíz and Nogués (2014, pp. 9 and 19), Martín Aceña (2017), Sabaté et al. (2019).

⁷ A formal explanation of SVAR can be found in Sims (1986).

In order to do this, I show the attempts to join the gold standard. Then, we see if having a flexible exchange rate damaged Spain's economy. Thus, if Spain should have been adopted the gold standard or not. After that, we will study the importance of macroeconomic policies on economic growth. Thereby, how much of economic growth fluctuations is explained by each policy shocks and how change this effect along the years.

The paper is organised as follows: section 2 reviews the main features of the Spanish economy and the attempts to adopt the gold standard; section 3 describes the methodology and data; section 4 presents the empirical results; section 5 offers a discussion of the results in relation to the historical evidence and the previous literature; and, lastly, section 6 concludes.

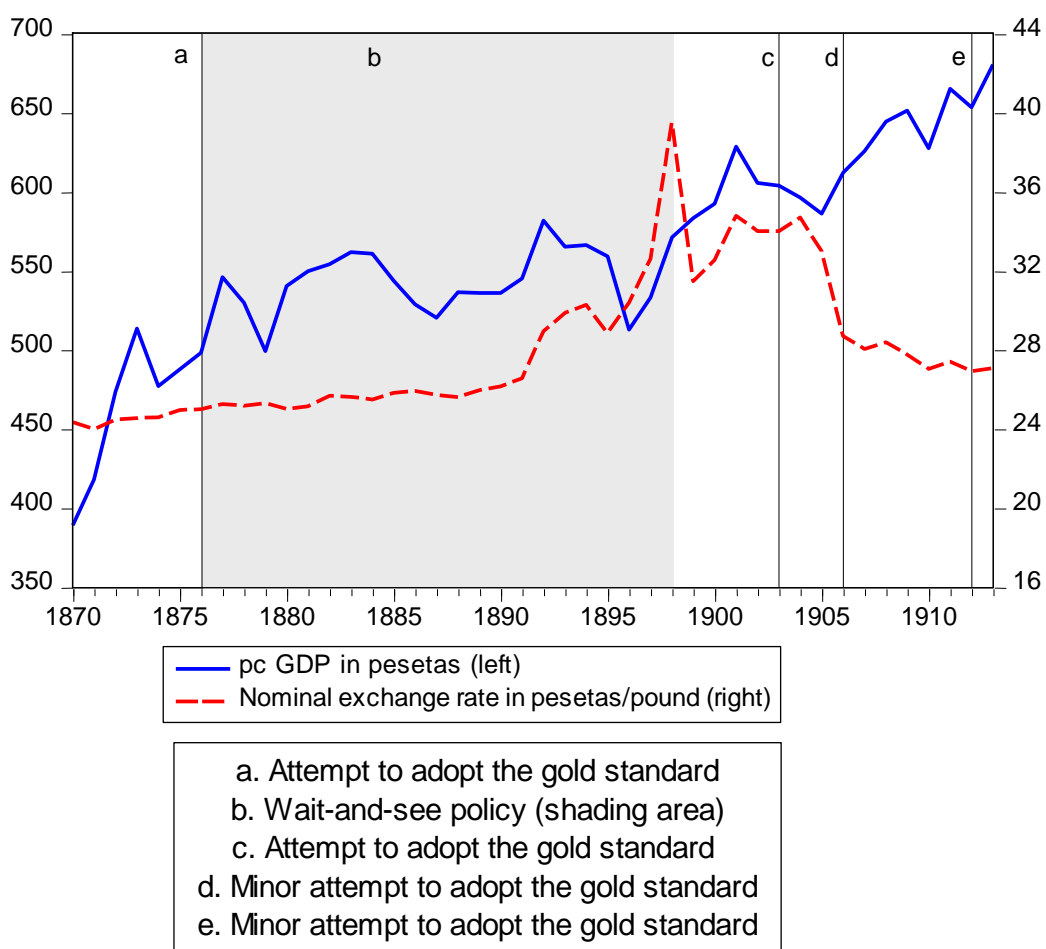
II. The Spanish economy between 1870 and 1913: Attempts to adopt the gold standard, policies and strategies.

The paper covers the period known as the classical gold standard. Spain had a *de jure* bimetallic standard over the period. Nevertheless, during the eighties, the country is regarded to have had a *de facto* fiduciary system.

In the nineteenth century the frequency of financial crises in Spain was well above the global average (11.1%, according to Betrán et al. (2013), vs 4.9% worldwide, according to Bordo et al. (2001). However, although the crises were quite severe in Spain, they were less severe than in the rest of the world (Betrán and Pons, 2019).⁸ Would they have been deeper if the country had adopted a fixed exchange rate (the gold standard)? According to Betrán and Pons (2019), financial crisis were due to foreign capital entries, railway and mining booms, sudden stops, banking expansion, increasing credit, public budget deficits, and current account imbalances.

⁸ More on Spanish crisis in Betrán et al. (2012) and Maixé and Iglesias (2018).

Figure 1. Evolution of pc GDP and nominal exchange rate (pesetas/pound).



Source: main text.

Serrano (2004) considers the years before 1898 as years in which there was a wait-and-see policy. The policymakers had an attitude of prudence waiting to see how the monetary system was defined at the international level. In the first years of the Restoration it seemed that the peseta was heading towards gold. The will of Spain was, once overcome the difficulties, to be part of the international monetary system. However, soon, the apparent lack of definition of the international monetary panorama provided a perfect excuse to opt for comfort.

Table 1. Attempts to adopt the gold standard

Attempts to adopt the gold standard (1870-1913)		
Year	Attempt	Problems
1876	<i>Junta Consultiva de la Moneda</i> wrote a <i>Dictamen</i> and it was converted into the Royal Decree of August 1876	Wait-and-see policy and dualism between banknotes and metallic money
1903	Project of 1903 written by Fernández Villaverde to adopt the gold standard. Measures such as payment of the customs duty in gold or the will to restore circulation and free minting of the gold coin and making the gold peseta a unit of account and the monetary standard in Spain.	Currency parity and the recovery of the exchange rate makes the urgency of a change disappears.
1906	Project presented at the Congress by Navarro Reverter to adopt the gold standard	They run a strict and orthodox monetary and financial policy. Even without considering to adopt the gold standard, it was desirable objective (Rodríguez Law of 1902).
1912	Navarro Reverter intended to direct the peseta towards gold (Project presented at the Congress).	Economic stagnation, inflationary pressures, budget deficits, decreases in pc GDP, political tensions, growing social conflict, discomfort in the Armed Forces.
Other measures to the gold standard		
1889	Coin exchange between France and Spain (only for twenty pesetas coins).	There were not twenty pesetas coins (only twenty-five pesetas coins).
1901	Prohibition of the minting of more silver coins (Law of 1901 by Ángel Urzáiz)	Silver was not re-minted throughout the Restoration. However, the amount of silver was so large that it continued to affect the Spanish monetary situation
1902	Payment of export and some importation duties in gold (law of February 22 by Ángel Urzáiz)	No. It stabilized the exchange rate.

Sources: Main text

In 1874, monopoly of issue was granted to the Bank of Spain in order to resolve the State's financial problems. During the 1870s, many countries placed their monetary systems on the gold standard, and in Spain the decree of 1876, which restored the Consultative Board of the Currency, represented the country's first attempt to join. A *Dictamen* (a report written by experts) advised that the Spanish monetary system should be based on gold. The first part of the *Dictamen* discussed the difficulties of bimetallism, while the second part presented gold as the axis of the system (Serrano, 2004, p.30). However, the government ignored the board's advice and stayed off the gold standard (Martín Aceña, 1993, p. 137). Despite the difficulties, the decisions and diagnoses were not very different from those made in other European countries (Serrano, 2004).

According to Serrano (2004, pp. 39-40), the problem was the starting point of the *Dictamen*, which focused exclusively on the fall in the price of silver. It would have been more sensible to concentrate on Spanish monetary reorganization in general but, instead, a short-term approach was applied. The authorities could have acted by raising the price of gold to the market price, as

recommended by the Consultative Board of the Currency, and by demonetizing the silver coinage. The supply of money could have been restricted, because the reserves were dwindling and interest rates were high (Martín Aceña, 1993, p. 139). However, Tortella (1994a, p. 480) considers that trying to conserve the stock of gold at all costs would have imposed an intolerable and unnecessary discipline on the country, given its problems with the balance of payments.

Spain went on to have a unique monetary regime, fully fiduciary in its internal circulation and with a fluctuating exchange rate. Serrano (2004, p. 67) highlights that "(...) *The monetary regime was flotation, in the strictest sense of the term. This singularity confers a very special interest on the peseta in contemporary monetary history, since it turned out to be the European currency with the longest period of stable flotation, until the crisis of the 1930s*". Later Spanish governments, less interested in monetary orthodoxy, saw in seigniorage an additional source of income for improving the state of the public treasury. Thus, the purchase of gold was no longer financed. Finally, the deficits became more serious and nobody supported a circulation full of silver (a de facto fiduciary system). The time to join the gold standard had passed, and the question of whether or not to apply for membership would not be posed again until 1898.

According to Tortella (1994a, p. 177), despite the rushed nature of the government's decision not to adopt the gold standard, it was in fact the best possible alternative, or at least the least bad. The survival of the system of full metallic weight could have been an obstacle to growth (Tortella, 1994a, p. 177). The 1929 *Dictamen* considered it very doubtful that the gold standard system in Spain could have been maintained in the long term (Tortella, 1994a, p. 325). Sardà (1987) states that, although it was not the idea of the monetary authorities, the country was favoured by not adopting the gold standard; its decision not to join protected the Spanish economy from the fluctuations in income and prices that faced the rest of the economies and the international depression of the last quarter of the nineteenth century.

Gold remained an option for economic policy, but the Spanish currency was never committed to the rules of convertibility, capital-compensating movements, the use of the interest rate as an instrument of adjustment, or fiscal discipline. The peseta was never integrated into the gold standard because of a dualism in Spanish monetary organization (Serrano, 2004, p. 155). Neither the decree of 1868, which regulated coin circulation, mentioned banknotes, nor did the decree of 1874, which regulated banknotes, refer to coin circulation. The Bank of Spain dealt with the fiduciary circulation and had the power to convert, while the Treasury dealt with the coin circulation. The precariousness of the Spanish Treasury prevented it from devoting the necessary resources to improve economic situation, or submitting to fiscal discipline. This problem persisted in the *Dictamen* of 1876 and the Royal Decree of August 1876. The declaration of convertibility

could have eliminated the problem, but convertibility was never in fact established (Serrano, 2004).

In 1889, France and Spain agreed to accept reciprocally twenty-peseta coins. The Bank of Spain concurred, but no twenty-peseta coins were available because, in 1876, they had issued a twenty-five peseta coin. Therefore, twenty-peseta coins had to be minted; as the numbers made were insufficient, the agreement fell through.

The exchange rate remained stable for the most part until the late 1880s and early 1890s, though with a tendency towards depreciation. In the early 1890s there was a currency crisis due to the enduring effects of the financial problems of the late 1880s, the Baring crisis and the law of 1891 that increased the limit of issuing banknotes (Serrano, 2004). Betrán and Pons (2019) associate the crash of 1890-92 with the international crisis, and they explain how the financial structure was damaged. Referring to the period of the first large depreciation of the peseta in 1891, the finance minister Raimundo Fernández Villaverde (1893, p. 563), considered that membership of the gold standard required major sacrifices and concluded that it was not a valid solution for Spain at that time. Between the end of the 1870s and the beginning of the 1890s there were those who defended monometallism, others bimetallism, and others who maintained ambiguous or eclectic positions (Serrano, 2004). It did not seem clear which monetary standard option was better, either in practice or in theory. Schumpeter (1971, p. 1168) noted that the bimetallic argument could have won the controversy, even without the support offered by several top-level scholars.

The change began in 1898. This was a turning point in Spanish monetary history, at least in the field of ideas. The wait-and-see policy came to an end and the gold standard was always a possible remedy (Serrano, 2004, p. 85). Fernández Villaverde made specific proposals for adopting the gold standard. Fernández-Villaverde (1900, p. 69, 84 and 106), considered that the problem should not be resolved abruptly because a sudden reduction of the monetary circulation would cause a crisis and be an evil in itself. Moreover, his diagnosis of the defects of the Spanish monetary organization was fairly accurate – for example, the continuation of the minting of silver, the financial indiscipline of the Treasury, and the perverse relations of the government with the Bank of Spain (Serrano, 2004, p. 95).

On November 28, 1901, a further step was taken toward gold when the minting of silver was prohibited. Nonetheless, the demonetization of silver proved difficult. Even though no more silver was minted, the amount already in existence did not disappear. With the laws of December 26, 1899 and November 28, 1901, the government adopted provisions that favoured the restoration of the circulation and the minting of gold coins. The best moment to adopt the gold standard was 1903 (Serrano, 2004). In that year, Fernández Villaverde, who had been President of the Council

during the previous year, proposed legislation to regularize and improve the exchange rate. He was seeking to restore circulation and the free minting of gold coins and to establish the date when the gold standard would be adopted by Spain.

The project of 1903 had to be carried out within the monetary system created by the decree-law of October 19, 1868.⁹ This implied, according to Villaverde, that banknotes should be convertible to the historical equivalent of 100 pesetas/29 grams of gold. The project of 1903 consisted of returning to the parity of 25.22 pesetas per pound, something that was difficult to achieve. To accomplish this, national prices had to be controlled (Serrano, 2004, pp. 106 and 109), which would have implied the control of relative prices. The proposal included the generalization of the payment in gold of customs duties as a way to obtain gold. Budget discipline and the amount of gold obtained via customs duties achieved some monetary stability. The reduction of the depreciation of the peseta in 1906 and the economic stability achieved meant that adopting the gold standard was no longer such an urgent necessity (Serrano, 2004).

After 1903, two subsequent attempts were made to adopt the gold standard, in 1906 and 1912. According to Juan Velarde (2004), the latter failed due to problems of social conflict, discontent among the military during the Moroccan War, and economic stagnation. Until the 1930s there were several moments when the political situation in Spanish encouraged entry, and the foreign scenario was positive (Serrano, 2004, p. 159). But the adoption of the gold standard never materialized. In the long term, this was a period of substantial stability (Carreras and Tafunell, 2004, Serrano, 2004 and García-Iglesias, 2005).

Martín Aceña (1993, p. 136), explains that Spain could and should have enjoyed the international monetary system. The inconvertibility and the flexible exchange rate introduced risk in Spanish international transactions, reducing trade and capital flows. However, since the first exchange crisis of the peseta, at the beginning of the nineties, a powerful current of opinion held that the Spanish economy had a restriction on its possibilities of committing itself to a monetary system as demanding as gold in its difficulty in maintaining in equilibrium income and external payments (Serrano, 2004). Protectionism or floating change was not seen as causes of the backwardness of Spain, but as its inescapable results and appropriate defensive strategies for a backward country. Even in the *Dictamen* there are echoes of these positions (Serrano, 2004, p. 61). Moreover, Martín Aceña et al. (2011) consider that neither the Treasury nor the *Banco de España* were prepared to take the necessary measures to choose the appropriate parity, balance the budget or follow an orthodox fiscal policy to maintain the value of the exchange rate. For many, it was the situation of the treasury that did not allow the gold standard to be implemented, since it required limiting

⁹ Fernández-Villaverde (1903).

the budget and indebtedness (Tortella, 1994a). If Spain did not implement the gold standard, it was not because of a doctrinal principle, but because of the fear that its politicians and especially the *Banco de España* harbored, that chronic deficits in the balance of trade and budget would eventually cause a drain of gold that would make the project unviable (Tortella, 1994a).

III. Methodology and data

To this end, an SVAR (structural vector autoregression) model is constructed. The methodology has been used by Cha (2003) and by Shibamoto and Shizume (2014) to capture the magnitudes of the effects of macroeconomic policies in Japan, by Gordon and Krenn (2010) to measure the same effects in the US, and by Mattesini and Quintieri (1997) in the Italian case, among others¹⁰. Concretely, Shibamoto and Shizume (2014) have studied the impact of monetary, fiscal and exchange rate policy in Japan economy during the inter-war period. As I do in this paper, Fackler and Parker (1994a) use historical decomposition and counterfactual analysis to understand which theory explains better the movements of GDP during the Great Depression and to understand if some part of the depression could have been avoided by increasing the money stock in an anticipated way. Bordo et al (2004) run an empirical analysis grounded by a VAR model of money supply under the gold standard. They restrict themselves to business cycle frequencies because of the short span of data available.

To estimate the importance of monetary, fiscal and exchange rate policy on real GDP, I construct the following SVAR model using the variables of output ($ypcr_t$), fiscal balance (f_t), money stock (m_t) and real effective exchange rate (e_t):

$$B(L)X_t = b_0 + \varepsilon_t$$

where $X_t = (ypcr_t, f_t, m_t, reer_t)$, b_0 is the vector of the constant, $B(L) = B_0 - \sum_{j=1}^p B_j L^j$ where B_0 is the contemporaneous relations between the variables making the system overparametrized (Enders, 2004), L denotes the lag and $\varepsilon_t = (\varepsilon_{ypcr_t}, \varepsilon_{f_t}, \varepsilon_{m_t}, \varepsilon_{reer_t})$ is a four-by-one vector of serially uncorrelated structural disturbances with a mean zero and a covariance matrix Σ_ε . The vector ε_t model random disturbances or white noise processes.

The reduced form baseline VAR is specified as follows:

$$A(L)X_t = a_0 + u_t$$

where a_0 is the vector of the constant, X_t is a vector of endogenous variables, $A(L)$ is an autoregressive lag-polynomial. The benchmark includes a constant. $A(L) = I - \sum_{j=1}^p A_j L^j$ is a p -th order lag of matrix A_j ($j = 1, 2, \dots, p$), L denotes the lag and $u_t = (u_{ypcr_t}, u_{f_t}, u_{m_t}, u_{reer_t})$

¹⁰ For the English case, see an analysis of monetary policy in Jeanne (1995).

is the a four-by-one vector of serially uncorrelated structural disturbances with a mean zero and a covariance matrix Σ_u . The reduced form residuals which will present non zero cross correlations. The model includes one lag of each endogenous variable. Generalized weights is used as an identification of the reduced form covariance matrix Σ_u is used to orthogonalize the reduced form of innovations.

I model output, fiscal policy, monetary policy and exchange rate adjustments using the following SVAR above.¹¹ The SVAR is estimated in first differences because after considering the time series properties of the data, all variables seem I(1).¹² It is said that it is possible to lost information when someone runs the model in first differences because long-run relations between levels can be ignored. In this case is not an important problem. For example, differentiating pc GDP means to have economic growth which is a variable of interest for the model. When the SVAR is estimated on levels (Annex), the performance of the estimation is consistent even if each variable is not stationary (Hamilton, 1994a, pp. 651-653 and Ramey, 2016). When I run my estimation in levels, my results do not differ much from to those obtained in first differences (see Figure 4 in the Annex to know more about results and differences with the main results).

As it is explained before, four macroeconomic variables are used in this analysis. I use the nominal effective exchange rate and the real effective exchange rate to consider the value of the currency due to reasons I explain later. The $ypcr_t$ is real pc GDP measured using GDP from Prados de la Escosura (2003) and population from Nicolau (2005) deflated by GDP deflator (Prados de la Escosura, 2003), f_t is the real fiscal balance as percentage of GDP obtained by Comín and Díaz (2005), m_t is the money supply measured from Martín Aceña, (2018), $reer_t$ is the real effective exchange rate, whose calculation is explained below, and $neer$ is the nominal effective exchange rate.¹³

To build the real effective exchange rate, I consider the average weight of the exchange rate against the pound sterling, the French franc and the US dollar. The calculation of the exchange rate makes use of the GDP deflator from Prados de la Escosura (2003) for Spain, the deflator obtained by Toutain (1987) for France, Balke and Gordon (1989) and Mitchell (2007) for the US and Thomas and Dimsdale (2017) for the UK.¹⁴ Results do not change if CPI (Consumer Price Index) obtained by Maluquer (2013) for Spain and Mitchell (2007) for the other countries is used to construct the real effective exchange rate. The peseta exchange rate is obtained from Martín Aceña and Pons (2005) and Martínez Ruiz and Nogués (2014). The weight of foreign trade to the

¹¹ VAR is estimated by OLS.

¹² Based on KPSS (Kwiatkowski-Phillips-Schmidt-Shin, 1992) test considering constant.

¹³ I have chosen pc GDP because it is a better measure of economic growth since it takes into account the population.

¹⁴ I use GDP deflator following Serrano et al. (2017).

respective countries is obtained from Prados de la Escosura (1982, p. 42), using fixed weightings updated every five years.¹⁵ The weightings account for more than 60% of total foreign trade over the entire period¹⁶.

The frequency of the data is annual. The sample runs from 1870 to 1913¹⁷. All the variables have been converted into logarithms with the exception of the fiscal balance.¹⁸ Fiscal balance is taken in % of GDP. The available criteria for selecting the number of VAR lags (Akaike criteria, Schwarz Criteria or Hannan-Quinn Criteria) point to one lag as the optimal number to carry out the SVAR estimation. Bordo, Landon and Redish (2004) have a comparable sample size and they run a SVAR and historical decomposition and counterfactuals.

IV. Empirical results

Counterfactual analysis

In this section, I study what would have happened to output (economic growth) in the absence of a flexible exchange rate (i.e., absence of exchange rate shocks) by using simulations in my VAR model. The VAR is always estimated in first differences.¹⁹ Spain is the only country that allows us to make this counterfactual analysis because it was not committed to the gold standard and had no obligation to maintain its exchange rate fixed during the period of the classic gold standard.

SVAR allows us to carry out the counterfactual analysis that is inherent in our questions: how would Spain's output have evolved if had been on the gold standard? To do this, I estimate a counterfactual analysis following Bordo et al. (2004) and Shibamoto and Shizume (2014). The SVAR is estimated with the variables pc GDP, budget balance, money supply and effective nominal exchange rate.²⁰ Nominal effective exchange rate is used in the counterfactual analysis. The nominal exchange rate is the one that shows the fluctuations as a consequence of having a flexible exchange rate. The real exchange rate always fluctuates, since it depends on the relationship between national and international prices. The results obtained using the real effective exchange rate instead of the nominal can be found in the Annex.

When we estimate in first differences, we differentiate the logarithm of pc GDP obtaining pc GDP growth; the difference between two values shows the increase or decrease from one year to the

¹⁵ Same data on foreign trade is used to calculate the nominal effective exchange rate.

¹⁶ See Aixala (1999) to know more about how real effective exchange rate can be constructed in the Spanish case.

¹⁷ It is not possible to start the analysis earlier because of the lack of historical series of monetary circulation prior to 1874.

¹⁸ Because the fiscal balance has negative values, it cannot be converted into logarithms. We will use the budget balance over GDP. Money supply is M1. One can find it in Martín Aceña (2018) as "money supply" in both estimations before and after 1874.

¹⁹ In Annex it can be found the results in levels as a robustness check.

²⁰ See data section for more information.

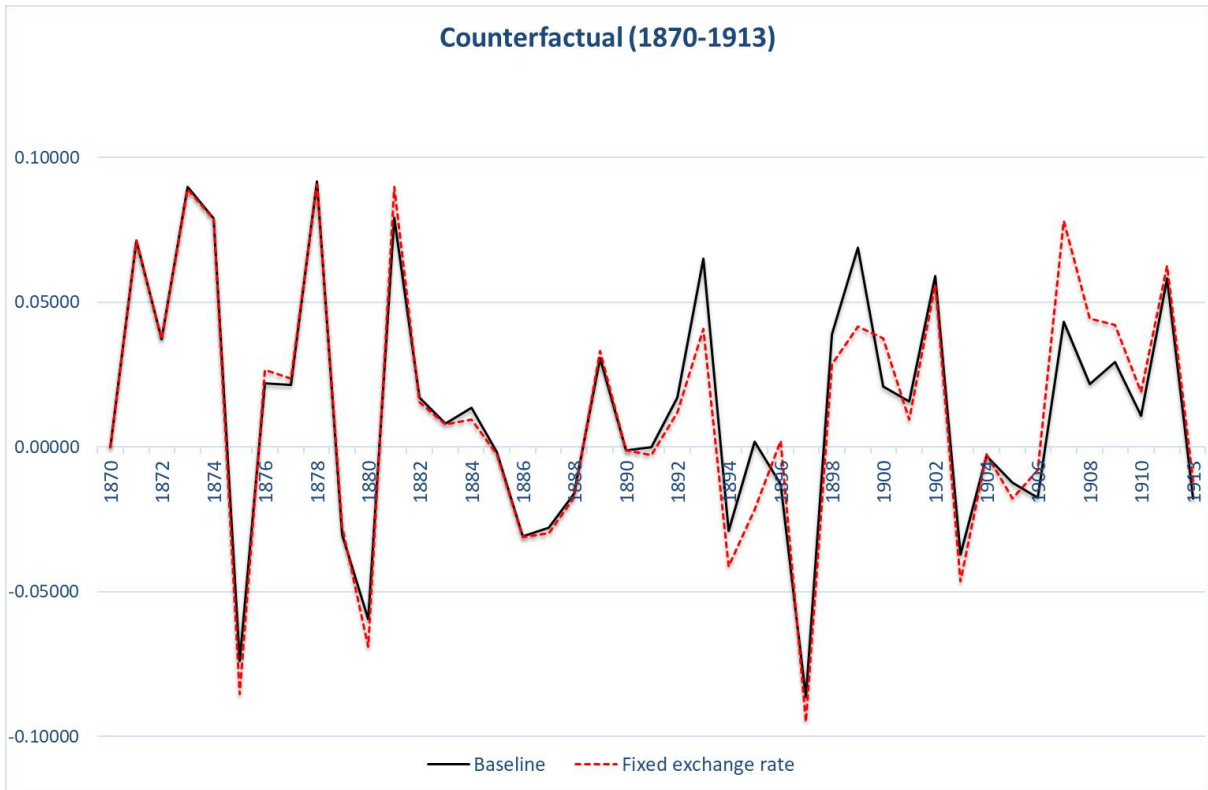
next. In the same way, I consider the growth of the money supply and not stock of money or the growth or decrease of the budget balance. As for the exchange rate, it reflects how much the currency has appreciated or depreciated with respect to the previous year.

Figure 3 shows the results based on counterfactual simulations that switch off the shock response of nominal effective exchange rate. The historical path of economic growth is shown by the solid line, while the dotted line with dots shows the fictitious path of economic growth assuming that the nominal exchange rate had been fixed at the initial value throughout the period. This means there were no exogenous exchange rate shocks and no endogenous exchange rate responses to fluctuations of other variables. We see the deepest falls in 1874, 1878, 1893 and 1896.

First of all, it can be seen that the falls in pc GDP were less marked with a flexible exchange rate. In spite of this, the point that GDP growth finally reaches in 1913 does not seem to have depended on the presence of a fixed or a flexible exchange rate.²¹ This result can reinforce the idea that the exchange rate could have had a positive impact on economic growth in the short run but not in the long run. Then, at the beginning of the 20th century, joining the gold standard would have been a good decision because economic growth would have been higher. Thus, from 1903/1904 onwards, the greater stability in Europe at the turn of the century, together with the good economic evolution of neighbouring countries such as Italy or France, meant that having a flexible exchange rate would be negative and growth would have been greater with a fixed exchange rate at the beginning of the 20th century. The following interpretation could also be given. The shock of the exchange rate, which was appreciating sharply as a result of the enormous depreciation of previous years, could have slowed down the economy. If the exchange rate had been kept fixed throughout the period, the economic impacts until 1903 would have been more profound (see figure 2 and table 2). However, Spain would not have suffered a sudden appreciation of the currency and the consequent negative impact on economic growth during the first years of the 20th century.

²¹ The annex presents the counterfactual analysis in levels (figure 5). Figures for GDP in 1913 do not differ much from those that would have been obtained under a fixed exchange rate regime.

Figure 2. Counterfactual analysis considering that Spain had a fixed exchange rate during the whole period.



Source: Our own elaboration

Table 2. Difference between having a flexible or a fixed exchange rate.

Economic growth with flexible exchange rate minus
economic growth with fixed exchange rate

1870	0.000%	1892	2.425%
1871	0.000%	1893	1.222%
1872	0.075%	1894	2.352%
1873	0.039%	1895	-1.477%
1874	1.145%	1896	0.840%
1875	-0.442%	1897	1.037%
1876	-0.229%	1898	2.725%
1877	0.094%	1899	-1.652%
1878	-0.266%	1900	0.614%
1879	0.972%	1901	0.302%
1880	-1.067%	1902	0.906%
1881	0.178%	1903	-0.043%
1882	0.008%	1904	0.532%
1883	0.418%	1905	-0.935%
1884	0.084%	1906	-3.493%
1885	0.018%	1907	-2.243%
1886	0.189%	1908	-1.290%
1887	0.135%	1909	-0.815%
1888	-0.254%	1910	-0.822%
1889	-0.011%	1911	-0.442%
1890	0.279%	1912	-0.610%
1891	0.502%	1913	0.013%

In green the economic growth gain due to having a flexible exchange rate. In red the loss of growth due to having a flexible exchange rate. (Always compared with having a fixed exchange rate)

Source: Our own elaboration

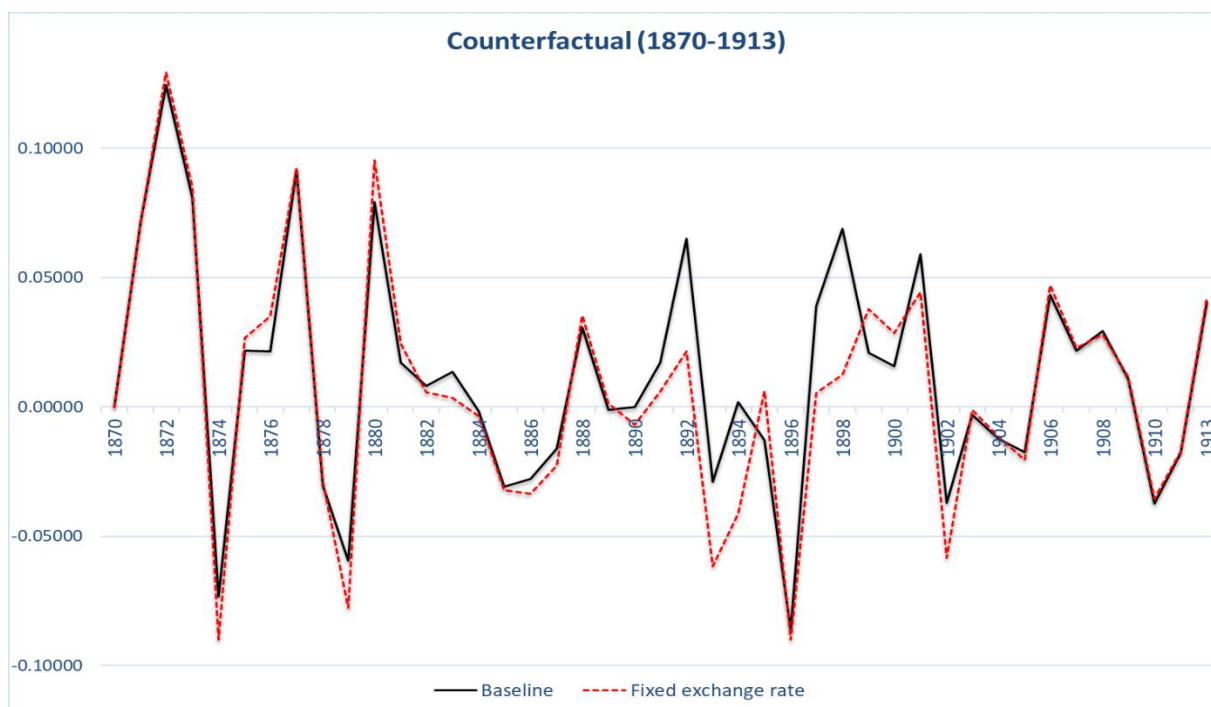
Table 2 shows the differences in growth between the baseline and the counterfactual. When GDP decreased in 1874, it seems that having a fixed exchange rate would have made the recovery harder. In the upward trend in 1892, growth was 2.4% higher than it would have been under a fixed exchange rate regime. We can see how having a flexible exchange rate helped the economy during the fall in 1896, since the decrease would have been higher in a fixed exchange rate system. Until 1903, there are more years in green than in red. Thus, Spain's economic growth was higher due to its being outside the gold standard. After 1903, on the other hand, there are more years in red than in green.

To have a better understanding of the counterfactual results I fix nominal exchange rate at 1903 parity from 1903 to 1913. It means that exchange rate was flexible until 1902 and from 1903 was fixed at a devalued parity. Therefore, same counterfactual is estimated considering that the

exchange rate would have been fixed at 1903 level (devaluated parity). As can be seen in figure 3, the negative effect of having a flexible exchange (thus, the negative effect of appreciating the currency after 1903 in figure 2) disappears. From these results it can be understood that Spain could have adopted the gold standard after Fernández Villaverde policies and the best effects of adopting this system would have achieved by keeping the exchange rate fixed at a devaluated parity. However, authorities only wanted to adopt the gold standard at the historical parity (Serrano, 2004).

Villaverde ruled out the convertibility of the peseta to devaluated parity because in order to obtain the positive effects of the gold standard, such as the attraction of capital, the payment of lower interest rates and the maintenance of confidence to maintain a certain autonomy of monetary policy, required adopting the commitment of historical parity. That is, a long-term commitment was required. When adopting a devaluated fixed exchange rate, it was assumed as a short-term commitment. In this way, the countries had higher interest rates and were even required to issue the debt in gold as a sign of distrust. It is for these reasons that Villaverde defended the entry of Spain to the gold standard at historical parity (Serrano, 2004, p. 104).²²

Figure 3. Counterfactual analysis comparing output having exchange rate fixed from 1903 to 1913 (dotted line) and having exchange rate fixed at initial level for throughout period (continuous line).

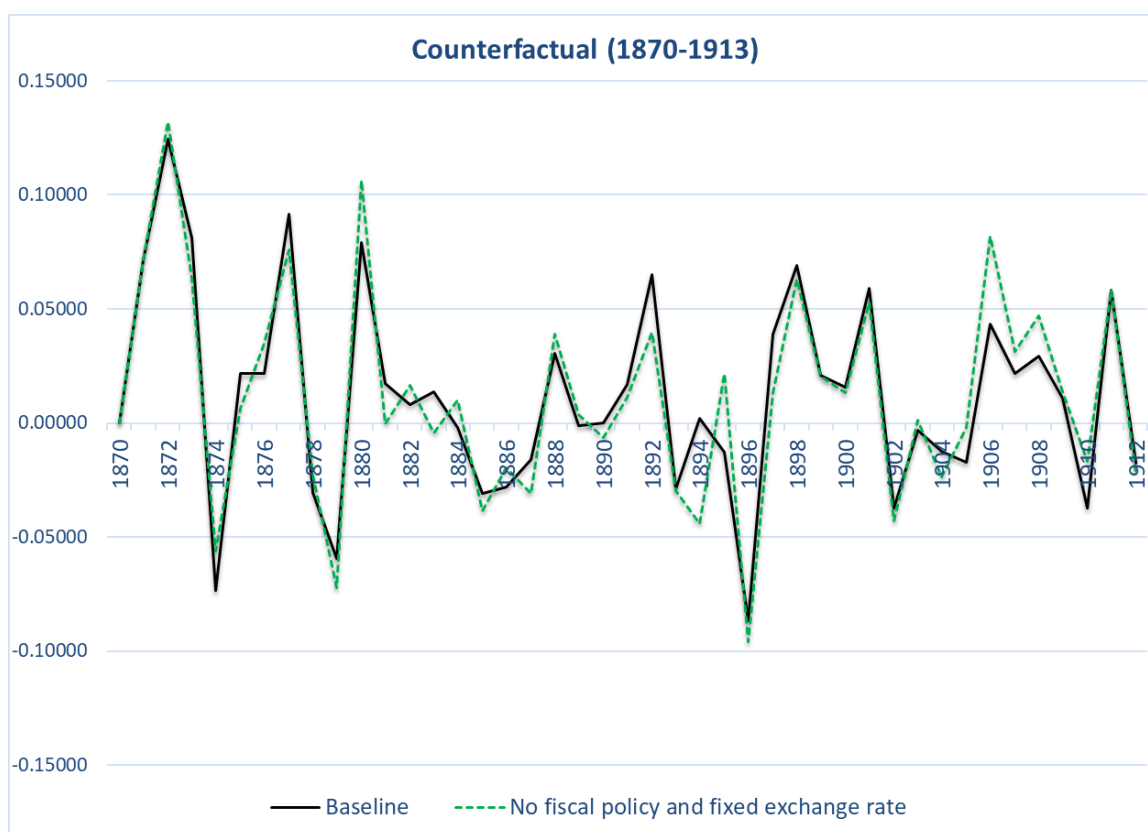


Source: Our own elaboration

²² More on Villaverde and his decision not to adopt a devaluated parity in Serrano (2004, pp. 102-105).

A counterfactual analysis is also ran positing that the fiscal balance remained stable during the whole period and the exchange rate was fixed at its initial value. This means that there were no fiscal or exchange rate shocks affecting economic growth. Figure 4 presents the counterfactual, switching off the shock responses of the nominal effective exchange rate and fiscal balance. Thus, the dotted line shows the fictitious path of economic growth with a stable fiscal balance and a fixed exchange rate. The main difference is due to the Moroccan war: economic growth would have been lower without fiscal policy instruments.

Figure 4. Counterfactual analysis considering a fixed exchange rate and fiscal balance stability.

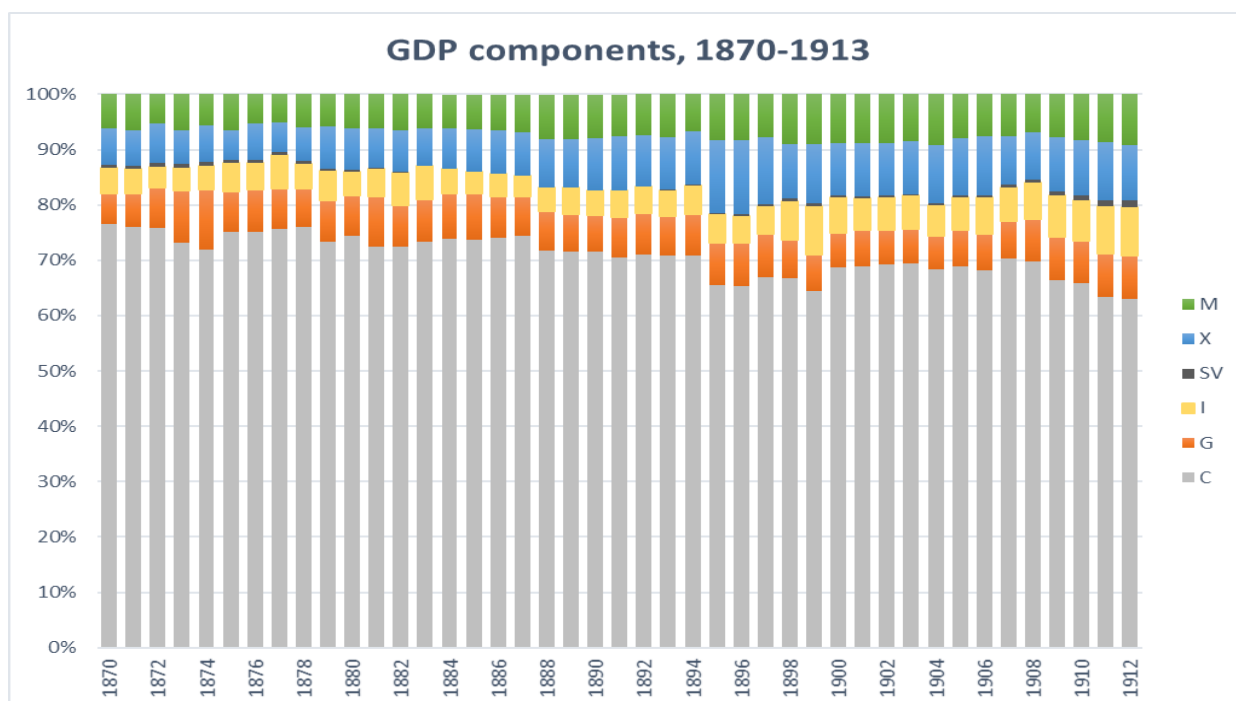


Source: Our own elaboration.

As explain in the robustness check section, the counterfactual does not change if we use the total GDP instead of pc GDP, or public expenditure instead of the budget balance. If we add to the SVAR (*lypcr, f, lm, lneer*) the variable prices, the results remain the same (figure 2 in the Annex). When we add capital flows to the model the results are also maintained (figure 3 in the Annex). The results obtained may make us wonder about the importance of macroeconomic policies in explaining economic growth during the 1870-1913 period. The counterfactual performed considering the real effective exchange rate can be found in figure 1 in the Annex. As

can be seen, real effective exchange rate shocks were more important than nominal effective exchange rate shocks.

Figure 5. Contribution of the components of GDP, 1870-1913



Source: Own elaboration based on Prados de la Escosura (2003).

Furthermore, focusing on the economic crisis of the late 1890s, the statistics on GDP point to the importance of exports in the economic recovery (Figure 5). Figure 5 shows the GDP components: consumption (C), government expenditure (G), investment (I), stock variation (SV), exports (X), and imports (I), and indicates the proportion of GDP explained by the increase in exports. It also helps to understand the potential importance of the exchange rate. As a proportion of GDP exports increased by 44.5% between 1893 and 1898, second only to consumer spending. The proportion of exports in GDP increased in the late 1880s and early 1890s. In the short run, thanks to its flexible exchange rate, Spain barely noticed the cyclical downturn that affected the international economy between 1890 and 1896 (Sardà, 1987, p. 197). Herranz and Tirado (1996) also highlight how the different income elasticity of exports and imports hampered foreign payments, and discouraged Spain from joining the gold standard, due to the effect on the price of the peseta.

Historical decomposition of the variables

Once we know what would have happened if we had had a fixed exchange rate, it would be relevant to study the importance of macroeconomic policies to explain pc GDP growth during the period of the classical gold standard (considering Spain had a flexible exchange rate). In order to

measure the importance of macroeconomic policies throughout the period, we will use the real effective exchange rate and not nominal exchange rate. This will allow us to see the importance that monetary policy and fiscal policy and exchange rate adjustments had on economic growth (in the real economy). Thus, pc GDP, budget balance, money supply and the real effective exchange rate are used.

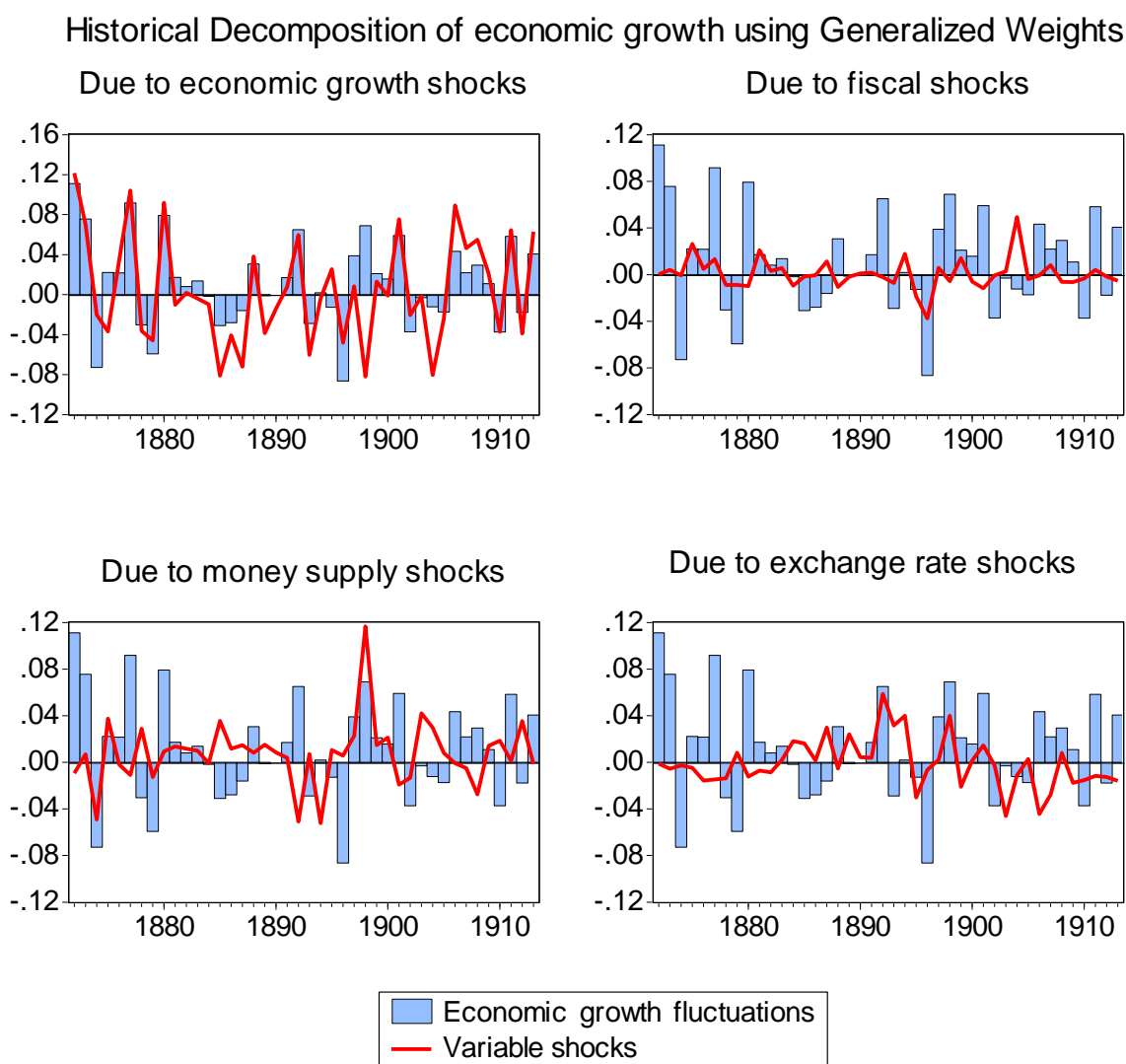
First, I estimate a SVAR. In order to assess the driving forces of the dynamic evolution of the economic growth, I run historical decomposition. For Burbidge and Harrison (1985), technique of historical decomposition seems ideally suited as a vehicle for re-examination of money's role and other policies during the depression. It allows to assess the contribution of exchange rate shocks and monetary and fiscal policy shocks to the observed output changes in busts and booms over the period under study. Historical decomposition of each variable allows us to study how the model interprets and describes the history. Thus, this analysis indicates the contribution of each structural shock on the evolution of economic growth over time. Running this analysis is useful to investigate the variables responsible of the falls and rises of one variable (output in our case).

The series of real pc GDP (or better said, economic growth) is decomposed into four components that are explained by the four types of structural shocks, respectively: GDP, fiscal balance, money supply and, exchange rate. In the figure 6 economic growth fluctuations is explained by four different structural shock. The figures show the contributions of the individual shocks to fluctuations of one variable (in our case, economic growth). Each panel contain the actual path (the fluctuations of the variable) and the contribution of each structural shock to the fluctuations of that variable. If the shock line follows the behaviour of the actual line, it shows that the isolated shock accounts for the behaviour of the variable. If the shock line does not follow the pattern of the first line, then the isolated shock had no effect on the variable. The bar chart shows the fluctuations in GDP, and the continuous line shows the decomposition into the different structural shocks.

The shocks in pc GDP account for the largest part of the fluctuations in economic growth during the whole period. After shocks in GDP, the variable that follows the behaviour of the economic growth fluctuations most closely is the real effective exchange rate. Real effective exchange rate shocks are important in explaining economic growth fluctuations, especially between 1885 and 1905. The real exchange rate helps to improve economic growth after the pc GDP fall of the mid-1880a (figure 1) and after the decrease in 1896. Thus, it explains the rise in economic growth during the first two years after suffering a large fall. Indeed, the peseta's greatest loss of value occurred in 1898. Money supply also helps to explain the fluctuations of economic growth. It follows the behaviour of economic growth before the 1880s and from 1891 to 1903. Changes in the amount of money also explain the recovery of economic growth after 1896 (when Spain

suffered a large fall in GDP). Fiscal shocks have practically no effect on fluctuations in real GDP. Fiscal policy shocks do not follow the movements of economic growth even when the model is estimated considering total fiscal balance (rather than over GDP). They may have been important in the decrease of 1896 and they seem to have had a countercyclical effect during the first years of the twentieth century.

Figure 6. Historical decomposition of pc GDP



Source: own elaboration

Robustness check

In order to explore the robustness of our results we consider various alternative variable definitions and add additional endogenous and exogenous variables to SVAR model. All of these changes have only minor effects on the results obtained in the counterfactual and historical decomposition analysis.

When I deflate the exchange rate by CPI from Maluquer (2013) and Mitchell (2007), results are maintained. I also run the VAR considering the total GDP from Prados de la Escosura (2003) instead of pc GDP, government expenditure from Comín and Diaz (2005) instead of budget balance over GDP, budget balance deflated by GDP deflator (Prados de la Escosura, 2003) instead of budget balance over GDP or banknotes in circulation from Martín Aceña (2017) instead of money supply. In all cases results obtained are very similar. Moreover, I repeat the analysis considering the variable prices (in order to take into account inflation) without important changes in my results (see Figure 2 in the annex).²³ Finally, I add capital inflows from Prados de la Escosura (2010) that can be considered important during that period and counterfactual and historical decomposition analysis remain the same (see Figure 3 in the annex).²⁴ New data on fiscal balance have been estimated by Comin, though they have not yet been published. Reestimating my results with these new data (Figure 4 in the annex), the results are maintained and the main conclusions remain the same.

As Spain was affected by recurring armed conflicts in the period, the same model has also been estimated with the addition of an exogenous dummy variable that takes a value of 1 for years in which Spain was engaged in armed conflict and 0 for years in which it was not (Figure 6 in Annex)²⁵. The results do not change significantly. The counterfactual analysis is the same as when we estimate the model without considering wars.²⁶ The historical decomposition of output, when taking wars into account, does not show changes compared to the main findings.²⁷ There is no heteroskedasticity or autocorrelation and the system is stable as can be shown in the Annex (Figure 7 and Table 1).

V. Benefits and costs of being outside the gold standard

In the period under study, the maintenance of the gold standard was an important requirement for prosperity. It was a system, however, that was hard to apply in countries on the southern periphery of Europe like Spain. Floating exchange rates were and are a fast way to correct for shocks that affect the equilibrium between domestic price levels and price levels abroad.²⁸ The classical gold

²³ Following Shibamoto and Shizume (2014), I add prices variable to check my results.

²⁴ See more on this in Clemens and Williamson (2000).

²⁵ Spain was engaged in the following armed conflicts: Third Carlist War (1872-1876), Ten Years' War (1868-1878), Little War (Cuba) (1879-1880), Cuban War of Independence (1895-1898), Spanish-American War (1898), Philippine Revolution (1896-1898), Margallo War (1893-1894), Melilla War (1909-1913), and Rif War, or Second Moroccan War (1911-1927).

²⁶ The counterfactual analysis is always done with the nominal effective exchange rate, except when stated otherwise (figure 1 in Annex). As has been stressed, being on the gold standard meant keeping the nominal exchange rate stable. The real exchange rate cannot be fixed because it depends on prices.

²⁷ The historical decomposition is always done with the real effective exchange rate because the aim is to capture the real impacts of exchange rate behaviour on Spanish economic growth.

²⁸ "The classical gold standard is not appropriate in practice to overcome [such difficulties], simply because it cannot produce a readjustment of domestic prices quickly enough" (Keynes, 1931/1988, p. 180).

standard did not permit this type of response and it undercut a country's options to control its own economy through the setting of exchange rates (Keynes, 1931/1988, pp. 173 and 180).²⁹ Policies in the late nineteenth century and early twentieth century run in accordance with circumstances.³⁰ Some of these policy options could not have been pursued under the gold standard, which required restrictive policies to be maintained over time.

Sardà (1987) states that although it was not the intention of the monetary authorities, the non-adoption of the gold standard favoured Spain. It isolated the Spanish economy from the fluctuations in income and prices that affected other countries and protected it from the international depression of the last quarter-century. This is what we find in figure 2, table 2 and figure 4, which show the benefits of being outside the gold standard during the final decades of nineteenth century. These results also support Fernández Villaverde (1900)'s observation that the end of the nineteenth century was not a good moment to adopt the gold standard.

As we see in figure 1, from 1903, GDP and exchange rate followed a different pattern. While the exchange rate appreciated, GDP rose. This is consistent with the findings of the counterfactual analysis, and also with Serrano (2004)'s view that the crucial moment to adopt the system was 1903. In figure 6, it can be found that exchange rate shocks were important for understanding the behaviour of economic growth. The depreciation of the peseta may have helped to improve exports and raise GDP, as we find in Table 2. The results suggest that the depreciation of the peseta was relevant to increasing output, especially during the falls in 1886 and 1896 when Spanish economy was badly hit. Without a flexible exchange rate, the impact of fluctuations on the economic cycle would have been greater at the end of the nineteenth century. It is not surprising that fiscal policy did not account for much of the economic growth; Spain was a liberal state that devoted a low percentage of its GDP to public expenditure. The result is consistent with the historiography.

Therefore, Spain, despite not joining the gold standard, did not lose output. If the peseta exchange rate had not been permitted to separate from its historical parity, the Spanish growth would have outpaced the actual growth at the beginning of the 20th century. On the other hand, had it entered in 1876, the economic shocks would have been greater and the economy would have been negatively affected in the short term. We all know that the cost of a crisis is not just felt in the loss in terms of GDP, but only in its effects on the level of employment and on people's standard of living. Therefore, future research should analyse the loss in the living standards that would

²⁹ Keynes (1931) reproduced in Keynes (1988).

³⁰ Olariaga (1977, p. 137) considers Spain's policy was ad hoc. They did not regulate the economic cycle.

have have been caused by deeper crises (i.e, if a fixed exchange rate had been maintained until 1903).

VI. Conclusion

This paper presents a counterfactual analysis between 1870 and 1913 for Spain, in order to consider whether having a fixed exchange rate would have improved the country's economic growth. This study is the first of its kind on this topic. The Spanish case is significant, because the country did not adopt the classical gold standard. The main finding is that the depreciation of the exchange rate had positive effects on the Spanish economy outside the gold standard, alleviating the crises during the 1870-1903 period. As Villaverde wrote, it was not the moment to adopt the gold standard. The historical decomposition analysis reveals that adjustments in exchange rates and monetary policy were important to sustaining growth, and played an important role in explaining the behaviour of economic growth before 1903. The exchange rate level helped to improve the terms of trade, and promoted exports until the beginning of the twentieth century. The effects of fiscal policy were less significant. After 1903, the adoption of the gold standard would have been possible and it would not have damaged the economy; indeed, being on the gold standard (keeping the exchange rate fixed) seems to have been the optimal option for increasing the economic growth from around 1903. If the peseta exchange rate had not been permitted to separate from its historical parity, the Spanish economic growth would have outpaced the actual growth at the beginning of the 20th century. However, the economic shocks would have been greater and the economy would have been negatively affected during the late 19th century. Finally, the paper provides new empirical evidence for the core-periphery debate during the period of the classical gold standard.

Concluding remarks

This study focuses on the rather unusual case of Spain and the classical gold standard. Spain never adopted this monetary system and did not keep its exchange rate stable. For most of the period under study, Spain experienced budget deficits and accumulation of public debt. Like other countries on the Mediterranean periphery, it suffered the effects of the gold standard monetary system and, in recent times, the effects of the euro crisis, also in a context of fixed exchange rates among the eurozone countries. For this reason, it is important to analyse the potential costs and benefits for Spain if the country had adopted the gold standard and the reasons why it was difficult to do so (chapter 1); the causes of Spain's decision to remain outside the gold standard and whether this was a real problem (chapter 2); the consequences of not being on the gold standard (chapter 3) and whether it was positive or negative for the Spanish economy to be outside the fixed exchange rate system (by creating and studying a counterfactual scenario, chapter 4). To do so, I aimed to determine whether the lack of fiscal discipline and the accumulation of debt prevented the adoption of the gold standard, and to understand the role played by the different macroeconomic policies in Spanish economic growth. My thesis sheds new light on the discussion about the Spain's non-adoption of the classical gold standard. It also shows new empirical evidence for the core-periphery (north-south) debate during the late nineteenth and the early twentieth centuries. Finally, the results obtained stress that the monetary system was not a cause of the divergence experienced in Spain before the Great War.

Chapter 1 discusses the literature on the positive or negative effects that being outside the gold standard could have had for Spanish economy. Spain wanted to join the gold standard, as demonstrated by its attempt to become a member in 1876. This article shows the main problems that could explain the Spain's non-adoption of the gold standard: fiscal balance and balance of payments deficits. Moreover, it can be found an explanation for gold reserves. The first part of the article poses two questions presented in the introduction: Was there a desire to join the gold standard? Was it even possible to do so? The paper underlines that an evaluation of the benefits or costs of Spain's non-adoption of the gold standard depends basically on the theoretical and temporal perspective used. If the priority was the short term, having a flexible exchange rate could be seen as being positive for the economy. On the other hand, if the most important aim is long term stability (price stability), then having a fixed exchange rate would have been the best option. The chapter also questions whether the long term perspective could be considered as a luxury good for a backward country, such as Spain since the economy needed wealth for purposes other than its circulation as a currency. Moreover, I argue that having a flexible exchange could have protected the economy from economic cycle fluctuations. The chapter opens the door for the

analyses carried out in the other three chapters. So this article proposes the following introductory questions: Why didn't Spain adopt the gold standard? What were the costs and benefits of maintaining flexible exchange rates (not adopting the gold standard) for a backward country like Spain?

The second chapter focuses on the reasons that made the adoption of the gold standard difficult for Spain. It provides an answer to the first question posed in introduction (Why didn't Spain adopt the gold standard?) As far as I know, it is also the first study of debt sustainability for Spain at the end of the nineteenth century and the beginning of the twentieth. Previous studies have assessed fiscal dominance. The main findings are that the primary balance responded negatively to an increase in debt until the beginning of twentieth century, when the response started to be positive. Therefore, debt was unsustainable until 1903 even when seigniorage is considered. Thus, it was very difficult to be part of the gold standard due to this huge debt accumulation and the weak political position until 1903. Seigniorage was not significant for the sustainability of the debt, even though, as pointed by Joan Sardà, it was important to sustain economic growth. My results suggest that the sustainability or unsustainability of debt depended on economic policies such as the fiscal ones adopted by Raimundo Fernández Villaverde at the beginning of the twentieth century to keep the budget balance under control. I detect a structural change in 1903 which has not previously been found in studies related to debt or fiscal dominance. This structural change in 1903 is considered as a result of the policies carried out by Fernández Villaverde. It was also in 1903 when Fernández Villaverde presented a draft bill to oversee the entry of Spain into the gold standard; from 1903 membership would have been possible, since fiscal discipline was maintained and the public debt became sustainable.

The third chapter is based on the different temporal approaches that can be considered to understand what happened in Spain during the classical gold standard period and the beneficial or detrimental effects that macroeconomic policies had on the Spanish economy. I attempt to answer the following question: What was the effect on the Spanish economy of keeping the exchange rate flexible (i.e., not adopting the gold standard)? The article establishes a point of union between the two existing theses on Spain and the gold standard. As explained in chapter 1, the positive or negative consequences of having a flexible exchange depend on the temporal approach considered. ARDL analysis reveals that the expansionary monetary policies implemented had a positive impact on Spain's output in the long run. I find that monetary policy helped to sustain economic growth in the long run. The explanation may lie in the connection between fiscal policy and monetary policy throughout the period.

I also find that exchange rate had a positive impact on Spanish output in the short run but not in the long run. Therefore, exchange rate adjustments seem to play an important short-run role in

Spain's output. However, in the long run, the exchange rate had a non-significant impact on Spanish output (tested with new data on fiscal balance) and a negative and significant effect on Spanish GDP (tested with classical data on fiscal balance). This possible negative effect is consistent with the findings of various scholars such as Krugman for backward economies with trade balance deficits (see the discussion in chapter 3). Thus, both theories (Sardà and Martín-Aceña) are correct: the exchange rate was able to help to overcome business cycle fluctuations and to promote economic growth in the short run, but not in the long run. The Toda and Yamamoto causality analysis of the variables carried out in this chapter shows that monetary policy accommodates the state's fiscal needs. Therefore, the results corroborate that there was also fiscal dominance from 1870-1913, as other articles had underlined for a larger periods of time. This article not only focuses on the never-ending debate on Spain and the classical gold standard but is contributes to the broader discussion about the effects of exchange rate depreciation on output carried out by economists such as Krugman, Alexander, Cooper among others. As far as I know, no analysis of this kind has been carried out before for Spain for the period under study. Finally, considering fiscal policy is positive and significant in the long-run main results and annex results, my results supports the story that the size of the government debt is one of the two important reasons why Spain did not join the Gold Standard. The accumulation of deficits (long run) had a negative impact on Spanish economy while surpluses had the opposite effect.

Chapter 4 runs a counterfactual analysis to study the possible outcome for the Spanish economy under a fixed exchange rate system. It answers the question posed in the introduction: what would have happened if we had had a fixed exchange rate? This kind of analysis (never previously applied to the Spanish case) can help to resolve the never-ending debate on the country's non-adoption of the gold standard. According to the results in chapter 4, the depreciation of the currency helped the Spanish economy by cushioning the impact of business cycles at least until the beginning of the twentieth century. It can be seen that under a fixed exchange rate system, the falls would have been deeper. Before the early twentieth century, adopting the gold standard would have been negative for Spain in terms of economic growth. However, after the Villaverde reforms, Spain achieved budget surpluses and a certain level of fiscal discipline. This made the debt sustainable (chapter 2) and from that moment onwards it would have been better to have a fixed exchange rate than a flexible one. In fact, it is proven that, from 1903, if the exchange rate had been maintained at the devalued level of 1903, economic growth would have been exactly the same as the growth under exchange rate fixed at initial level (figure 3, chapter 4) and the Spanish economy would have not suffered the appreciation experienced in the first years of the twentieth century (figure 2, chapter 4). If the peseta exchange rate had remained around its historical parity, Spanish growth at the beginning of the twentieth century would have been higher. On the other hand, had it entered in 1876, the economic shocks would have been greater

and the economy would have been negatively affected in the short term. However, this study has limitations and can only assess the economic part of the issue. It cannot calculate how different countries and markets would have reacted to a commitment to devalued parity, or the consequences that social level (living standards or inequality) might have had when the crises were deeper. Also, based on a historical decomposition analysis I find that adjustments in exchange rates and monetary policy were important for sustaining growth. They played a key role in explaining the economic growth fluctuations especially before the beginning of twentieth century. These findings are consistent with those presented in chapter 3. Significantly, even when wars are considered, the results obtained remain similar.

This study offers the possibility of comparing the results obtained with the currently available data on budgetary balance with those of the new data recently estimated by Francisco Comín. Chapters 2 and 3 are mainly estimated with new data and the results for classic data can be found in the respective annexes. Chapter 4 was awarded the Carande prize; because one of the requirements was that the paper be published rapidly, the results with the new data were not included and are now presented in the respective annex. As can be seen, the results are maintained and in fact are even clearer, showing that the falls would have been much deeper in the last decades of the nineteenth century in the light of the new fiscal balance data. This thesis also provides an estimation of the real effective exchange rate constructed with the GDP deflator and the CPI (Annex 1 in chapter 2).

As Villaverde suggested, and as shown by the results obtained in chapters 2 and 4, before the beginning of the twentieth century the adoption of the gold standard would have been a mistake. The exchange rate level helped to improve the terms of trade, and promoted exports (basically in the short run) until the beginning of the twentieth century (chapters 3 and 4). The effects of fiscal policy were less significant, as one would expect in a liberal state (chapters 3 and 4). At the beginning of the twentieth century, the adoption of the gold standard would have been possible (chapters 2 and 4). Keeping the exchange rate fixed at historical parity would have aggravated the consequences of crises until the beginning of the twentieth century; however, after that time it would have generated higher economic growth. Spain's adoption of the gold standard would have been positive for the economy if it had entered with devaluated parity (chapter 4). In this way, the appreciation suffered by the exchange rate between 1902 and 1906 would not have negatively affected the economy. Having a fixed exchange rate would not have damaged the economy during the first years of the twentieth century, and in fact being on the gold standard would have been a good option for the Spanish economy from around 1903.

These results are reflected in another way in chapter 3, where it is found that in the short term the flexible exchange rate had a positive and significant impact on the economy. That is, in the short

term, the flexible exchange rate helps to cushion the economic cycle, while in the long term it is not clear that it does not eventually have a negative effect. Again, the results corroborate the findings of chapter 2. This shows how the public debt was sustainable between 1903 and 1913, making it possible for Spain to join the gold standard thanks to having overcome one of the main economic obstacles to entry. This is also consistent with the results of the counterfactuals studied in chapter 4.

We stress that while there are fiscal problems and the economy suffers from recurring deficits and the accumulation of public debt, it is better to have a flexible exchange rate. That is to say, with greater macroeconomic problems, greater flexibility is needed to cushion the economic impacts. This makes it possible to adapt quickly when there are falls, as can be seen in chapter 4. However, when some of the problems affecting the economy are resolved, a fixed exchange rate system does not have a negative impact on the economy, and it can allow a country to take advantage of the benefits of its healthy economy. An exchange rate fixed at parity in 1870 would have given good results from the beginning of the twentieth century, due to the stable economic situation of Spain and its neighbours. However, it would have had a high cost before that date due to the need for flexibility.

Finally, was the non-adoption of the gold standard one of the main causes of Spain's backwardness relative to the European average during that period?

The results show that the non-adoption of the gold standard cannot explain the divergence experienced by Spain before the Great War. The results in chapter 2 show how debt became sustainable ten years before this war. As can be seen in chapter 1, figure 1, between 1903 and 1913 Spain diverged continuously from the European countries. Therefore, achieving a sustainable level of debt did not help to overcome the divergence pattern. However, the periods with a slight convergence instead of the divergence pattern are similar to the years when the exchange rate helped to explain the movements of pc GDP (figure 6 in chapter 4). The results in chapter 3 are inconclusive. However, considering the new data on fiscal balance to be better than the classical data, it seems that the flexible exchange rate did not have a real impact on Spanish economy between 1870 and 1913. According to the results in chapter 3, the monetary policy does not seem to have been a cause of the divergence experienced by Spain during the period under study; it had a positive impact on GDP. The results in chapter 4 are clear: having an exchange rate fixed at the initial level throughout the period would have permitted a higher economic growth at the beginning of the twentieth century, but not during the last decades of the nineteenth when the falls in times of crises would have been deeper.

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Annexes

Annex chapter 1.

Tabla 1. Costes y beneficios de la no entrada de España en el patrón oro.

COSTES DE LA NO ADOPCIÓN DEL PATRÓN ORO EN ESPAÑA													
Autor	Año	Comercio exterior				Aislamiento internacional				Mayores niveles de riesgo			
		Comercio exterior	Estimación cuantitativa	Coste	Precios	Estimación cuantitativa	Coste	Tipos de interés	Estimación cuantitativa	Coste	Riesgo	Estimación cuantitativa	Coste
Catalan, J., C. Sudrià, Y D. Tirado	2001	x	No	No	x	No	No	x	No	No	x	No	No
Catalan, J., Y A. Sánchez	2012												
Carreras, A., Y X. Tafunell	2004					No		x		Sí			
Cubel, A., J. Palafox Y C. Sudrià	1998												
Cubel, A.	2001							x	Sí	Sí	x	Sí	Sí
Dictamen	1929							x	No	Sí			
Gallego Martínez, D.	2001	x	No	No									
García-Iglesias, M. C	1999							x	Sí	Sí	x	Sí	Sí
García-Iglesias, M. C	2002										x	Sí	Sí
García-Iglesias, M. C	2005												
García Ruiz, J. L.	1992												
Herranz, A. Y Tirado, D.	1996												
Llona, A.	2001					Sí		x	Sí	No			
Maliquer De Motes, J.	2013					No		x	No	No			
Martín Aceña, P.	1981	x	No	Sí	x	Sí					x	No	Sí
Martín Aceña, P.	1993	x	No	Sí	x	Sí					x	No	Sí
Martín Aceña, P.	1997	x	No	Sí	x	Sí					x	No	Sí
Martín Aceña, P.	2000												
Martín Aceña, P., J. Reis y A. Llona	2000							x	No	Sí			
Martínez Ruíz, E., y Nogueas, P.	2014												
Nadal, J. Y Sudrià, C	1993							x	No	No			
Prados De La Escosura, L.	1982	x	No	Sí									
Prados De La Escosura, L.	1988	x	No	Sí	x	Sí					x	No	Sí
Ródenas, C., S. Brú Y S. Almenar	2001	x	No	No	x	Sí					x	No	No
Sabaté, M.	1993												
Sabaté, M.	2000												
Sabaté, M., M. D. Gadea Y J. M. Serrano Sanz	2001	x	Sí	No									
Sabaté, M., Gadea, M. D. Y Escarfo, R.	2006												
Sabaté, M., C. Filat y A. B. Gracia	2011	x	Sí	No									
Sánchez Alonso, B.	1995	x	No	Sí									
Sardà, J.	1987												
Serrano Sanz, J. M.	2004												
Serrano Sanz, J. M., M. D. Gadea, Y M. Sabaté	1998	x	Sí	Sí									
Solí Villalonga, G.	1964												
Tortella, G.	1974												
Tortella, G.	1981							x	No	Sí			
Tortella, G.	1994	x	No	Sí	x	Sí							

Autor	Año	Menores niveles de inversión			Menor disciplina fiscal			Disfrutar de los beneficios de la integración			Mayor crecimiento económico		
		Inversión	Estimación cuantitativa	Coste	Disciplina fiscal	Estimación cuantitativa	Coste	Integración europea	Estimación cuantitativa	Coste	Crecimiento económico	Estimación cuantitativa	Coste
Catalan, J., C. Sudrià, Y D. Tirado	2001	x	No	No	x	No	No				x	No	No
Catalan, J., Y A. Sánchez	2012												
Carreras, A., Y X. Tafunell	2004	x	No	No							x	No	No
Cubel, A., J. Palafox Y C. Sudrià	1998												
Cubel, A.	2001												
Dictamen	1979												
Gallego Martínez, D.	2001				x	No	No				x	No	No
García-Iglesias, M. C.	1999												
García-Iglesias, M. C.	2002												
García-Iglesias, M. C.	2005	x	No	Sí	x	No	Sí				x	Sí	No
García Ruiz, J. L.	1992	x	No	No									
Herranz, A. Y Tirado, D.	1996												
Llona, A.	2001												
Maluquer De Motes, J.	2013												
Martin Aceña, P.	1981	x	No	Sí	x	No	Sí	x	No	Sí	x	No	Sí
Martin Aceña, P.	1993	x	No	Sí				x	No	Sí	x	No	Sí
Martin Aceña, P.	1997	x	No	Sí	x	No	Sí				x	No	Sí
Martin Aceña, P.	2000												
Martin Aceña, P., J. Reis y A. Llona	2000	x	No	No							x	No	No
Martinez Ruiz, E., y Nogue, P.	2014												
Nadal, J. Y Sudrià, C.	1993												
Prados De La Escosura, L.	1982												
Prados De La Escosura, L.	1988												
Ródenas, C., S. Brú Y S. Almenar	2001												
Sabaté, M.	1993										x	No	No
Sabaté, M.	2000	x	No	No									
Sabaté, M., M. D. Gadea Y J. M. Serrano Sanz	2001												
Sabaté, M., Gadea, M. D. Y Escarío, R.	2006										x	No	No
Sabaté, M., C. Fillat y A. B. Gracia	2011												
Sánchez Alonso, B.	1995												
Sardà, J.	1987				x	No	No				x	No	No
Serrano Sanz, J. M.	2004												
Serrano Sanz, J. M., M. D. Gadea, Y M. Sabaté	1998										x	No	No
Solé Villalonga, G.	1964												
Tortella, G.	1974												
Tortella, G.	1981										x	No	No
Tortella, G.	1994												

BENEFICIOS DE LA NO ADOPCIÓN DEL PATRÓN ORO EN ESPAÑA																	
Autor	Año	Autonomía de la política económica				Evitar la deflación internacional				Tipo de cambio como estabilizador automático				Evitar grandes contracciones			
		Política Monetaria y Fiscal	Estimación cuantitativa	Beneficio	Evitar deflación	Estimación Cuantitativa	Beneficio	Estabilizador automático	Estimación Cuantitativa	Beneficio	Mantener el bienestar general	Estimación cuantitativa	Beneficio	Mantener el bienestar general	Estimación cuantitativa	Beneficio	
Catalan, J., C. Sudrià, Y D. Tirado	2001	x	No	Sí	x	No	Sí	x	No	Sí	x	No	Sí	x	No	Sí	
Catalan, J., Y A. Sánchez	2012	x	No	Sí				x	No	Sí							
Carreiras, A., Y X. Tafunell	2004	x	No	Sí													
Cubel, A., J. Palafox Y C. Sudrià	1998																
Cubel, A.	2001	x	Sí	Sí				x	Sí	Sí				x	Sí	Sí	
Dictamen	1929																
Gallego Martínez, D.	2001																
García-Iglesias, M. C.	1999																
García-Iglesias, M. C.	2002																
García-Iglesias, M. C.	2005	x	No	Sí				x	No	Sí							
García Ruiz, J. L.	1992																
Herranz, A. Y Tirado, D.	1996	x	Sí	Sí													
Llona, A.	2001	x	Sí	Sí										x	Sí	Sí	
Maluquer De Motes, J.	2013																
Martín Aceña, P.	1981							x	No	Sí				x	No	Sí	
Martín Aceña, P.	1993							x	No	Sí							
Martín Aceña, P.	1997																
Martín Aceña, P.	2000																
Martín Aceña, P., J. Reis Y A. Llona	2000																
Martínez Ruiz, E., y Nogues, P.	2014	x	No	Sí										x	No	Sí	
Nadal, J. Y Sudria, C.	1993																
Prados De La Escosura, L.	1982																
Prados De La Escosura, L.	1988																
Ródenas, C., S. Brú Y S. Almenar	2001	x	No	Sí				x	No	Sí				x	No	Sí	
Sabaté, M.	1993																
Sabaté, M.	2000	x	No	Sí				x	No	Sí							
Sabaté, M., M. D. Gadea Y J. M. Serrano Sanz	2001																
Sabaté, M., Gadea, M. D. Y Escario, R.	2006							x	No	Sí							
Sabaté, M., C. Fillat Y A. B. Gracia	2011	x	Sí	Sí													
Sánchez Alonso, B.	1995																
Sardà, J.	1987	x	No	Sí				x	No	Sí				x	No	Sí	
Serrano Sanz, J. M.	2004							x	No	Sí				x	No	Sí	
Serrano Sanz, J. M., M. D. Gadea, Y M. Sabaté	1998																
Solé Villalonga, G.	1964							x	No	Sí				x	No	Sí	
Tortella, G.	1974	x	No	Sí				x	No	Sí				x	No	Sí	
Tortella, G.	1994	x	No	Sí										x	No	Sí	

Annex chapter 2

If we look at the number of times that the constitution was changed in the nineteenth century, we will see that political stability was very weak until the 1970s.

Table 1. Constitutions and years of duration

Constitution	Years of duration
1808	6
1812 ¹	6
1834	2
1837	8
1845	24
1852	<i>Non nata</i>
1856	<i>Non nata</i>
1869	5
1873	<i>Non nata</i>
1876 ²	48

Source: Paredes (2010)

On the other hand, the liberal reforms that were developed in the years before 1874 made possible the stability experienced at the end of the nineteenth century, being the basis of the subsequent economy (see *Apogeo del liberalismo en "La Gloriosa": la reforma económica en el sexenio liberal (1868-1874)* by Antón Costas)

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¹ 1812-1814 and 1820-1823

² 1876-1923 and 1930-1931

Annex chapter 3

Annex 1

The estimation of real effective exchange rate used is the following.

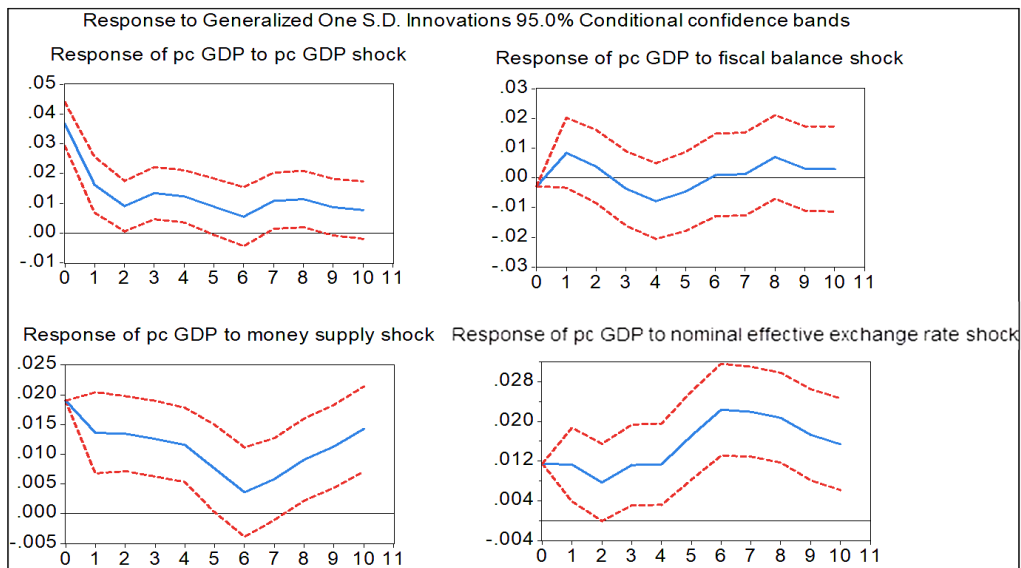
	Real effective exchange rate constructed with GDP deflator	Real effective exchange rate constructed with CPI	Nominal effective exchange rate
1870	100.26	109.78	89.28
1871	99.69	110.82	87.89
1872	105.88	109.43	89.77
1873	106.19	102.74	90.07
1874	99.26	101.31	90.79
1875	103.3	102.10	92.14
1876	101.38	104.49	92.28
1877	100.49	104.64	93.3
1878	94.78	100.39	92.99
1879	93.92	98.50	93.41
1880	98.38	93.37	92.24
1881	95.07	97.34	92.75
1882	93.24	96.27	94.81
1883	94.17	98.40	94.63
1884	99.44	94.34	94.17
1885	101.16	92.28	95.09
1886	98.86	91.62	95.66
1887	105.66	87.93	94.69
1888	104.44	89.05	94.5
1889	112.68	96.15	95.86
1890	110.18	98.26	96.85
1891	112.27	96.94	98.42
1892	138.15	99.78	106.85
1893	144.53	106.34	110.23
1894	156.12	106.06	112.02
1895	135.84	97.00	106.58
1896	134.84	108.46	112.19
1897	138.35	111.40	120.39
1898	168.31	132.42	143.75
1899	138.83	106.87	115.96
1900	141.45	113.65	120.35
1901	155.14	118.07	128.65
1902	145.83	114.13	125.84
1903	134.7	112.68	125.56
1904	128.53	115.12	128.14
1905	129.49	109.15	121.87
1906	117.1	97.02	106.08
1907	111.99	97.43	103.6
1908	119.05	98.52	104.95
1909	112.78	98.39	102.53
1910	106.8	99.20	99.75
1911	107.45	99.54	100.97
1912	101.75	100.88	99.29
1913	100	100.00	100

Sources: Nominal bilateral exchange rate against pound, dollar and franc from Martín Aceña and Pons (2005) and Martínez-Ruiz and Nogués-Marco (2014); GDP deflator from Prados de la Escosura (2003) for Spain, Thomas and Dimsdale (2017) for the UK, Balke and Gordon (1989) for the US and Toutain (1987) for France; CPI from Maluquer (2012) for Spain and from Mitchell (2007) for the other countries; commercial trade from Prados de la Escosura (1987), also in Carreras and Tafunell (2005).

Annex 2

Figure 1. Results considering nominal effective exchange rate instead of real effective exchange rate.

Levels Equation		ECM Regression		
F	0.000219 **	C	1.015	***
	0.000108		[0.152]	
LMSN	0.582128 **	@TREND	-0.002	***
	0.227925		[0.0005]	
LNEER	-0.075131	D(F)	-0.00003	
	0.145443		[0.00004]	
EC = LYPCR - (0.0002*F+ +0.5821*LMSN - 0.0751*LNEER)		CointEq(-1)*	-0.446	***
			[0.0682]	
		Adjusted R-	0.50	
		Durbin-	2.00	
		Watson stat		



Standard errors in [].

*, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

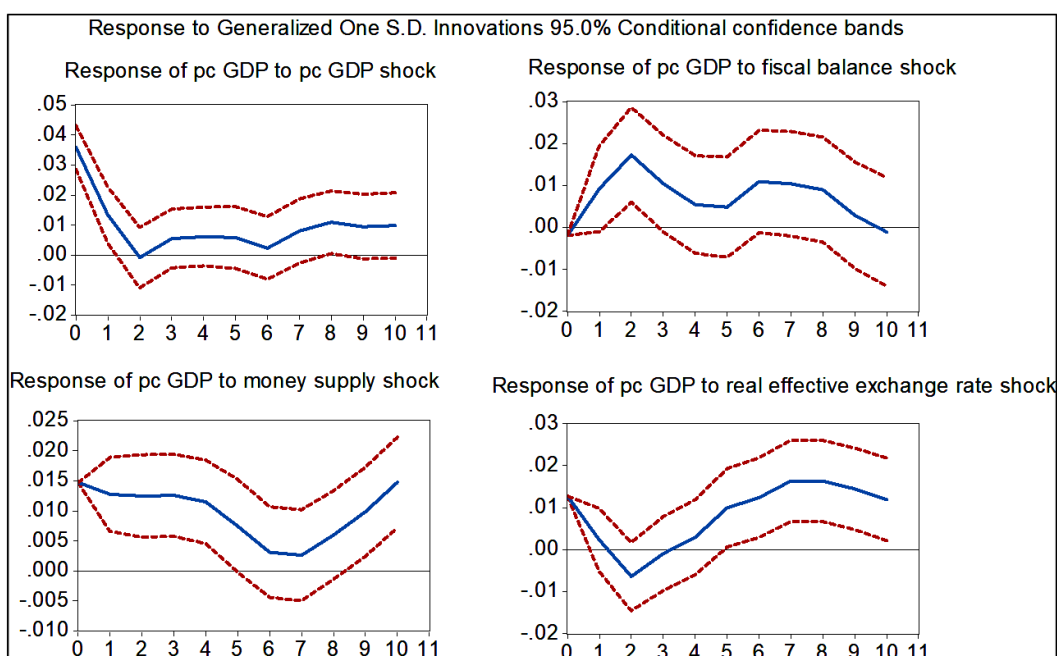
Table 1. Granger causality considering nominal effective exchange rate.

Dependent variable: LYPCR		Dependent variable: LMSN	
F	0.635	LYPCR	0.024
LMSN	0.021	F	0.088
LNEER	0.229	LNEER	0.451
All	0.107	All	0.045
Dependent variable: F		Dependent variable: LNEER	
LYPCR	0.300	LYPCR	0.507
LMSN	0.150	F	0.092
LNEER	0.317	LMSN	0.296
All	0.259	All	0.377

Source: Own calculation

Figure 2. Results considering old data on fiscal balance (Comín and Díaz, 2005) instead of the new one (Comín, unpublished).

Levels Equation			ECM Regression		
F_OLD	0.0003	**	C	3.186	***
	[0.0001]			[0.452]	
LMSN	0.3099	**	@TREND	0.0010	***
	[0.1142]			[0.0004]	
LREER	-0.2377	***	D(F_OLD)	-0.00002	
	[0.064]			[0.0001]	
EC = LYPCR - (0.0003*F_OLD + 0.3099*LMSN - 0.2377*LREER)			D(LREER)	0.0897	
				[0.0632]	
			D(LREER(-1))	0.2069	***
				[0.0647]	
			CointEq(-1)*	-0.6364	***
				[0.0906]	
			R-squared	0.65	
			Adjusted R-s	0.60	
			Durbin-Wats	1.74	



Standard errors in [].
 *, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

Table 2. Unit root test for fiscal data from Comín and Díaz (2005)

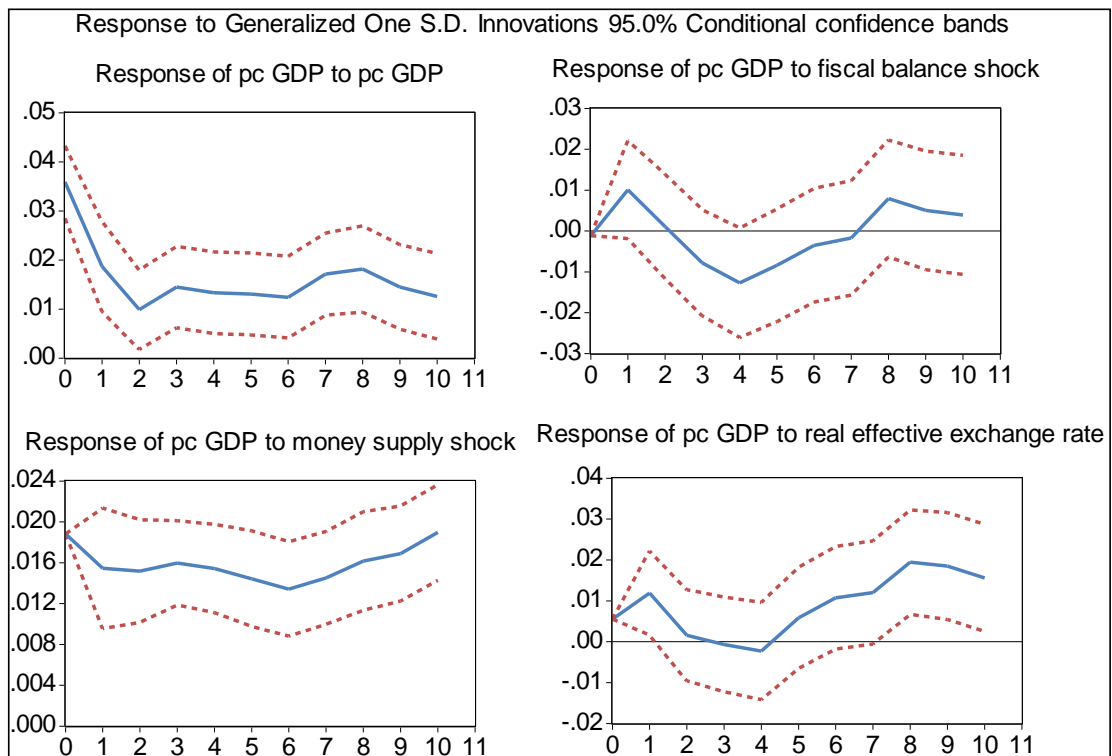
Null hypothesis:	F has a unit root		D(F) has a unit root	
	constant	trend	constant	trend
ADF statistic	-4.06845	-4.006867	-6.277	-6.833
Prob.	0.0027	0.0158	0.000	0.000
	F is stationary		D(F) is stationary	
KPSS statistic	0.540	0.124	0.335	0.081
Prob.	< 0.05	< 0.01	> 0.1	> 0.1

Source: own elaboration

Figure 3. Results considering real effective exchange rate calculated using CPI prices (Maluquer, 2013)

Levels Equation		ECM Regression	
F	0.000237 **	C	0.919633 ***
LMSN	0.578569 **	@TREND	0.137982
LREER_CPI	-0.018454	D(F)	-2.35E-05
	0.200083	CointEq(-1)*	-0.447696 ***
			0.068929
		R-squared	0.533874
		Adjusted R-squared	0.498018
		Durbin-Watson stat	1.95646

$$EC = LYPCR - (0.0002 * F + 0.5786 * LMSN - 0.0185 * LREER_CPI)$$



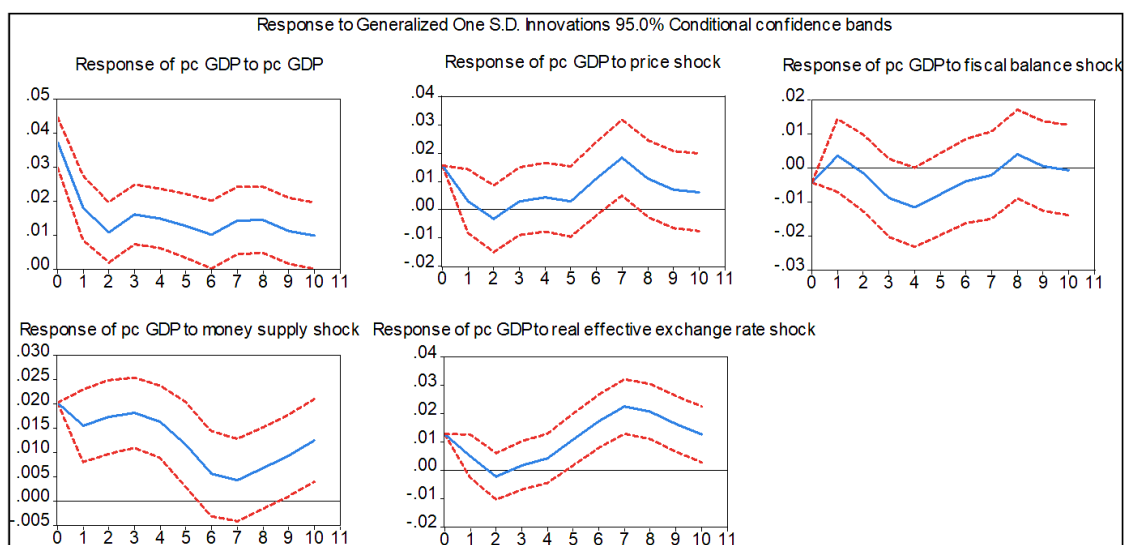
Standard errors in [].

*, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

Figure 4. Results adding prices.

Levels Equation		ECM Regression	
LP	-0.318 [0.757]	C	1.193 *** [0.189]
F	0.0004 * [0.0002]	@TREND	-0.0023 *** [0.0005]
LMSN	0.605 * [0.312]	D(LP)	0.531 *** [0.186]
LREER	0.039 [0.106]	D(F)	0.0001 [0.00004]
		CointEq(-1)*	-0.390 [0.063]
		R-squared	0.62
		Adjusted R-squared	0.58
		Durbin-Watson stat	1.96

$$EC = LYPCR - (-0.3182*LP + 0.0004*F + 0.6051*LMSN + 0.0386)$$


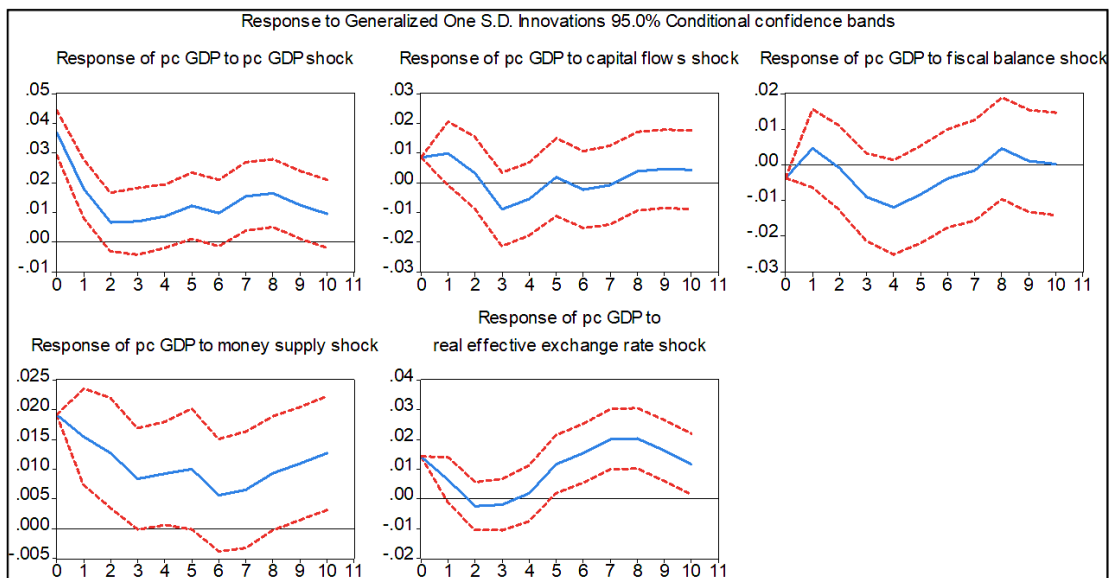
Standard errors in [].

*, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

Figure 5. Results adding capital flows.

Levels Equation		ECM Regression	
KI	-0.0003 [0.0002]	C	0.600 *** 0.089858
F	0.0002 [0.0001]	@TREND	-0.003 *** 0.000517
LMSN	0.682 * [0.347]	D(F)	-0.0003 [0.00004]
LREER	-0.066 [0.117]	D(LREER)	0.132 ** [0.065]
$EC = LYPCR - (-0.0000 * KI + 0.0002 * F + 0.6825 * LMSN - 0.0661$		CointEq(-1)*	-0.399 *** 0.062]
		R-squared	0.59
		Adjusted R-squared	0.55
		Durbin-Watson stat	2.09



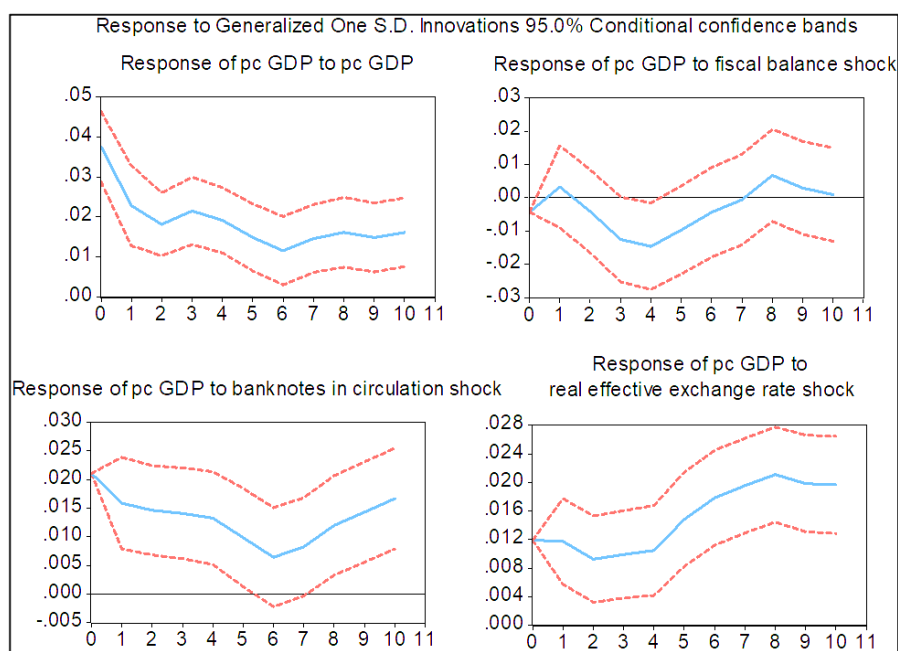
Standard errors in [].

*, **, *** are probability of 10, 5 and 1%, respectively

Source: own elaboration

Figure 6. Results considering banknotes in circulation instead of money supply.

Levels Equation		ECM Regression		
Variable	Coefficient	C	2.296	***
			[0.322]	
		@TREND	0.002	***
			[0.0005]	
F	0.0001	D(F)	-0.00004	
			[0.00004]	
LMBN	7.41E-05	D(LREER)	0.132	***
			[0.0624]	
LREER	0.394809 ***	D(LREER(-1))	0.136	***
			[0.062]	
	0.131081	CointEq(-1)*	-0.585	***
	-0.133247 *		0.082456	
	0.074589	R-squared	0.646551	
EC = LYPCR - (0.0001*F + 0.3948*LMBN - 0.1332*LREER)		Adjusted R-s	0.597461	
		Durbin-Wats	1.8514	



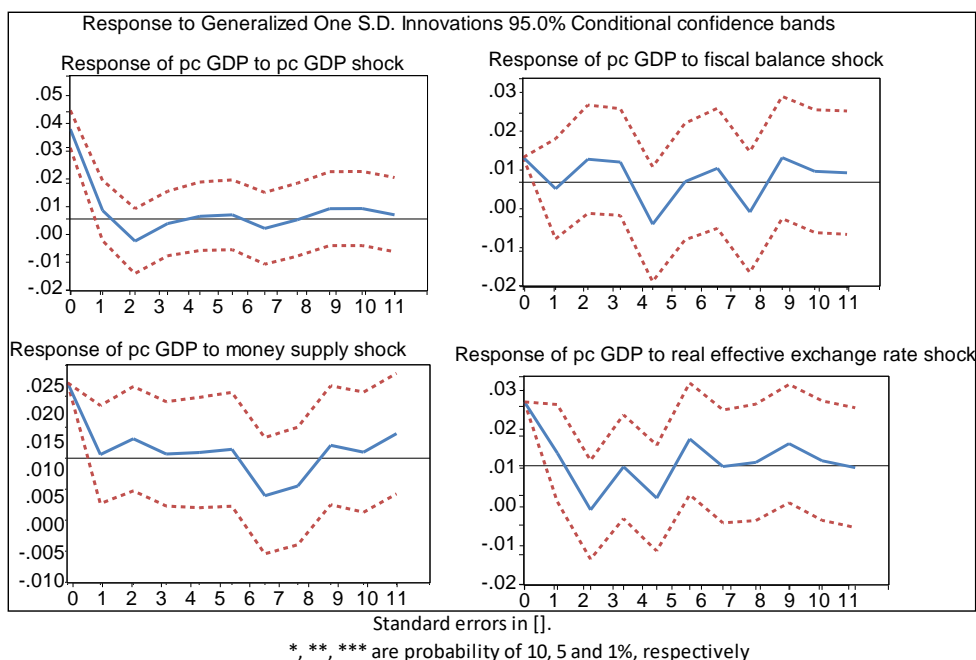
Standard errors in [].

*, **, *** are probability of 10, 5 and 1%, respectively

Source: Own calculation

Figure 7. Results considering fiscal balance over GDP instead of real fiscal balance.

Levels Equation			ECM Regression		
F_GDP	1.98	***	C	3.526	***
	[0.587]			[0.439]	
LMSN	0.311	***	@TREND	0.0011	***
	[0.112]			[0.0004]	
LREER	-0.199	***	D(F_GDP)	-0.0632	
	[0.0485]			[0.222]	
EC = LYPCR - (1.9830*FC +			D(F_GDP(-1))	-0.93	***
0.3110*LMSN2 - 0.1994*LERDEFL1)				[0.26]	
			D(LREER)	0.105	
				[0.0632]	
			D(LREER(-1))	0.2430	***
				[0.0664]	
			CointEq(-1)*	-0.731	***
				[0.0914]	
			R-squared	0.70	
			Adjusted R-s	0.65	
			Durbin-Wats	1.74	

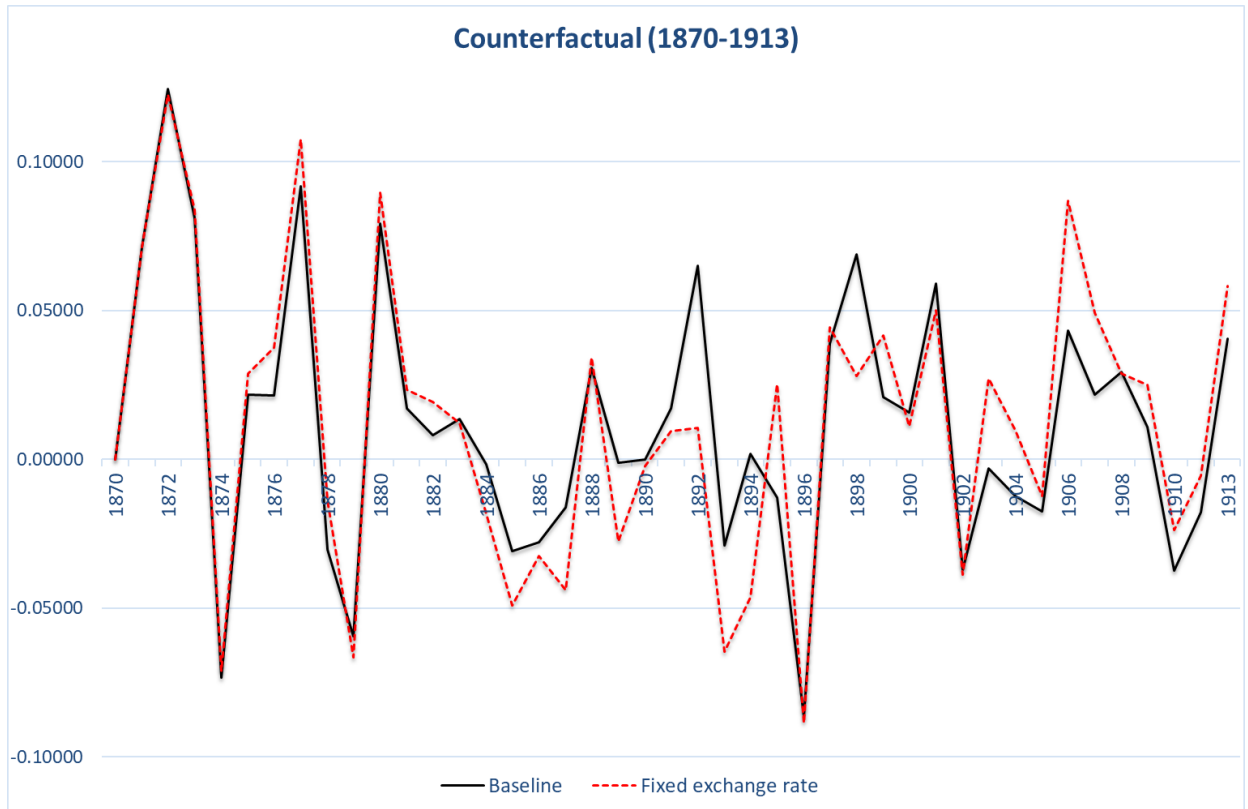


Source: Own calculation

Annex chapter 4

Figure 1 shows the counterfactual analysis done in section V changing nominal effective exchange rate by the real effective exchange rate constructed as it is explained in section III. I pretend to show that the main conclusion do not change even when the analysis is done with real effective exchange rate.

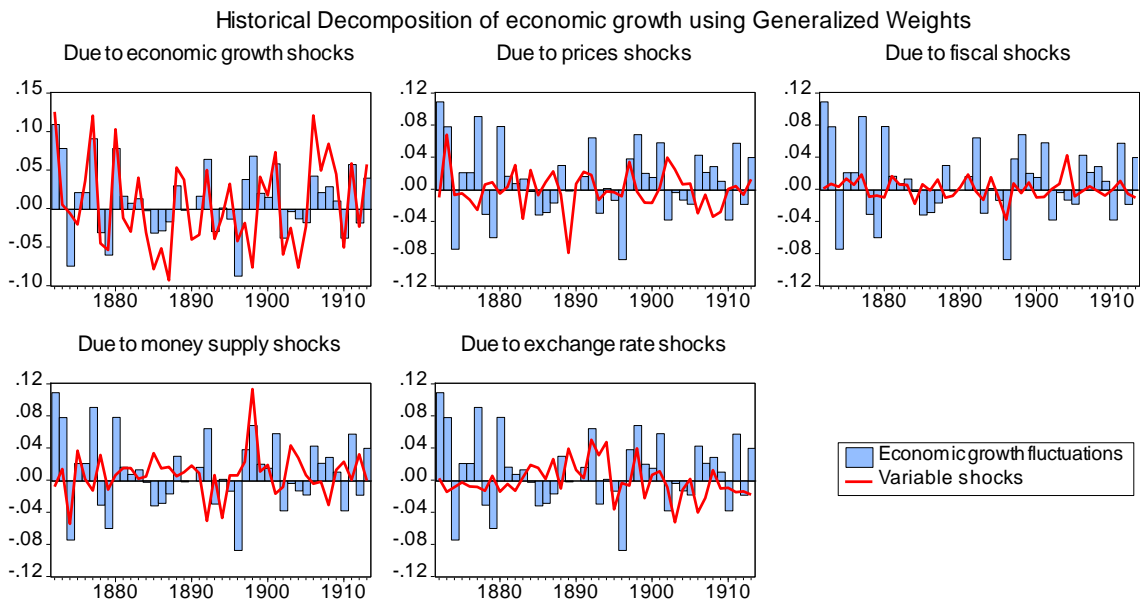
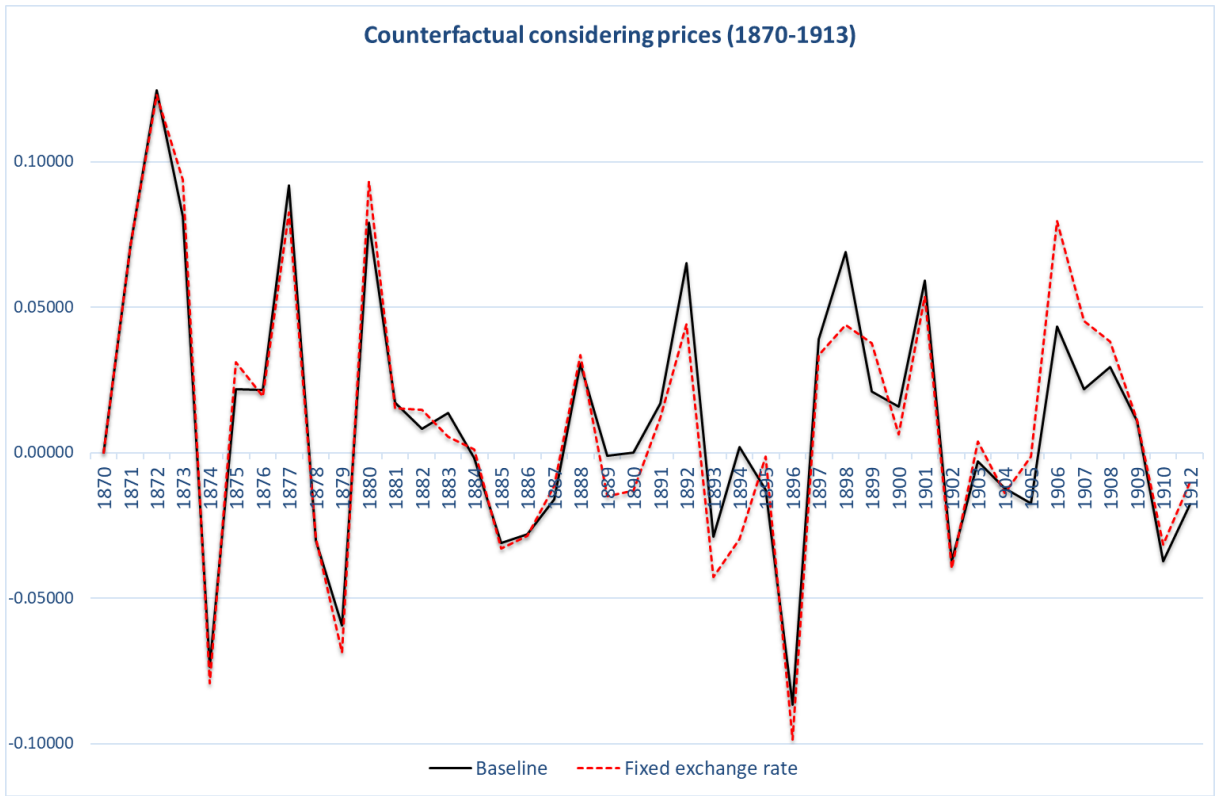
Figure 1. Counterfactual considering real effective exchange rate.



Source: own elaboration

Figure 2 shows the counterfactual analysis run in section V adding prices as a variable to explain economic growth as Shibamoto and Shizume (2014). It can be seen that results remain the same. It can also be found the historical decomposition of economic growth, again, adding the variable prices. Please, note that the counterfactual analysis is always done with nominal effective exchange rate as it has been explained while the historical decomposition is run considering the real effective exchange rate to understand in which way macroeconomic policies helped to explain the evolution of economic growth.

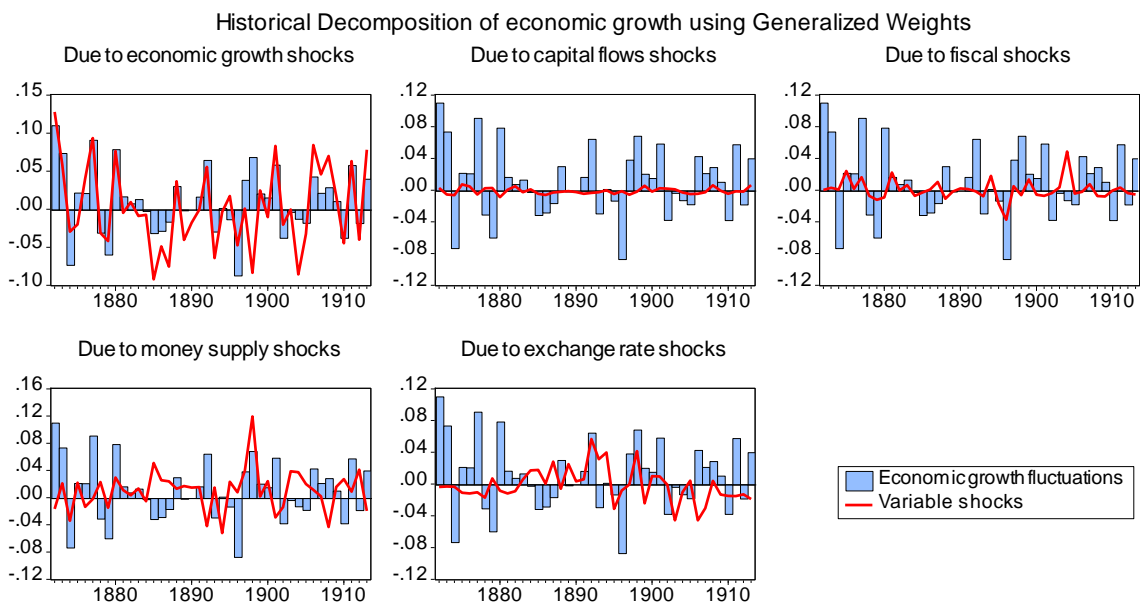
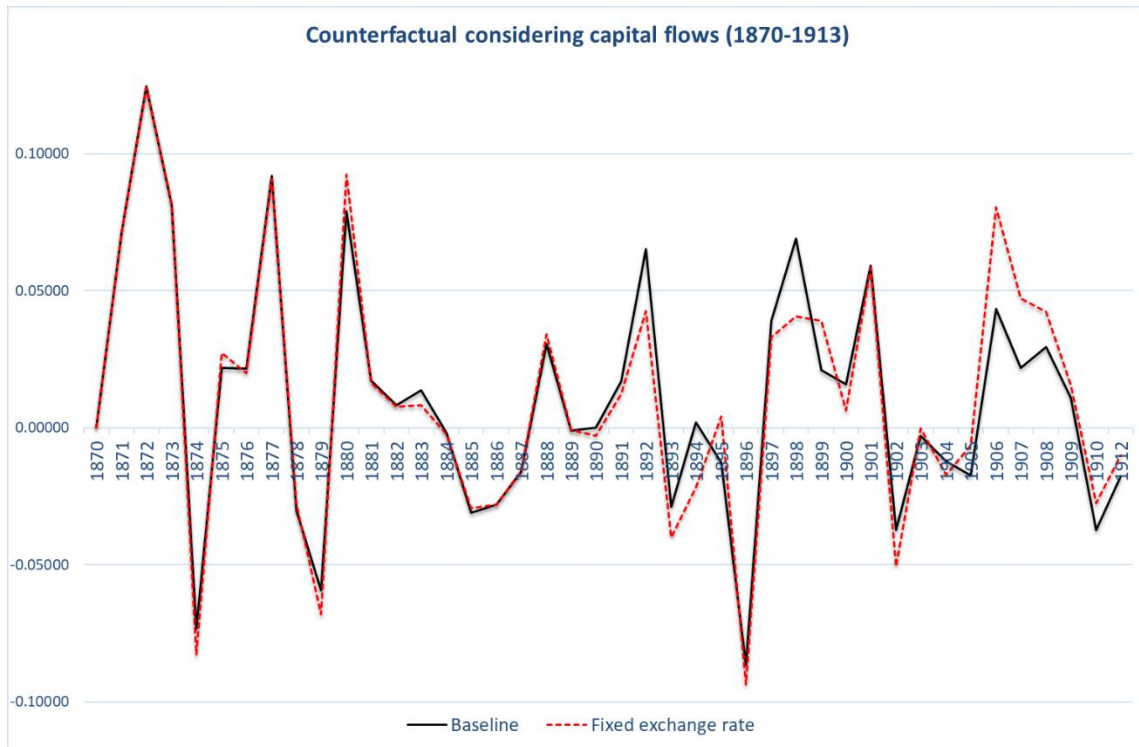
Figure 2. Results considering prices.



Source: our own data

Figure 3 shows that adding capital flows as a variable to explain economic growth does not change the counterfactual results. The figure also displays the historical decomposition analysis considering capital flows.

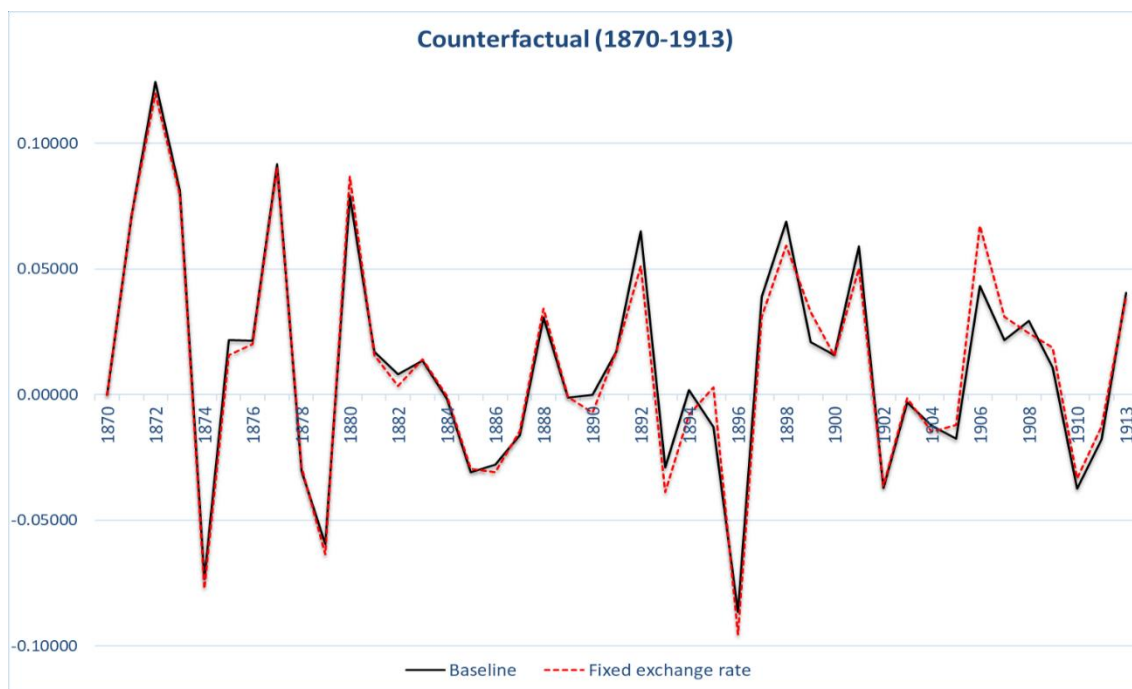
Figure 3. Results considering capital flows.



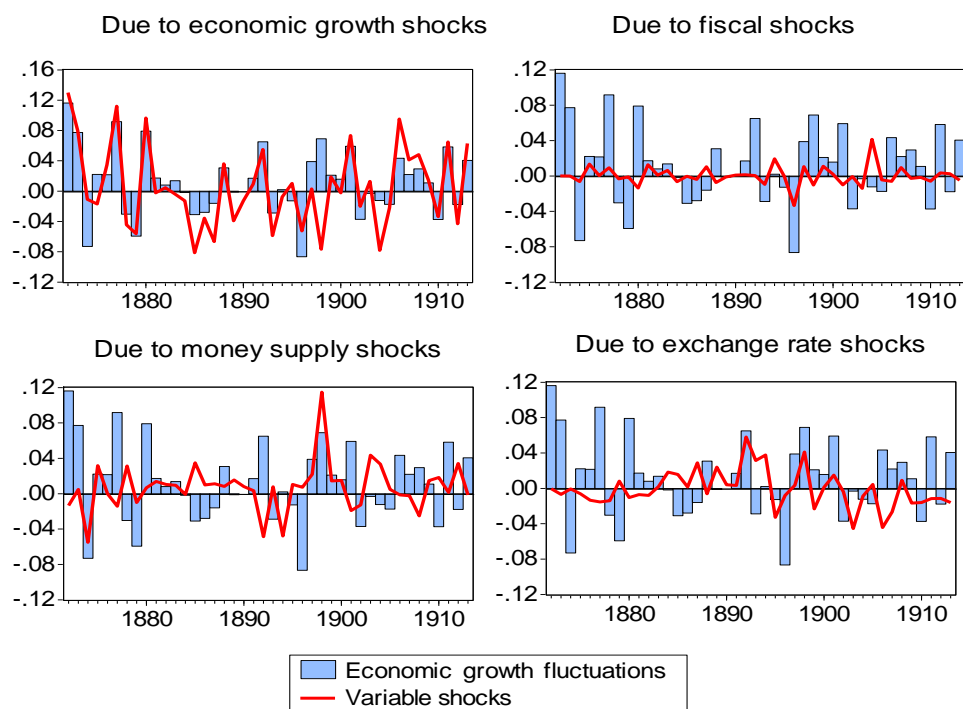
Source: Own elaboration

Figure 4 shows the results considering new data on fiscal balance estimated by Francisco Comín. This data has not been published yet. I pretend to show that, even with the new data, results are very similar. First, it can be found the counterfactual analysis and, second, the historical decomposition of economic growth. Both are done in the same way as section 5.

Figure 4. Results considering new data on fiscal balance from Comín (unpublished).



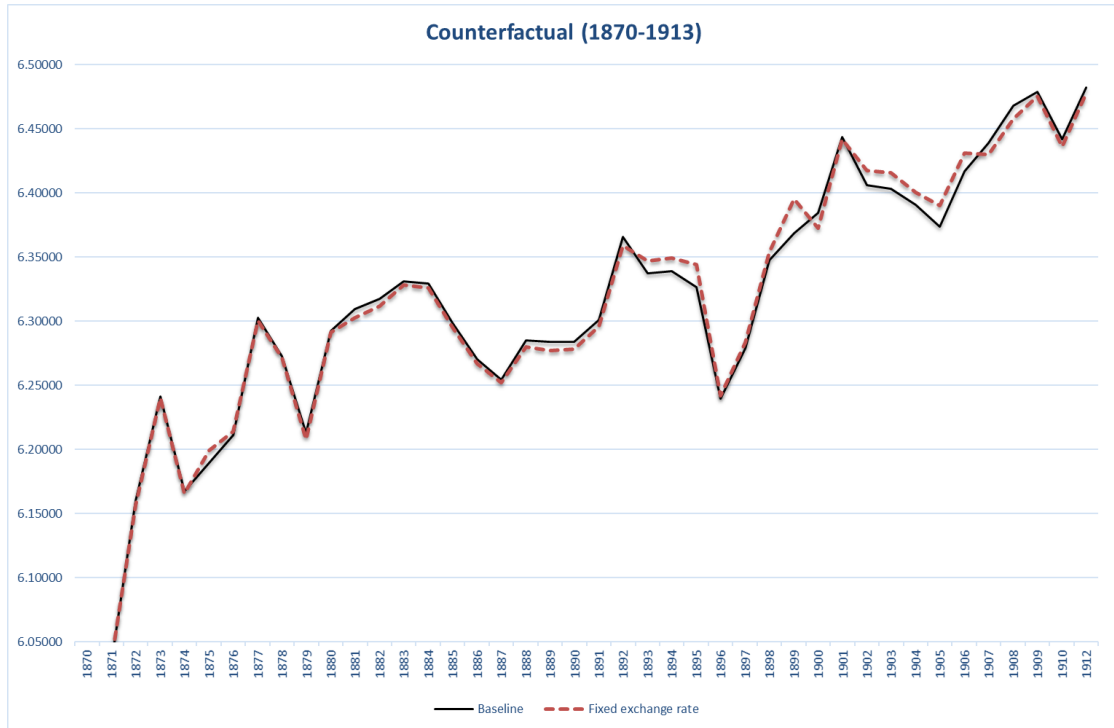
Historical Decomposition of economic growth using Generalized Weights



Source: own elaboration

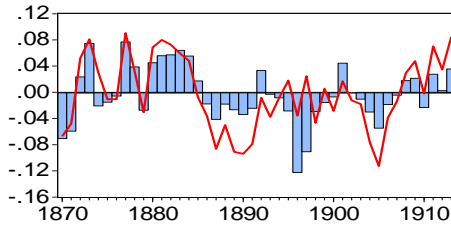
Figure 5 presents the results of counterfactual analysis and historical decomposition considering the estimation run in levels instead of in first differences.

Figure 5. Results taking variables in levels.

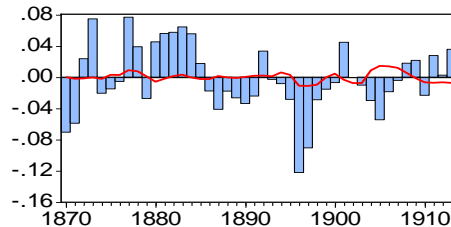


Historical Decomposition of Economic Growth using Generalized Weights

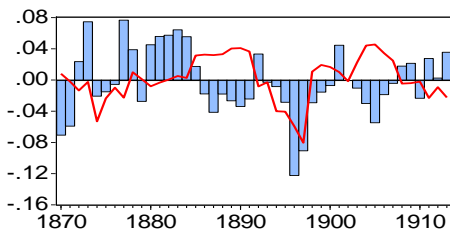
Due to economic growth shocks



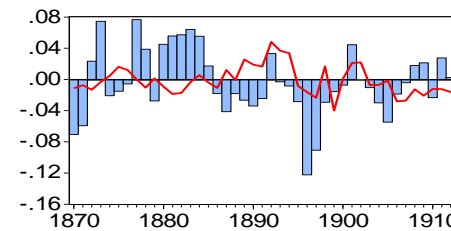
Due to fiscal shocks



Due to money supply shocks



Due to exchange rate shocks

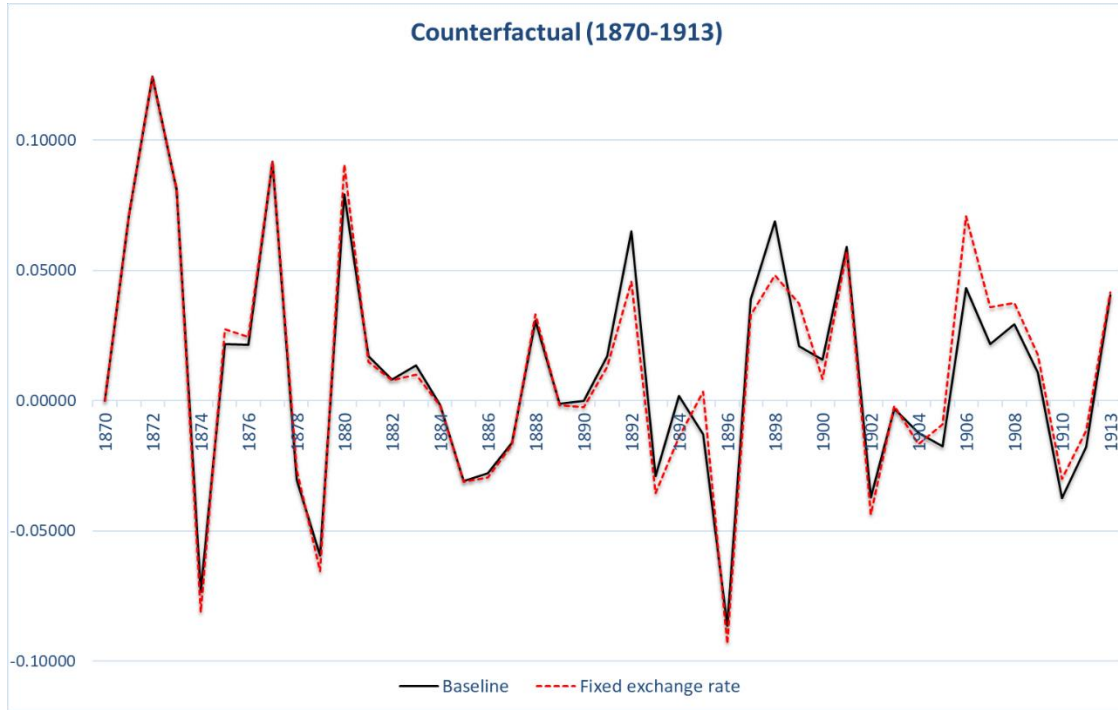


■ Economic growth fluctuations
— Variables shocks

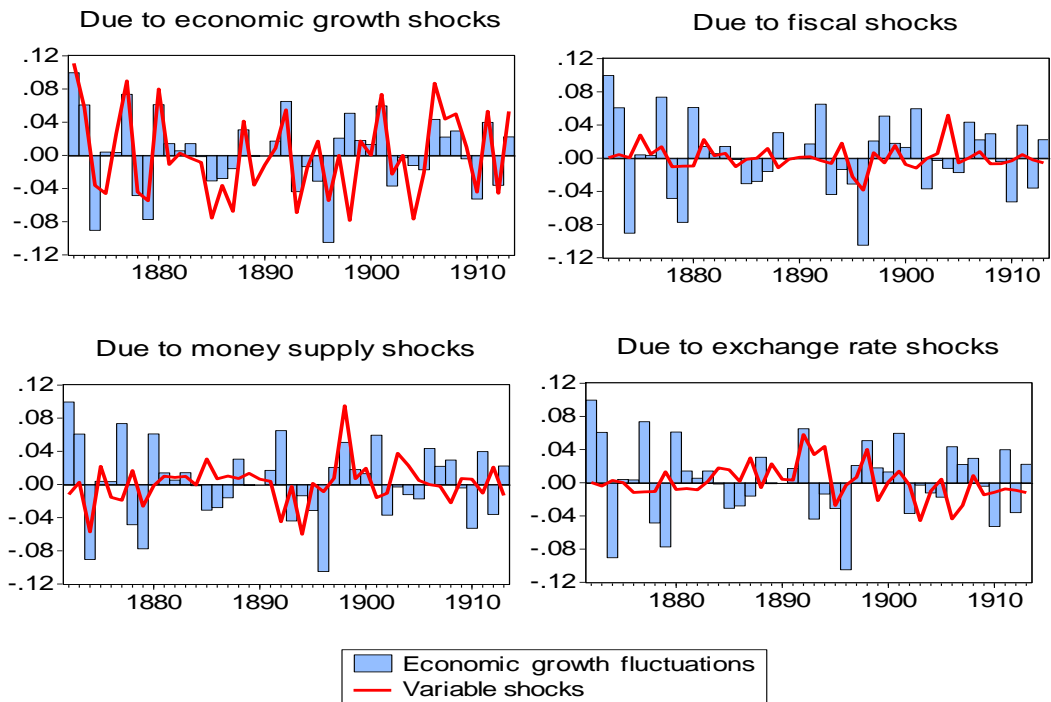
Source: Own elaboration

Figure 6 shows the counterfactual analysis adding a dummy variable to consider wars experienced by Spain during that period. It can also be found that the historical decomposition of economic growth do not change when wars dummy is added to the estimation.

Figure 6. Counterfactual analysis and historical decomposition considering wars.

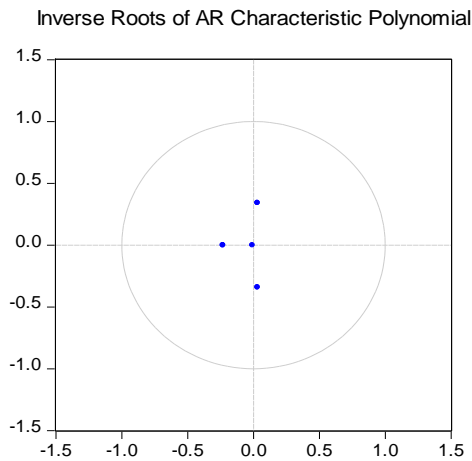


Historical Decomposition of economic growth using Generalized Weights



Source: Own elaboration

Figure 7. Stability test for VAR.



Source: own elaboration

Table 1. Autocorrelation and heteroskedascity tests.

VAR Residual Portmanteau Tests for Autocorrelations

Null Hypothesis: No residual autocorrelations up to lag h

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	0.969312	---	0.991854	---	---
2	17.40903	0.3596	18.21441	0.3115	16

*Test is valid only for lags larger than the VAR lag order.

df is degrees of freedom for (approximate) chi-square distribution

VAR Residual Serial Correlation LM Tests

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	8.871601	16	0.9186	0.540060	(16, 98.4)	0.9191
2	15.22685	16	0.5081	0.955857	(16, 98.4)	0.5100

Null hypothesis: No serial correlation at lags 1 to h

VAR Residual Heteroskedasticity Tests (Levels and Squares)

Joint test:

Chi-sq	df	Prob.
71.26831	80	0.7466

Source: Own elaboration

