

## Artículo

# Did the non-adoption of the gold standard benefit or harm Spanish economy? A counterfactual analysis between 1870-1913

Alba Roldan

University of Barcelona  
Email: [aroldan@ub.edu](mailto:aroldan@ub.edu)

## ARTICLE INFO

### Article history:

Received 24 May 2019  
Accepted 18 June 2019

### JEL classification:

E42  
E52  
E63  
N10

### Keywords:

Classical Gold Standard  
Spain  
Exchange Rate  
Counterfactual  
SVAR

### Códigos JEL:

E42  
E52  
E63  
N10

### Palabras clave:

Patrón oro clásico  
España  
Tipo de cambio  
Contrafactual  
SVAR

## 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.

© 2018 Asociación Española de Historia Económica.

## ¿La no adopción del patrón oro benefició o perjudicó a la economía española? Un análisis contrafactual entre 1870 y 1913

## RESUMEN

Este artículo pretende trazar una visión general de lo que habría sucedido si España hubiera mantenido estable su tipo de cambio (si no hubiera habido choques cambiarios que afectaran al crecimiento económico) entre 1870-1913. Se dice que ante notables impactos económicos las rigideces del sistema monetario inhibieron la recuperación, particularmente en los países de la periferia. ¿Hubiera sido mucho mayor el impacto de los ciclos económicos si se hubiera mantenido el tipo de cambio estable? Para responder a esta pregunta presento un análisis contrafactual basado en un modelo SVAR. Además, este estudio quiere mostrar cuán importantes para explicar las fluctuaciones del crecimiento económico fueron las políticas macroeconómicas (que se ejecutan fuera del patrón de oro). También se busca entender qué variables ayudaron a aumentar el crecimiento y cuáles perjudicaron la economía mediante el análisis de la descomposición histórica de las variables. Mi estudio arroja nueva luz sobre el funcionamiento de la política macroeconómica en España durante el patrón oro clásico. Tener un tipo de cambio fijo hubiera hecho las caídas del crecimiento más profundas hasta el comienzo del siglo xx. A partir de ahí, la adopción del patrón oro hubiera sido una buena opción. Los resultados del trabajo aportan nueva evidencia en el debate centro-periferia para el periodo conocido como «patrón oro clásico».

© 2018 Asociación Española de Historia Económica.

*[...] 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)

## 1. 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<sup>1</sup>. 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)<sup>2</sup>.

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 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 instability<sup>3</sup>.

Southern European economies did not succeed in remaining within the rules of the classical gold standard<sup>4</sup>. 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; 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<sup>5</sup>. The proponents of a fixed 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<sup>6</sup>. 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)<sup>7</sup>. 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.

<sup>4</sup> 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).

<sup>5</sup> On one hand, Sardà (1987); Solé Villalonga (1964, 1967), and Tortella (1981, 1994) 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 *et al.* (2001); 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).

<sup>6</sup> Sardà (1987); Martín-Aceña (1981, p. 267); Martín-Aceña (1993, p. 135); Tortella (1994, 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 Ruiz and Nogues (2014, pp. 9 and 19); Martín-Aceña (2017), and Sabaté *et al.* (2019).

<sup>7</sup> A formal explanation of SVAR can be found in Sims (1986).

<sup>1</sup> 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.

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

<sup>3</sup> 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, 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 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).

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 20<sup>th</sup> 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 20<sup>th</sup> 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 20<sup>th</sup> century.

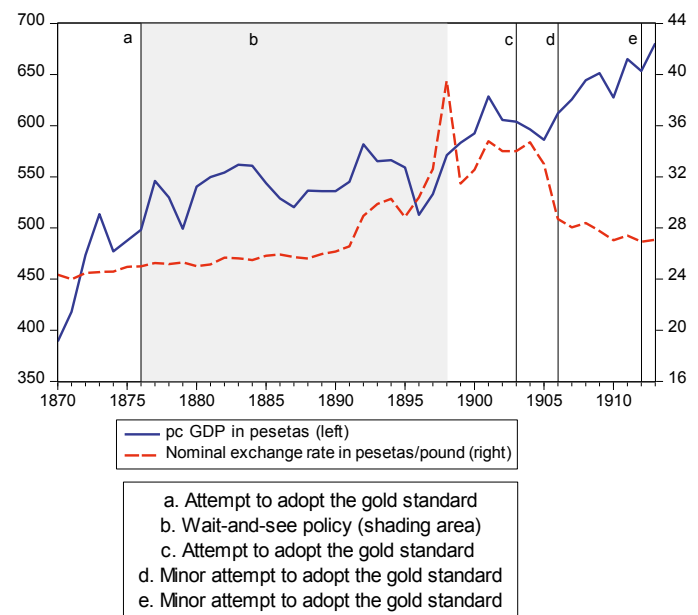
In order to do this, I show the attempts to join the gold standard. Then, we see if having a flexible exchange rate damaged Spain's economy. Thus, if Spain should have been adopted the gold standard or not. After that, we will study the importance of macroeconomic policies on economic growth. Thereby, 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.

## 2. 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 19<sup>th</sup> 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)<sup>8</sup>. 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.



**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.

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 bimetallicism, 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 (1994, 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.

<sup>8</sup> More on Spanish crisis in Betrán *et al.* (2012) Maixé and Iglesias (2018) and Comín and Hernández (2013).

**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.

Source: Main text.

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 (1994, 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, 1994, 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, 1994, 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 19<sup>th</sup> 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 bimetalism, 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<sup>9</sup>. 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; 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 the budget and indebtedness (Tortella, 1994). 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, 1994).

### 3. 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 others<sup>10</sup>. Concretely, Shibamoto and Shizume

<sup>9</sup> Fernández-Villaverde (1903).

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

(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 (1994) 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 shortspan 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,

$$B(L) = B_0 - \sum_{j=1}^p B_p L^j \quad \text{where } B_0 \text{ is the contemporaneous relations}$$

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  $\Sigma_\varepsilon$ . The vector  $\varepsilon_t$  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.  $A(L) = I - \sum_{j=1}^p A_p L^j$  is a  $p$ -th

order lag of matrix  $A_j$  ( $j = 1, 2, \dots, p$ ),  $L$  denotes the lag and  $u_t = (u_{ypcr_t}, u_{f_t}, u_{m_t}, u_{reer_t})$  is a four-by-one vector of serially uncorrelated structural disturbances with a mean zero and a covariance matrix  $\Sigma_u$ . 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  $\Sigma_u$  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<sup>11</sup>. The SVAR is estimated in first differences because after considering the time series properties of the data, all variables seem  $I(1)$ <sup>12</sup>. 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, differenciating 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 perfor-

mance of the estimation is consistent even if each variable is not stationary (Hamilton, 1994, pp. 651-653; 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<sup>13</sup>.

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<sup>14</sup>. Results do not change if CPI (Consumer Price Index) obtained by Maluquer (2012) 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 Nogues (2014). 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<sup>15</sup>. The weightings account for more than 60% of total foreign trade over the entire period<sup>16</sup>.

The frequency of the data is annual. The sample runs from 1870 to 1913<sup>17</sup>. All the variables have been converted into logarithms with the exception of the fiscal balance<sup>18</sup>. Fiscal balance is taken in % of GDP. The available criteria for selecting the number of VAR lags (Akaike criteria, Schwarz Criteria or Hannah Quinn Criteria) point to one lag as the optimal number to carry out the SVAR estimation. Bordo et al. (2004) have a comparable sample size and they run a SVAR and historical decomposition and counterfactuals.

#### 4. 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

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

<sup>14</sup> I use GDP deflator following Serrano et al. (2017).

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

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

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

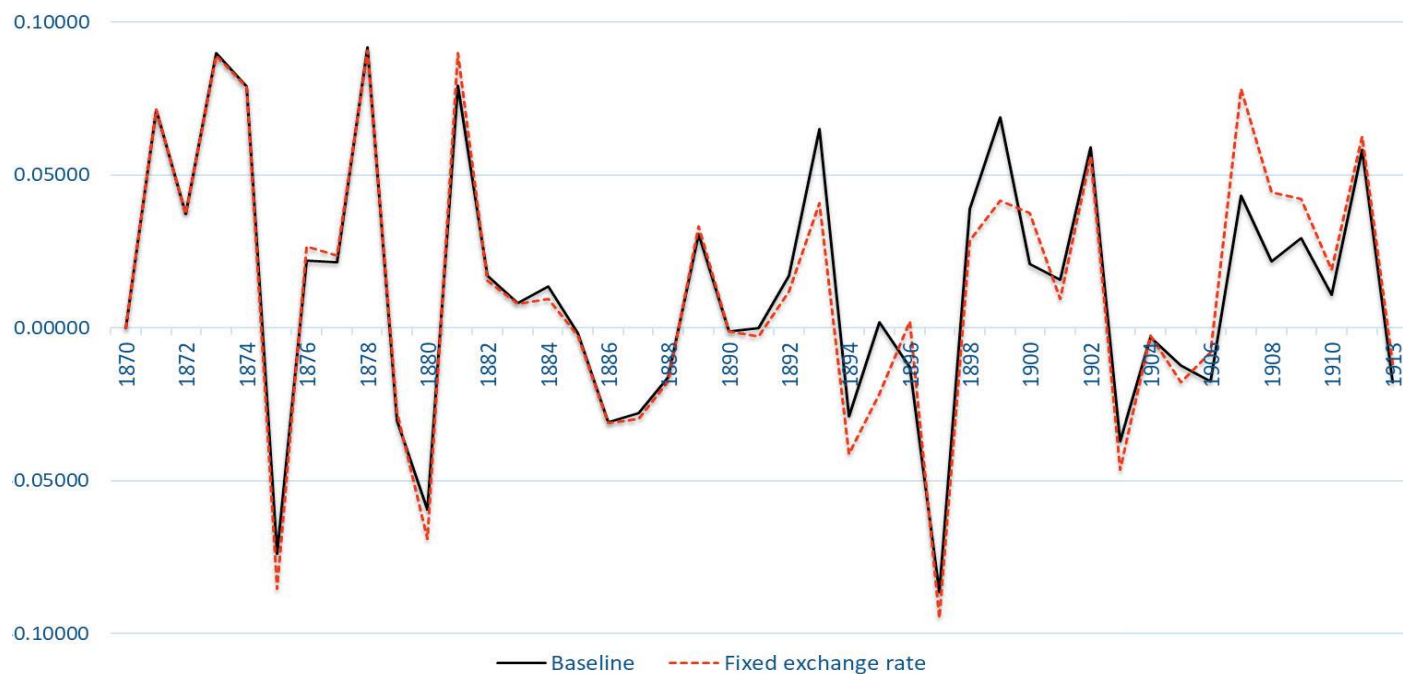
<sup>18</sup> Because the fiscal balance has negative values, it cannot be converted into logarithms. We will use the budget balance over GDP. Money supply is M1. One can find it in Martín-Aceña (2018) as "money supply" in both estimations before and after 1874.

<sup>11</sup> VAR is estimated by OLS.

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



## Counterfactual (1870-1913)



**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.

my VAR model. The VAR is always estimated in first differences<sup>19</sup>. 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<sup>20</sup>. 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 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<sup>21</sup>. 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 20<sup>th</sup> 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 neighboring 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 20<sup>th</sup> 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 20<sup>th</sup> century.

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 devalued parity. However, authorities only wanted to adopt the gold standard at historical parity (Serrano, 2004).

Villaverde ruled out the convertibility of the peseta to devalued 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 devalued 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)<sup>22</sup>.

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.

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

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

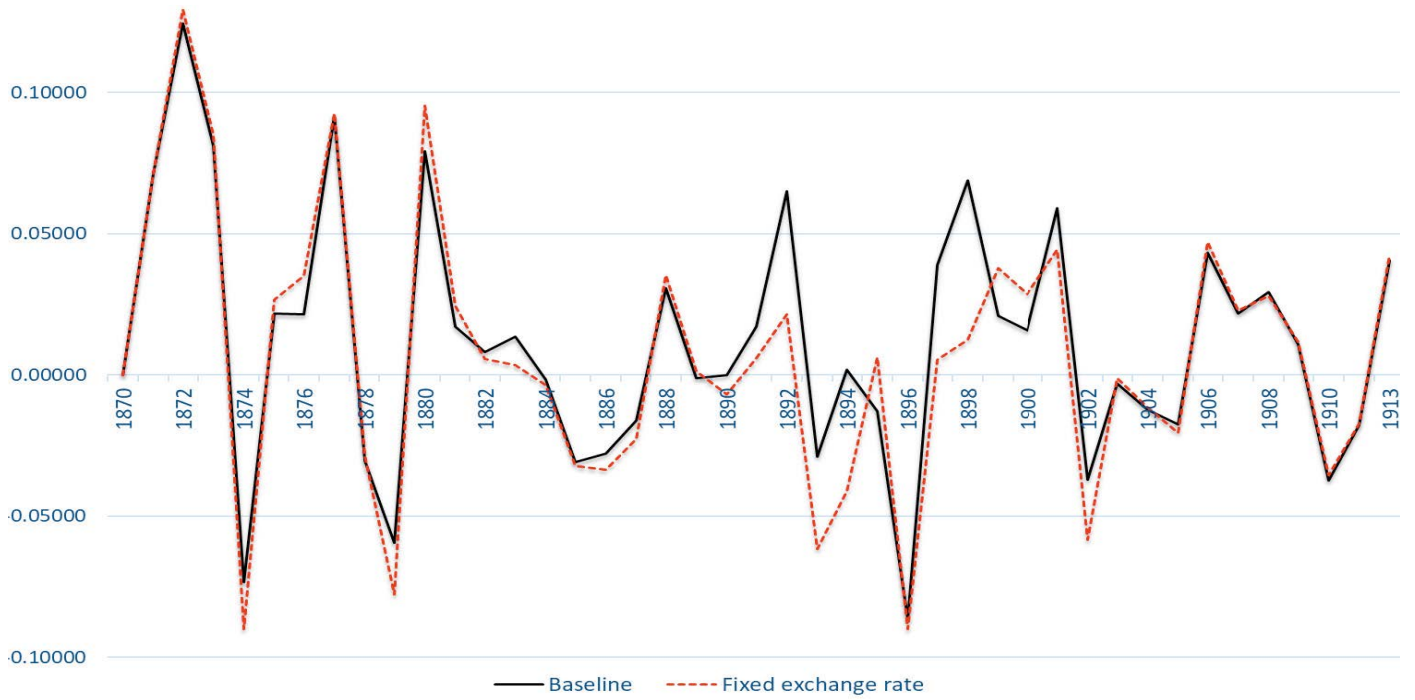
<sup>20</sup> See data section for more information.

<sup>21</sup> 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.

<sup>22</sup> More on Villaverde and his decision not to adopt a devalued parity in Serrano (2004, pp. 102-105).

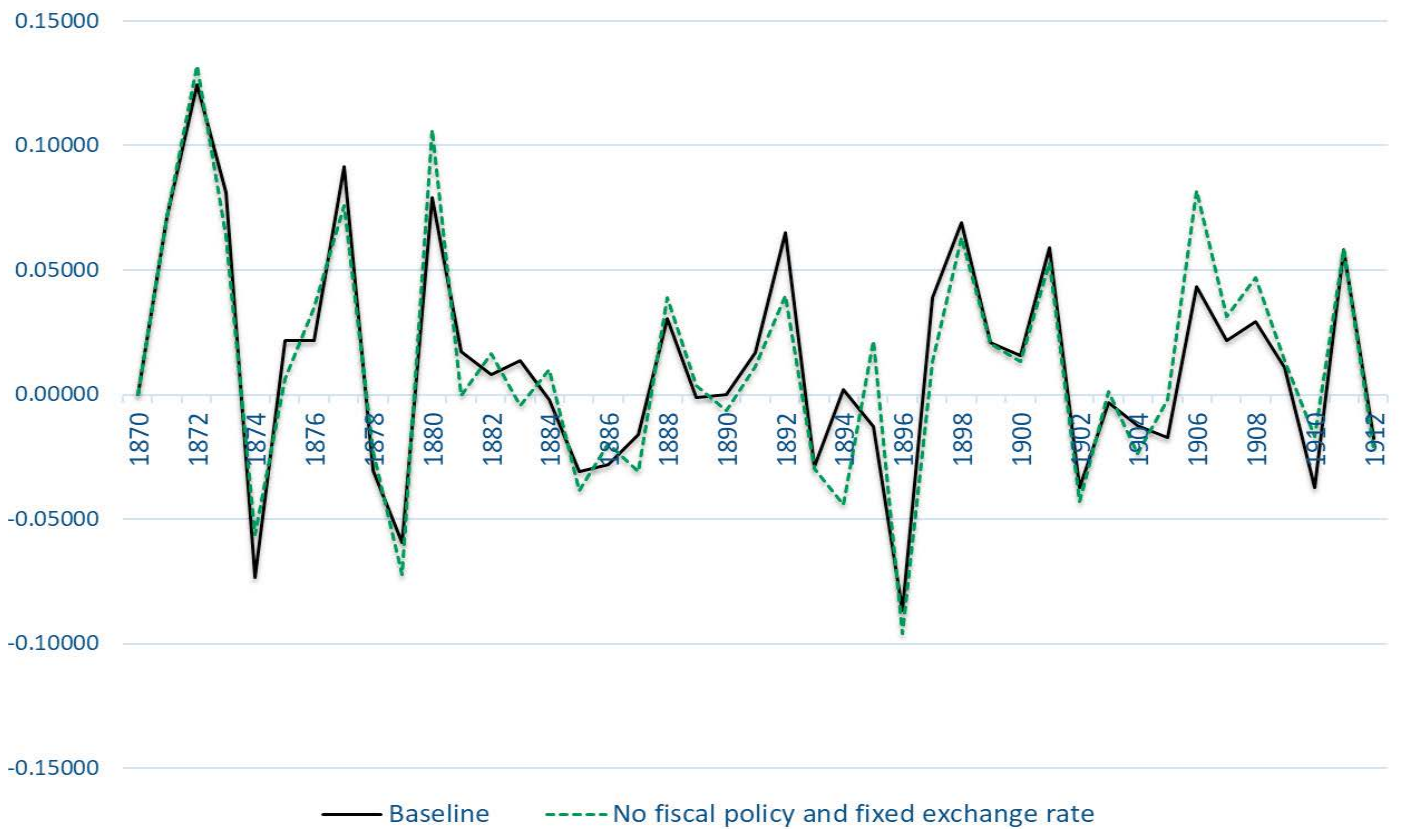


**Counterfactual (1870-1913)**



**Figure 3.** Counterfactual analysis comparing output having exchange rate fixed from 1901 to 1913 (dotted line) and having exchange rate fixed at initial level for throughout period (continuous line).

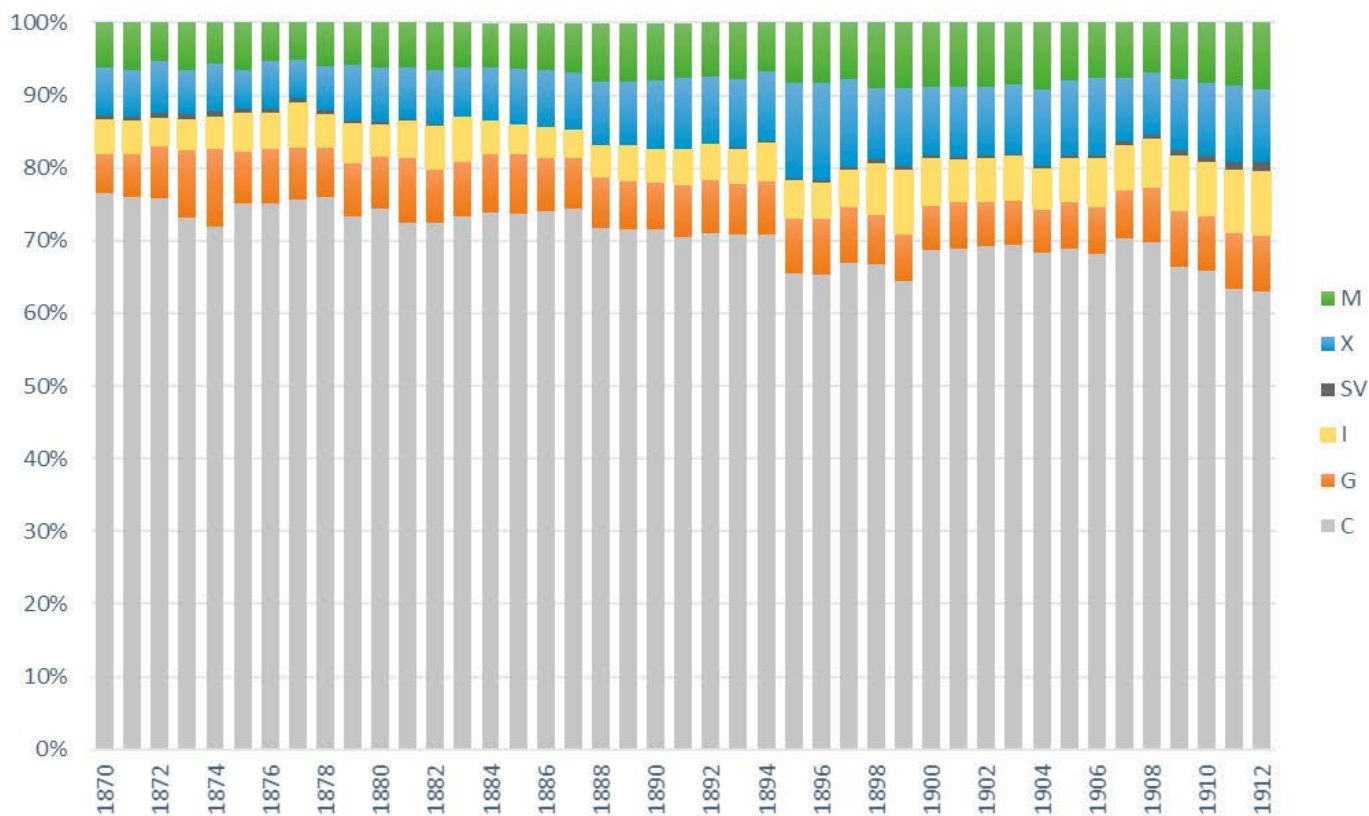
Source: Our own elaboration.



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

Source: Our own elaboration.

### GDP components (1870-1913)



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

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

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.

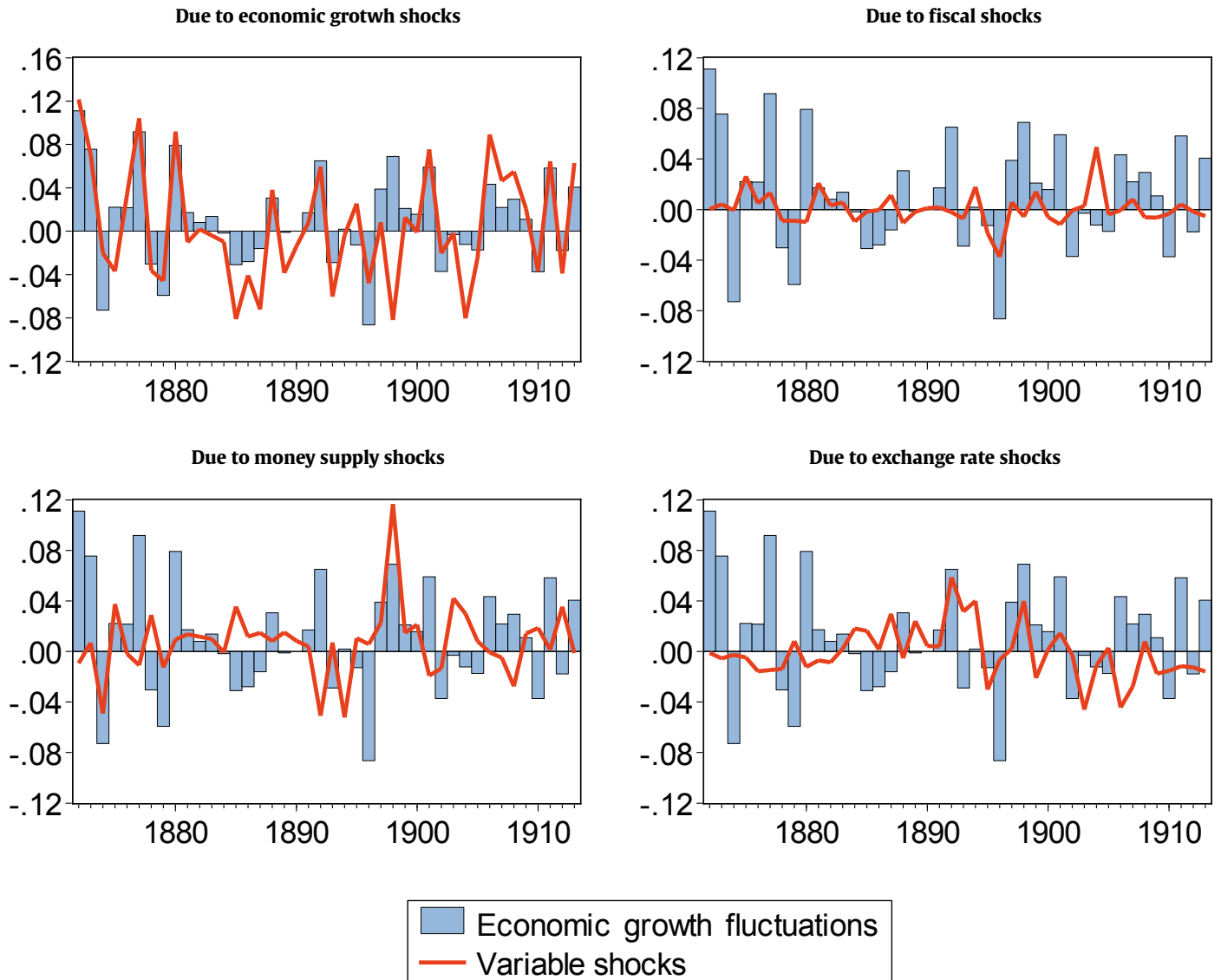
Furthermore, focusing on the economic crisis of the late 1890s, the statistics on GDP point to the importance of exports in the economic recovery (Figure 6). Figure 6 shows the GDP components: consumption (C), government expenditure (G), investment (I), stock variation (SV), exports (X), and imports (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.

#### 4.1. 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).

### Historical Decomposition of economic growth using Generalized Weights



**Figure 6.** Historical decomposition of pc GDP.

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 20<sup>th</sup> century.

## 4.2. 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)<sup>23</sup>. 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)<sup>24</sup>. 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)<sup>25</sup>. The results does not change significantly. The counterfactual analysis is the same as when we estimate the model without considering wars<sup>26</sup>. The historical decomposition of output, when taking wars into account, does not show changes compared to the main findings<sup>27</sup>. There is no heteroskedasticity or autocorrelation and the system is stable as can be shown in the Annex (Figure 7 and Table 1).

## 5. 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

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

<sup>24</sup> See more on this in Clemens and Williamson (2000).

<sup>25</sup> 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).

<sup>26</sup> 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.

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

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<sup>28</sup>. The classical gold 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, 1930/1988, pp. 173 and 180)<sup>29</sup>. Policies in the late nineteenth century and early twentieth century run in accordance with circumstances.<sup>30</sup> 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 20<sup>th</sup> 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 have been caused by deeper crises (i.e., if a fixed exchange rate had been maintained until 1903).

<sup>28</sup> "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, 1930/1988, p. 180).

<sup>29</sup> Keynes (1930) reproduced in Keynes (1988).

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

## 6. 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 20<sup>th</sup> century. However, the economic shocks would have been greater and the economy would have been negatively affected during the late 19<sup>th</sup> century. Finally, the paper provides new empirical evidence for the core-periphery debate during the period of the classical gold standard.

## Acknowledgments

Earlier versions of this article were presented at Economic History Society Conference in the Royal Holloway (2017), Iberometrics (2017), Workshop on Exchange Rate History at Lund University (2017), Economic History PhD seminar at the University of Barcelona (2017) and Congreso Internacional de la AEHE (2017). I wish to thank the participants for their feedback. I am also immensely grateful to Rui Esteves, Matthias Morys, Marcela Sabaté, José Luís Peña, Lluís Castañeda, Masato Shizume, Jonas Ljunberg, Daniel Tirado and Germán Forero for their comments on an earlier version of the manuscript. I am also thankful to my research project colleagues at the University of Barcelona (Jordi Catalan, Ramon Ramon, Alejandro Sánchez, Josep Maria Benaul, Miquel Gutiérrez, Marc Prat and Montserrat Carbonell). I would also like to show my gratitude to José Antonio Miranda for their help and support every day. This research was supported by HAR2015-64769-P (Ministry of Economy and Competitiveness) and my FPU scholarship. I thank 4 anonymous reviewers for their so-called insights. Any errors are my own and should not tarnish the reputations of these esteemed persons.

## References

- Aixalá, J., 1999. La peseta y los precios: un análisis de largo plazo (1868-1995). Prensas Universitarias de Zaragoza, Zaragoza.
- Balke, N. S. and Gordon, R. J., 1989. The prewar business cycle reconsidered: new estimates of gross national product 1869-1908. *Journal of Political Economy*, 97, 38-92.
- Bernanke, B., 1995. The Macroeconomics of the Great Depression: A Comparative Approach. *Journal of Money, Credit and Banking*, 27 (1), 1-28.
- Bernanke, B., 2015. Mis años en la Reserva Federal. Deusto, Madrid.
- Betrán, C., Martín-Aceña, P. and Pons, M. A., 2012). Financial crises in Spain: lessons from the last 150 years. *Revista de Historia Económica-Journal of Iberian and Latin American economic History*, 30 (3), 417-446.
- Betrán, C. and Pons, M. A., 2013. Understanding Spanish Financial crises, 1850-2000: What determined their severity? EHES Working Paper, 48.
- Betrán, C., Pons and M. A., 2019. Understanding Spanish financial crises severity, 1850-2015. *European Review of Economic History*, 23 (2), 175-192.
- Bloomfield, A. I., 1959. Monetary policy under the international gold standard: 1880-1914. Federal Reserve Bank of New York, New York.
- Bordo, M. D., 1999. The Gold Standard and Related Regimes. Cambridge University Press, New York.
- Bordo, M., Eichengreen, B., Klingebiel, D. and Martinez-Peria, M. S., 2001. Is the crisis problem growing more severe? *Economic Policy*, 16 (32), 52-82.
- Bordo, M. D. and Flandreau, M., 2003. Core, periphery, exchange rate regimes, and globalization. In: Bordo, M. D., Taylor, A. M. and Williamson, J. G. (Eds.). *Globalization in historical perspective*. University of Chicago Press, Chicago, pp. 417-472.
- Bordo, M. D. and Jonung, L., 2001. A return to the convertibility principle? Monetary and fiscal regimes in historical perspective. In: Leijonhufvud, A. (Ed.). *Monetary Theory as a Basis for Monetary Policy*. Palgrave, London, pp. 225-283.
- Bordo, M. D., Lane, J.L. and Redish, A., 2004. Good versus bad deflation: lessons from the gold standard era. *National Bureau of Economic Research*, w10329.
- Bordo, M. D. and MacDonald, R., 2005. Interest rate interactions in the classical gold standard, 1880-1914: was there any monetary independence? *Journal of Monetary Economics*, 52 (2), 307-327.
- Bordo, M. and Rockoff, H., 1996. The Gold Standard as a "Good Housekeeping Seal of Approval". *Journal of Economic History*, 56, 2, 389-428.
- Burbidge, J. and Harrison, A. 1985. An historical decomposition of the great depression to determine the role of money. *Journal of Monetary Economics*, 16 (1), 45-54.
- Braga de Macedo, J., 1996. Converging towards a European currency standard-Convertibility and stability in 1990s and beyond. In: Eichengreen, B. and Reis, J., de Macedo, J. B. (Eds.). *Currency convertibility: the gold standard and beyond*. Routledge, New York, pp. 243-268.
- Catalan, J., Sudrià, C. and Tirado, D. A., 2001. Peseta and protección: el debate historiográfico. In: Sudrià, C. and Tirado D. A. (Eds.). *Peseta and Protección. Comercio exterior, moneda y crecimiento económico en la España de la Restauración*. Edicions de la Universitat de Barcelona, Barcelona, pp. 11-42.
- Catalan, J. and Sánchez, A., 2013. Cinco cisnes negros. Grandes depresiones en la industrialización moderna and contemporánea, 1500-2012. In: Comín, F., Hernández, M. (Eds.). *Crisis económicas en España, 1300-2012*. Alianza, Madrid, pp. 95-100.
- Carreras, A. y Tafunell, X. (Eds.), 2004. *Historia económica de la España contemporánea*. Crítica, Barcelona.
- Carreras, A. y Tafunell, X., 2005. *Estadísticas históricas de España: siglos XIX-XX*. Fundación BBVA, Bilbao.
- Cha, M. S., 2003. Did Takahashi Korekiyo rescue Japan from the great depression? *The Journal of Economic History*, 63 (1), 127-144.
- Cipolla, M. C., 1995. *Storia económica dell'Europa pre-industriale*. Il Mulino, Bologna.
- Clemens, M. A. and Williamson, J. G., 2000. Where did British foreign capital go? Fundamentals, failures and the Lucas paradox: 1870-1913. *National Bureau of Economic Research*, w8028.
- Comín, F. and Díaz, D., 2005. Sector público administrativo y estado del bienestar. In: Carreras, A. and Tafunell, X. (Eds.). *Estadísticas históricas de España: siglos xix-xx*. Fundación BBVA, Bilbao, 3 vols.
- Comín, F. and Hernández, M. (Eds.), 2013. *Crisis económicas en España, 1300-2002: lecciones de la historia*. Alianza Editorial, Madrid.
- Cubel, A., 2001. Estabilidad e inestabilidad macroeconómica en España, 1880-1913: el coste del abandono de la convertibilidad. In: Sudrià, C. and Tirado, D. A. (Eds.). *Peseta and protección. Comercio exterior, moneda and crecimiento económico en la España de la Restauración*. Edicions Universitat de Barcelona, Barcelona, pp. 177-196.
- Cubel, A., Palafox, J. and Sudrià, C., 1998. Public Deficit, Debt, Monetary Policy and External Equilibrium. Spain, 1880-1930. In: Bovykine, V., Broder, A. and Maranhao, R. (Orgs.). *Public debt, public finance, money and balance of payments in debtor countries 1890-1932/33*. Twelfth International Economic History Congress, Seville.
- De Cecco, M., 1974. *Money and empire*. Blackwell, Oxford and London.
- Dictamen de la Comisión nombrada por Real Orden de 9 de enero de 1929, para el estudio de la implantación del patrón oro, 1960. *Información Comercial Española*, 318, 51-83.
- Eichengreen, B., 1992. *The golden fetters. The Gold Standard and the Great Depression*. Oxford University Press, New York and Oxford.

- Eichengreen, B., 1996. *Globalizing capital: A history of the international monetary system*. Princeton University Press, Princeton.
- Eichengreen, B., Flandreau, M., 1997. *The gold standard in theory and history*. Routledge, London.
- Eichengreen, B., Reis, J. and de Macedo, J. B. (Eds.), 2005. *Currency convertibility: the gold standard and beyond*. Routledge, London.
- Eichengreen, B. and Temin, P., 2010. Fetters of gold and paper. *Oxford Review of Economic Policy*, 26 (3), 370-384.
- Enders, W., 2004. *Applied Econometric Time Series: And Rats Handbook for Econometric Time Series*, 2 Re. John Wiley & Sons, Hoboken, NJ.
- Escario, R., Sabaté, M. and Gadea, M. D., 2011. La sombra monetaria del déficit en la España de la peseta. *Investigaciones de Historia Económica*, 7 (1), 151-181.
- Fackler, J. S. and Parker, R. E., 1994. Accounting for the Great Depression: a historical decomposition. *Journal of Macroeconomics*, 16 (2), 193-220.
- Fernández-Villaverde, R., 1893. Sobre el estado anormal de los cambios. In: Serrano Sanz, J. M., 2002 (Coord.). *La cuestión monetaria en la Real Academia de Ciencias Morales y Políticas: antología de textos, 1857-1935*. Real Academia de Ciencias Morales y Políticas, Madrid, pp. 139-198.
- Fernández-Villaverde, R., 1900. Una campaña parlamentaria: discursos pronunciados por el Excmo. Sr. D. Raimundo Fernández Villaverde. Sucesores de Rivadeneyra, Madrid.
- Fernández-Villaverde, R., 1903. Proyecto de Ley para regularizar y mejorar el cambio exterior y para procurar el restablecimiento de la circulación y de la libre acuñación de la moneda de oro. Imprenta de la sucesora de M. Minuesa de los Ríos, Madrid.
- Fratianni, M. and Spinelli, F., 1984. Italy in the gold standard period, 1861-1914. In: Bordo, M. D. and Schwartz, A. J. (Eds.). *A Retrospective on the Classical Gold Standard, 1821-1931*. University of Chicago Press, Chicago, pp. 405-454.
- Frattiani, M. and Spinelli, F., 2012. *Storia monetaria d'Italia*. ETAS libri, Milano.
- García Iglesias, M. C., 2005. Ventajas and riesgos del patrón oro para la economía española (1850-1913). *Estudios de Historia Económica*, 47. Banco de España, Madrid.
- Gordon, R. J. and Krenn, R., 2010. The end of the great depression 1939-41: Policy contributions and fiscal multipliers. *National Bureau of Economic Research*, w16380.
- Hallwood, C. P., MacDonald, R. and Marsh, I. W., 1996. Credibility and fundamentals: were the classical and interwar gold standards well-behaved target zones. In: Bayoumi, T., Eichengreen, B. and Taylor, M. P. (Eds.). *Modern perspectives on the gold standard*. Cambridge: Cambridge University Press, Cambridge, pp. 129-161.
- Hamilton, J. D., 1994. *Time series analysis (Vol. 2)*. Princeton University Press, Princeton.
- Herranz, A. and Tirado, D. A., 1996. La restricción exterior al crecimiento económico español (1870-1913). *Revista de Historia Económica*, 14 (1), 11-49.
- Jeanne, O., 1995. Monetary Policy in England 1893-1914: A structural VAR analysis. *Explorations in Economic History* 32, 302-326.
- Keynes, J. M., 1913. *Indian Currency and Finance, The Collected Writings*, 1. MacMillan, London.
- Keynes, J. M., 1930. *Essays in Persuasion, The Collected Writings*, vol. IX, MacMillan. It is cited from Keynes, J. M., 1988, *Ensayos de persuasión*. Crítica, Barcelona.
- Llona Rodríguez, A., 2001. Flotar o hundirse: el dilema de la política de tipo de cambio en España entre 1850-1913. In: Sudrià, C. and Tirado, D. A. (Eds.). *Peseta y protección. Comercio exterior, moneda y crecimiento económico en la España de la Restauración*. Barcelona: Edicions Universitat de Barcelona, Barcelona, pp. 157-176.
- Maixé-Altés, J. C. and Iglesias, E. M., 2018. Banking, currency, stock market and debt crises in Spain, 1850-1995. *Applied Economics*, 50 (18), 2056-2069.
- Maluquer De Motes, J., 2013. La inflación en España. Un índice de precios de consumo, 1830-2012. *Estudios de Historia Económica* 64, Banco de España, Madrid.
- Martín-Aceña, P., 1981. España y el patrón oro, 1880-1913. *Hacienda Pública Española*, 69, 267-290.
- Martín-Aceña, P., 1993. Spain during the Classical Gold Standard Years, 1880-1914. In Bordo, M. D. and Capie, F. (Eds.). *Monetary Regimes in Transition*. Cambridge University Press, Cambridge, pp. 135-172.
- Martín-Aceña, P., 1997. El Banco de España: una visión histórica. *Papeles de Economía*, 73, 4-21.
- Martín-Aceña, P. The Spanish Monetary Experience, 1848-1914. In: Martín-Aceña, P. and Reis, J. (Eds.). *Monetary standards in the periphery: paper, silver, and gold, 1854-1933*. Palgrave Macmillan, Houndmills, pp. 112-151.
- Martín-Aceña, P., 2017. The Banco de España, 1782-2017. The history of a central bank. *Estudios de Historia Económica*, 73. Banco de España, Madrid.
- Martín-Aceña, P., 2018. Money in Spain. *New historical statistics. 1830-1998*. Banco de España, Madrid.
- Martín-Aceña, P., Martínez-Ruiz, E. and Nogues-Marco, P., 2011. Floating against the tide: Spanish monetary policy, 1870-1931. Working papers in Economic History of Universidad Carlos III de Madrid.
- Martín-Aceña, P. and Pons, M. A., 2005. Sistema monetario y financiero. In: Carreras, A., Tafunell, X. (Eds.). *Estadísticas históricas de España: siglos XIX-XX*. Fundación BBVA, Bilbao, 3 (2), pp. 645-706.
- Martín-Aceña, P., Reis, J. and Llona, A., 2000. The Gold Standard in the periphery. In: Martín-Aceña, P. and Reis, J. (Eds.). *Monetary standards in the periphery: paper, silver, and gold, 1854-1933*. Palgrave Macmillan, Houndmills, pp. 1-17.
- Martínez-Ruiz, E. and Nogues, P., 2014. Crisis cambiarias and políticas de intervención en España, 1880-1975. *Estudios de Historia Económica*, 66. Banco de España, Madrid.
- Mata, M. E., 1987. *Câmbios e política cambial na economia portuguesa, 1891-1931 (Vol. 8)*. Livraria Sá da Costa Editora, Lisboa.
- Mattesini, F. and Quintieri, B., 1997. Italy and the Great Depression: an analysis of the Italian economy, 1929-1936. *Explorations in Economic History*, 34 (3), 265-294.
- Mitchell, B. R., 2007. *International historical statistics: Europe, 1750-2005*. Palgrave Macmillan, Basingstoke.
- Mitchener, K. J., Shizume, M. and Weidenmier, M. D., 2010. Why did countries adopt the gold standard? Lessons from Japan. *The Journal of Economic History*, 70 (1), 27-56.
- Mitchener, K. J. and Weidenmier, M. D., 2015. Was the Classical Gold Standard credible on the Periphery? Evidence from currency risk. *The Journal of Economic History*, 75, 479-511.
- Morys M., 2013. Discount rate policy under the Classical Gold Standard: core versus periphery (1870s -1914). *Explorations in Economic History*, 50, 205-226.
- Nicolau, R., 2005. Población, salud y actividad. In: Carreras, A. and Tafunell, X. (Eds.). *Estadísticas históricas de España: siglos XIX-XX*. Fundación BBVA, Bilbao, pp. 77-154.
- Officer, L. H., 1996. *Between the Dollar-Sterling gold points. Exchange rates, parity and market behaviour*. Cambridge University Press, Cambridge.
- Olariaga, L., 1933. *La política monetaria en España*. Biblioteca de Ciencias Jurídicas, Madrid (reprinted by Servicio de Estudios de Banca Más Sarda, 1977).
- Obstfeld, M., Shambaugh, J. C. and Taylor, A. M., 2005. The Trilemma in History: Tradeoffs among exchange rates, monetary policies, and capital mobility. *Review of Economics and Statistics*, 87, 423-38.
- Prados de la Escosura, L., 1982. Comercio exterior and crecimiento económico en España, 1826 1913: tendencias a largo plazo. Banco de España, Madrid.
- Prados de la Escosura, L., 2003. *El progreso económico de España (1850-2000)*. Fundación BBVA, Bilbao.
- Prados de la Escosura, L., 2010. Spain's international position, 1850-1913. *Revista de Historia Económica-Journal of Iberian and Latin American Economic History*, 28 (1), 173-215.
- Ramey, V. A., 2016. Macroeconomic shocks and their propagation. In: Taylor, J. B. and Woodford, M. (Eds.). *Handbook of Macroeconomics*, Vol. 1. Elsevier, pp. 71-162.
- Reis, J., 1996. First to join the gold standard, 1854. In: Eichengreen, B., Reis, J. and de Macedo, J. B. (Eds.). *Currency Convertibility: The Gold Standard and Beyond*. Routledge, New York, pp. 159-181.
- Reis, J., 2000. The gold standard in Portugal, 1854-1891. In: Martín-Aceña, P. and Reis, J. (Eds.). *Monetary standards in the periphery: paper, silver, and gold, 1854-1933*. Palgrave Macmillan, Houndmills, pp. 69-111.
- Reis, J., 2007. An "art" and not a "science"? Central bank management in Portugal under the gold standard, 1863-1887. *The Economic History Review*, 60, 712-741.
- Roldan, A., 2017. Costes y beneficios de la no entrada de España en el patrón oro (1874-1914): una revisión. *Investigaciones de Historia Económica*, 13, 69-80.
- Ródenas, C., Brú, S. and Almenar, S., 2001. De plata and oro. Una reinterpretación del bimetallismo en España durante la Restauración. In: Sudrià, C. and Tirado, D. A. (Eds.). *Peseta y protección. Comercio exterior, moneda y crecimiento económico en la España de la Restauración*. Barcelona: Edicions Universitat de Barcelona, Barcelona, pp. 121-141.
- Ródenas, C. and Bru, S., 2006. La convertibilidad de la peseta en el siglo XIX. *Revista de Historia Económica*, 24 (3), 555-578.
- Sabaté, M., Fillat, C. and Escario, R., 2019. Budget deficits and money creation: exploring their relation before Bretton Woods. *Explorations in Economic History* 72, 38-56.
- Sabaté, M., Gadea, M. D. and Escario, R., 2006. Does fiscal policy influence monetary policy? The case of Spain, 1874-1935. *Explorations in Economic History*, 43 (2), 309-331.
- Sardà, J., 1987. *Escritos (1948-1980)*. Banco de España, Madrid.
- Schumpeter, J. A., 1971. *Historia del análisis económico*. Ariel, Barcelona.
- Serrano Sanz, J. M., 2004. El oro en la Restauración. *Real Academia de Ciencias Morales y Políticas*, Madrid.



- Serrano Sanz, J. M., Gadea, M. D. and Sabaté, M., 2017. Gone with the euro: a reappraisal of the peseta's adjustment mechanism (1870-1998). *Revista de Historia Económica*, 35 (2), 207-239
- Shibamoto, M. and Shizume, M., 2014. Exchange rate adjustment, monetary policy and fiscal stimulus in Japan's escape from the Great Depression, *Explorations in Economic History*, 53, 1-18.
- Sims, C. A., 1986. Are forecasting models usable for policy analysis? *Federal Reserve Bank of Minneapolis Quarterly Review*, 10 (1), 2-16.
- Solé Villalonga, G., 1964. La deuda pública en España and el mercado de capitales, Madrid: Instituto de Estudios Fiscales.
- Solé Villalonga, G., 1967. La reforma fiscal de Villaverde, 1899-1900. Editorial de Derecho Financiero, Madrid.
- Sudrià, C. and Tirado, D. A. (Eds.). 2001. *Peseta y protección. Comercio exterior, moneda y crecimiento económico en la España de la Restauración*. Edicions Universitat de Barcelona, Barcelona.
- Tattara, G., 2000. Was Italy ever on gold? MPRA Paper 37160
- Tattara, G., 2003. Paper money but a gold debt: Italy on the gold standard. *Explorations in Economic History*, 40 (2), 122-142.
- Tattara, G. and Volpe, M., 1997. Italy, the fiscal dominance model, and the gold standard age. MPRA, Paper 37155.
- Temin, P., 1995. *Lecciones de la Gran Depresión*. Alianza Editorial, Madrid.
- Thomas, R. and Dimsdale, N., 2017. *A Millennium of UK data*. Bank of England, London.
- Tortella, G., 1994. El desarrollo de la España contemporánea. *Historia Económica de los siglos XIX y XX*. Alianza, Madrid.
- Toutain, J. C., 1987. Le produit intérieur brut de la France de 1789 à 1982. *Institut de sciences mathématiques et économiques appliquées*, 15.
- Triffin, R., 1985. The myth and realities of the so-called gold standard. In: Eichengreen B. (Ed.). *The gold standard in theory and history*. Methuen and Co. Ltd., London, pp. 2-20.
- Valério, N., 1998. Recent developments on Portuguese retrospective national accounts. *Instituto Superior de Economia e Gestão. GHES Documento de Trabalho/Working Paper*, 12-1998.
- Velarde, J., 2004. Discurso de contestación. In: Serrano, J. M. *El oro en la Restauración (discurso de recepción del Académico de Número Excmo. Sr. D. José María Serrano Sanz: sesión del 4 de mayo de 2004)*. Real Academia de Ciencias Morales y Políticas, Madrid, pp. 179-197.