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## The Great Depression in Spain

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**Abstract:** In the decade of the 1930s the Spanish economy reported an slowdown of 20%, less severe than what occurred in the US, France and Germany, but very similar to the Italian and British experiences. In this paper we study two issues concerning this period of the Spanish economy: Did the World Depression account for the slump in the Spanish economy? And, why did the Spanish economy – unlike others – still show no signs of recovery at the onset of the Spanish Civil War (1936-1939)? We find that TFP accounts for most of the slowdown throughout this period, and the terms of trade explain the evolution of foreign trade. These findings suggest that (i) the origin of the Spanish downturn had a domestic source –with a drop in GDP, investment and imports–; (ii) the external economic and political situation affected the Spanish economy with some delay –with a drop in foreign trade and investment–; and, (iii) the socio-political situation delineated the recovery pattern.

**Key words:** The Great Depression; Spanish economy; Foreign Trade.

**JEL Codes:** E30, F40, N14, N44

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# 1 Introduction

The secular increasing trend in the Spanish economy was abruptly stopped at the beginning of the 1930s, and experienced a persistent slowdown throughout this decade (see Figure 1). If compared with other countries, taking a common detrended pattern (see Figure 2), the Spanish slump was less severe than that in the US, France and Germany, but very similar to the Italian and British experiences. Like in these countries, the Spanish economy was harmed by a sharp decrease in GDP, investment and imports, and later in exports, as well as a decline in consumption (see Figure 3).

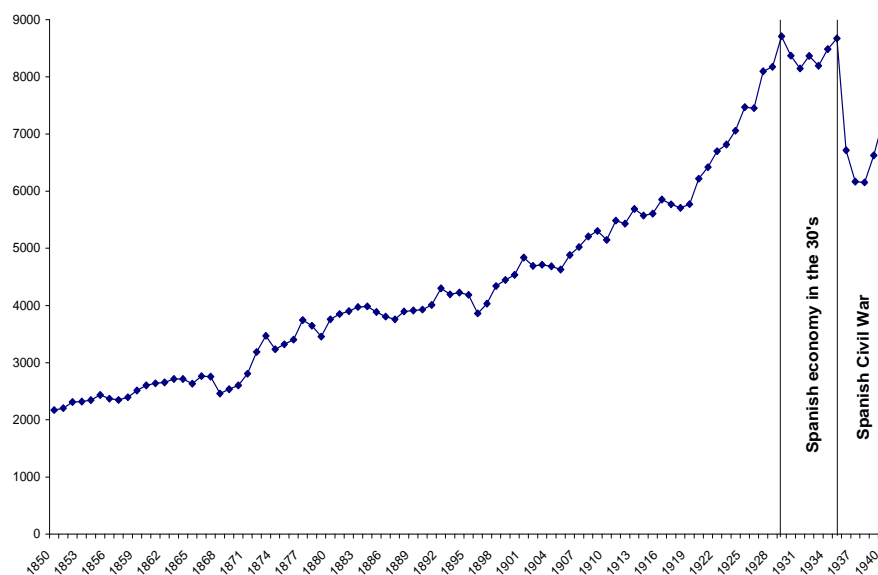


Figure 1: **Real GDP** in billion of 1995 pesetas. Source: Prados-de-la-Escosura (2003)

Two intriguing issues have been of concern to researchers when studying this period of the Spanish economy. First, did the World Depression account for the slump in the Spanish economy? Second, why did the Spanish economy –unlike others– still show no signs of recovery at the onset of the Spanish Civil War (1936-1939)? Concerning the foreign impact on the Spanish economic slump, the coinciding of an adverse international economic scenario with a period of political and social turmoil has prompted a dispute in the literature, which has provided two competing stories: the domestic-source explanation and the foreign explanation. The proponents of the domestic-source explanation argue that the Spanish economy was isolated from international perturbations due to: (i) the important weight on the GDP of the non-export-oriented agriculture sector (Comín 1987, 2002); (ii) the low weight of foreign trade in GDP –which brought with little foreign competition– due to the protectionist policies adopted throughout the '20s

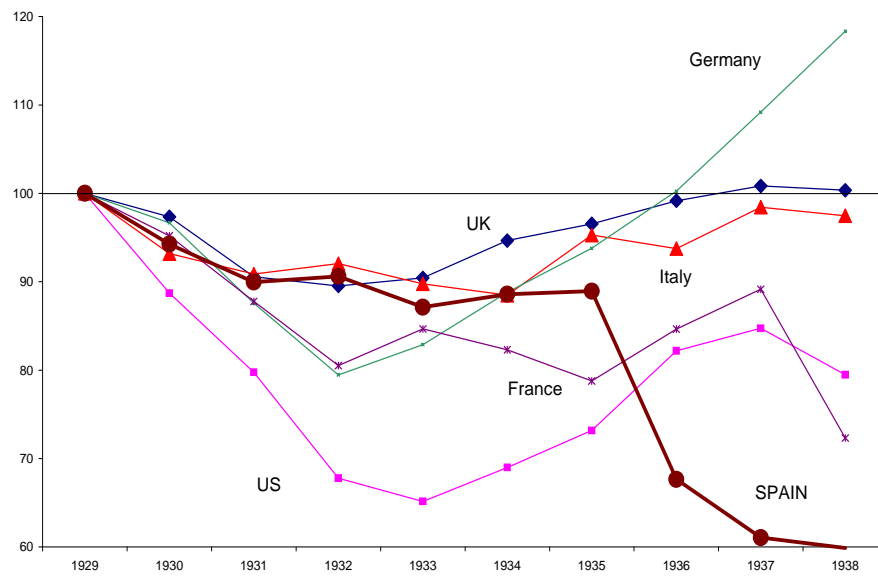


Figure 2: **Real GDP per capita for several countries: 1929-1938.** All the deviations from trend were obtained assuming a common long-run growth trend of 2% per year, and that all the economies were on trend in 1929. Source: Perri and Quadrini (2002, fig.1) and own computations for Spain from Prados-de-la-Escosura (2003).

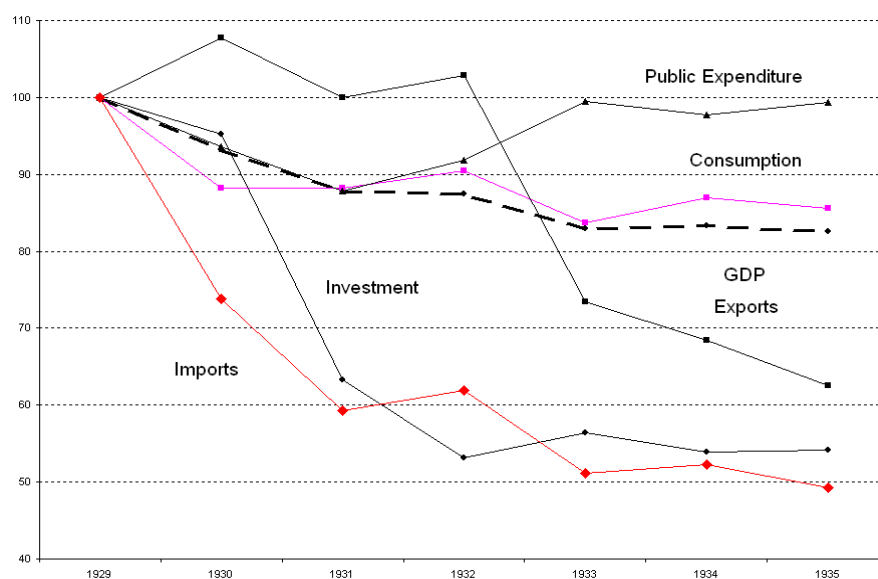


Figure 3: **Detrended GDP and its demand components (1929=100)**. All series are per working-age population, and were detrended by the average long-run growth rate of the Spanish economy 2%. Source: Own computations from Prados-de-la-Escosura (2003).

(Fontana et al 1976, Palafox 1980, 1991, Harrison 1983, Tortella et al 1984); and, (iii) Spain operated on flexible exchange rates throughout the Great Depression (Choudhri et al 1980, Bernanke et al 1991). For these authors, the slowdown was entirely due to uncertainties raised, first after the resignation of the dictator Primo de Rivera (29 January 1930) and then with the first steps of the new republican regime (proclaimed on 14 April 1931) that brought with disputed social, labor and economic reforms. Alternatively, the proponents of the foreign explanation argue that in the 1930s the Spanish economy suffered a Great Depression analogous to that in other Western economies (Hernández-Andreu 1980). The reason why it was milder than in other countries stems from the fact that the Spanish economy was only affected by the drop in the foreign trade sector (Carreras et al 2004).<sup>1</sup> Concerning the delay in recovery, the literature has exclusively pointed to domestic factors: “The singularity of the economic recovery [...] can only be explained by sociopolitical reasons.” (Carreras et al 2004, p.256).

In the present work we assess these internal and external explanations as well as the recovery pattern of the Spanish experience by using modern tools of macroeconomics, and following the methodology pioneered in the works of Cole et al (1999, 2002) and Prescott (1999). We suggest that any explanation for the Great Depression in Spain has to account for a supply shock source.

Initially, we conduct a growth accounting exercise to decompose changes in output into four fractions: the first due to changes in inputs of labor, the second to changes in inputs of capital, the third to changes in imported inputs, and the fourth to changes in total factor productivity (TFP). The results show that the decrease in output in the 1930s was mainly due to a decrease in TFP and, to a much lesser extent, in imported inputs. Next, we use a simple dynamic general equilibrium model—a small-open economy with no international capital mobility—to identify and quantify the sources of these movements. We first calibrate a neoclassical growth model to the interwar Spanish economy to its implied steady state, and then we undertake three experiments.

In our first experiment, we feed the computed TFP into the model economy to generate the path for real GDP per capita, investment, employment and foreign sector. The comparison of the model-generated path for each variable with the actual data for the same variable makes it possible to infer which fraction of the year-to-year variations of such variables for the 1929-1935 period can be accounted for by the actually observed TFP shocks. Our results suggest that TFP can explain much of the economic downturn and the recovery pattern. Concerning the latter, this finding might provide some support for the sociopolitical explanations: the environment of increasing political and social turmoil in the Spanish Republic thwarted any economic recovery, contrasting with other countries’ experiences.

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<sup>1</sup>The other other transmission channel, financial contagion, did not affect the Spanish economy. Since Spain did not participate in the Great War, no foreign borrowing was needed for reconstruction, and foreign trade during the war permitted the Banco de España to become Spain the country with the world’s fourth largest gold reserves. See Carreras et al (2004, Chap.5.6).

Concerning the former, the TFP might reflect the deterioration of expectations induced from internal and external events. To disentangle these effects, our model allows us further exploration of the external explanation as a source of the Spanish recession. We propose two experiments to analyze how the Spanish economy was affected by protectionist policies adopted by the Spanish authorities, and how the Spanish economy was affected by foreign protectionist policies adopted by the Spain's main trade partners.

In the first instance, the Spanish government put a number of protectionist policies into practice as retaliation for those implemented by foreign countries against Spanish goods. To investigate the importance of these policies, we conduct an experiment quite similar to the one conducted by Perri et al (2002). Starting from the steady state in which no trade barriers exist, we consider the unexpected and permanent introduction of an import tariff. The results lead us to conclude that the Spanish foreign protection is not the key to understanding the depression. In the second instance, we feed the series of the terms of trade from the data into the model economy. Our results suggest that the deterioration of the terms of trade cannot explain the economic downturn, although it can explain the delay in the drop of exports and investment. Thus, if the TFP path is additionally considered, a full picture of the Spanish Depression can be depicted providing support for both the internal and external theories.

As a summary of our findings, the origin of the Spanish downturn seems to have a domestic source, with a drop in GDP, investment and imports; this provides some support to the domestic-source explanation. The external economic situation appears to affect the Spanish economy only with some delay, with a drop in foreign trade and investment; this provides some support to the foreign explanation. Finally, the socio-political situation seems to delineate the recovery pattern.

In Section 2, we begin by summarizing the most relevant historical economic and political events in Spain from the Great War to the Spanish Civil War. In Section 3, we show Spanish macroeconomic performance from 1929 to 1935. In Section 4, we present a dynamic, general equilibrium model of the Spanish economy we have used to assess the macroeconomic effects of the factors being considered. Section 5 undertakes a number of quantitative experiments. Finally, Section 6 presents a summary and conclusion.

## 2 An historical review: Spain 1914-1935

The studies of the interwar period for the Spanish economy have been commonly divided into three subperiods: the Great War and the post-war period, the Primo de Rivera Dictatorship, and the Spanish Second Republic.<sup>2</sup>

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<sup>2</sup>For an overview of this period, see Comín (1987, 2002), Palafox (1991) and, especially, Comín (1988 Chap.5) and Carreras et al (2004). There are few studies that covers all three periods together. An exception, though not very extensive one, is represented by those works

## 2.1 The Great War and the post-war period, 1914-1923.

Spain remained neutral during the Great War (1914-1918). The Spanish economy boosted as the export sector grows to become 15% of GDP, even to the extreme of suffering domestic scarcity. As a consequence, company profits were huge in these years. Domestic prices soared in Spain during the war, while the workers purchasing power decreased. Massive exports to both sides of the conflict also resulted in a huge surplus in the balance of trade, so that Spanish firms increased their holdings in foreign currency. However, entrepreneurs could not make use of this foreign money. The possibilities to import machinery were scarce because of the destruction of the foreign industrial sector, so investment was limited during the war. In addition, Spanish legislation restricted international movements of capital, so the Banco de España (the Spanish central bank) sterilized part of this foreign money, about 40%, and exchanged it for gold, becoming the country with the fourth largest gold reserves at the beginning of the '20s. Thus, the Spanish economy did not need to borrow money from abroad after the war as did other European countries involved in the conflict.

The end of the Great War marked a sharp decline in foreign trade with exports dropping by 39% and imports growing by 33% between 1919 and 1922, together with enterprises closing, prices and production activity falling, and subsequently profits for export firms decreasing. Main big industrial companies (coal mining, textile and iron and steel industries) were mainly affected. They lobbied the government to increase foreign protection and to restrict workers' demands for wage increase, and they even supported and funded violent actions against trade unions. The social atmosphere deteriorated, mainly in industrial and urban areas (e.g., Barcelona), with an escalation of terrorist violence as well as government repression of unions. This period of turmoil ended in September 1923 with a military coup by Primo de Rivera, then the General of the Army in Catalonia, with the support of King Alfonso XIII.

## 2.2 The Primo de Rivera Dictatorship, 1923-1930

Primo de Rivera dictatorship was guided by nationalistic interests on economic grounds. His governments supported big Spanish companies with legislative measures and financial aid, and was involved in a huge infrastructure program (roads, railways, hydroelectric plants, dams, etc.). This brought with it an increase in foreign protection throughout the '20s,<sup>3</sup> and expansive public spending.<sup>4</sup>

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on the Great Depression in Spain (for a list of the literature, see Comín 1987, ft.9 and 10).

<sup>3</sup>The Spanish tariff index percentage (ad valorem) was 44% in 1925, far higher than the corresponding percentage for other countries, such as the US (29%), Italy (17%), Germany (12%), France (12%) or the UK (4%) (League of Nations, 1927).

<sup>4</sup>Although the governmental budget constraint was balanced, keeping within orthodoxy, the Spanish government created the *Presupuestos Extraordinarios* ["Extraordinary Budget"], to finance the building of civil infrastructures, ships and airplanes, and the *Caja Ferroviaria del Estado* ["State Railway Fund"], an autonomous institution to improve railway infrastructure,

The expansionary public spending policy turned out to be incompatible with the orthodox tax and monetary policies defended by the government: a balanced budget and the stabilization of the foreign exchange, aimed to the (never accomplished) return to the gold convertibility of the peseta. The discrediting of the economic policy led the dictator Primo de Rivera to resign on 29 January 1930, two months after the stock market crash in New York.

His resignation opened up a period of political and economic uncertainty in Spain. The monarchy was under siege, as King Alfonso XIII had personally supported Primo de Rivera's coup, and a new dictator, General Berenguer, was appointed. His government passed a balanced budget, abruptly stopping public investment programs. Industrial expectations plunged, and output and investment declined. To open a political transition, General Berenguer called local elections, resulting in the monarchist parties defeated in most of Spanish largest cities. As a consequence, King Alfonso XIII resigned on 14 April 1931, and Spain became a Republic.

### 2.3 The Spanish Second Republic, 1931-1936

The new regime brought out great expectations about solving some of Spain's social, economic and political issues which had been laid aside for years, even decades. The economic development of this period was the result of an overlapping internal period of political unrest and adverse external economic conditions.

Concerning external conditions, the impact of the international Great Depression seems to be limited. Carreras et al (2004) argue that it was milder than on other European countries since of the two channels of international transmissions, financial contagion and drop in foreign trade, the Spanish economy was only affected by the former.<sup>5</sup> The profile of the Spanish foreign trade was the following: exports mainly consist on agriculture goods, while imports include raw materials and produced goods difficult to substitute domestically.<sup>6</sup> Some produced goods were machinery, investment goods that played a role in the modernization of Spanish industrial and agricultural sectors; and raw materials, such as cotton –the main imported good–, were used as input for the industrial sector (e.g., textile production). (See Figure 4.)

The most competitive Spanish industries were involved in foreign trade throughout the '20s, and these were the ones mainly affected by the international crisis.

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both funded with public debt.

<sup>5</sup>After the end of the Great War many European economies asked for loans to reconstruct their countries, mainly from US banks. These were renewed throughout the '20s. The crash in November 1929 put several US banks into difficulties so they decided not to renew loans to European countries, putting some European economies in trouble. As indicated, the Great War turned Spain into a country in excess savings with no foreign lending and huge gold reserves.

<sup>6</sup>From 1930 to 1934, the most imported goods were raw cotton, followed by machinery, cars and their components, electric materials and fresh eggs; the most exported goods were oranges, followed by olive oil, and then by almonds, wine and potatoes. (Hernández-Andreu 1980, Table III-3).



Exports were primarily affected when the main buyers of agriculture goods established tariffs on them: the Hawley-Smooth tariff (1930) increased tariffs on onions, cork, oranges, and grapes; France established a contingent on wine imports (1931); and the Ottawa Conference restricted the import of oranges and rice to the Commonwealth (1932). In retaliation to US, the *Wais Tariff* (Law 1718, 22 of July of 1930) substantially raised duties on automobiles, tires, tubes and motion pictures (Jones, 1934); and to France, the Spanish government established contingents on imported goods (Law of 23 of December of 1931). Yet no further measures were taken against other countries. The reason was that imported goods were difficult to substitute domestically and Spanish authorities were aware that the low participation of Spanish imports on its partners' trade balances would result in an escalation of retaliatory measures that would only worsen Spanish exports.<sup>7</sup> In fact, Spanish foreign protection was mildly increased with respect other countries (see Figure 5). As a consequence, the terms of trade were deteriorated (see Figure 6).

Concerning the domestic situation, the literature has pointed out that the main problem in this period was the lack of economic confidence (e.g., Palafox 1991, Chap.4). From 1931 to 1933, the leftist parties ruled the country after winning the elections. On economic grounds, the government aimed to gain domestic and international respectability by passing balanced budgets, acknowledging the debts issued by the dictatorship –a fiscal financial burden throughout this period–, and stabilizing the exchange rate. In addition, the government aimed to fulfill social expectations by improving working conditions (e.g., increasing nominal wages and setting 8 hours of labor for farm workers), and carrying out a land reform (expropriations from landlords to their workers). The land expropriation laws, despite their quite small scope due to problems in funding the reform, caused alarm among industrial entrepreneurs who felt threatened that expropriations would spread to their own firms. Reforms collided with the resistance of those who had benefited from the previous regime, and the impatience of those to be benefited. In 1933 the rightist party CEDA won the elections, stopped some reforms (e.g., expropriations) and returned confidence to the entrepreneurs. In February 1936 the leftish party Frente Popular won the elections and in July the Civil War started. As Carreras et al (2004) pointed out “The sectoral policies implemented by the Republican governments did not succeed in preventing [Spain] from living –from April 1931 to July 1936– in a permanent oppressive atmosphere of economic crisis.” (p.259)

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<sup>7</sup>In 1932 the percentages of Spanish foreign trade participation in the trade balance of Spain's main foreign partners and of these countries' participation in the Spanish trade balance were markedly different. These countries' export/import participation in total Spanish balance trade was very high –Great Britain (25.8%/10.1%), France (18.0%/7.6%), US (7.0%/16.3%), and Germany (8.9%/10.2%)–, whereas Spain's export/import participation in these partners' total balance trade was very low –Great Britain (1.3%/1.5%), France (1.8%/2.2%), US (1.9%/0.7%), and Germany (1.4%/1.1%). See Palafox (1991, Table 3.7).

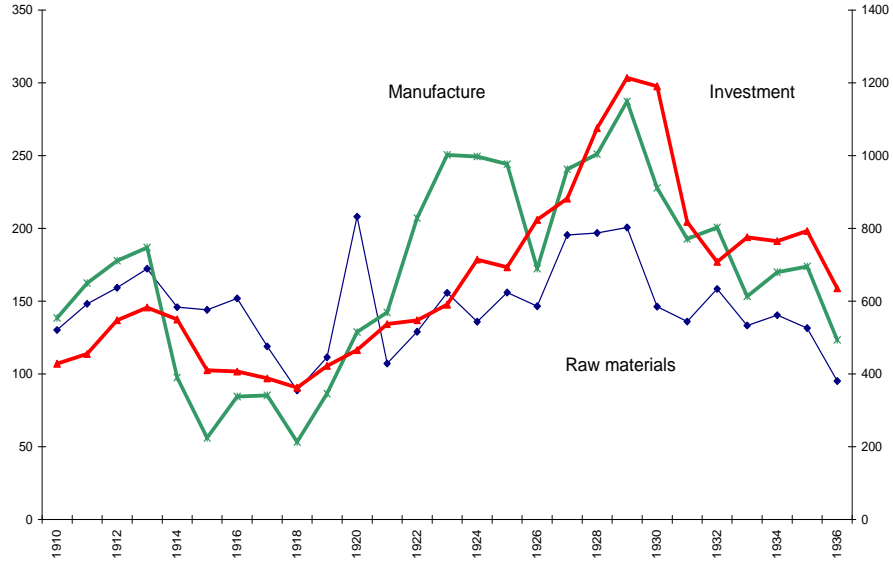


Figure 4: **Real imports (manufacture and raw materials)** –left scale– and **real investment** –right scale– (billions of 1995 pesetas). Source: Own computations from Prados-de-la-Escosura (2003) and Tena (1989).

### 3 Some features of the Great Depression in Spain

In this study, we mainly use Prados-de-la-Escosura (2003)’s database, the most comprehensive and homogeneous source for the interwar period. Initially, we argue our choice of the “normal” growth rate of the Spanish economy. Then we show data on aggregated variables that are relevant in our analysis and enumerate the features of the Great Depression in Spain, which are shared with those reported by other economies in the 30’s.<sup>8</sup> Finally, we conduct a growth accounting exercise.

#### 3.1 Detrending

The depth of the depression should be evaluated in relation to the “normal” growth rate of the economy. Choice of growth rate will greatly influence the evaluation of the depth and persistence of the depression. Table 1 presents average growth rates of Spanish GDP per capita, per working-age population (15-65), and per worker for different subperiods. The trend growth rate for the overall period for any of these three measures is lower than the secular growth rate of 2% for the U.S. economy in the 20th century (see Kehoe et al 2002). If we consider the whole

<sup>8</sup>See Cole et al (1999, 2002), Amaral et al (2002), Beaudry et al (2002), Fisher et al (2002) and Perri et al (2002).

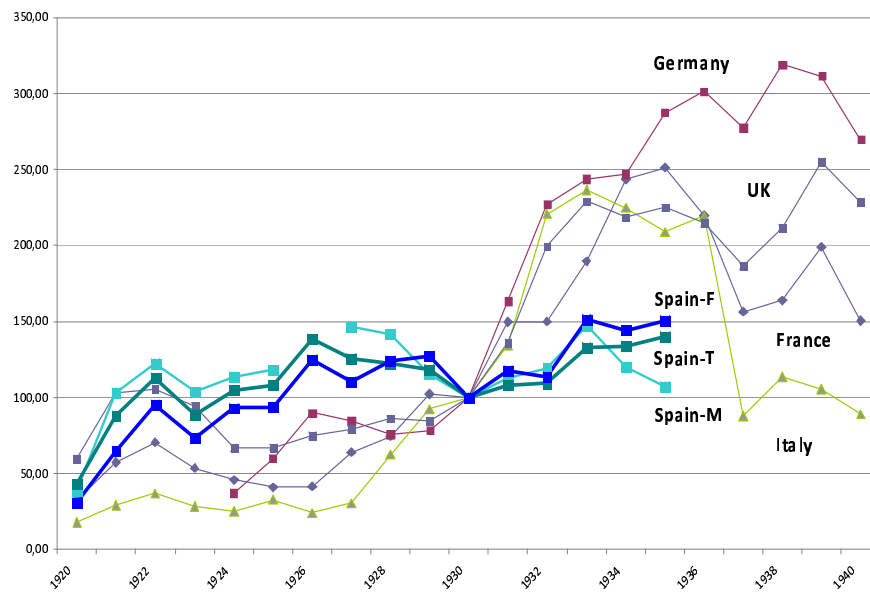


Figure 5: **International tariff levels for several countries (1930=100)**. The tariff levels are computed as the ratio of customs revenue to total imports. All countries and **Spain-M** are taken from Mitchell (1998, Tables G6 and E1). **Spain-F** (source of customs revenue: Fiscal Statistics) and **Spain-T** (source of customs revenue: Foreign Trade statistics) are taken from Tena (2005, Table 8.8).

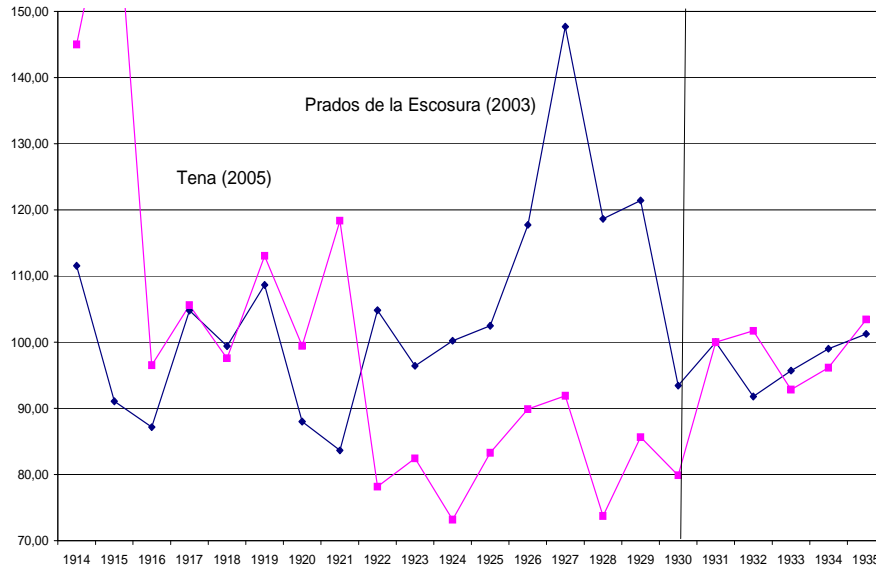


Figure 6: **The Spanish terms of trade** (price deflator of exports over price deflator of imports) 1931=100. Source: Own computations from Prados-de-la-Escosura (2003) and Tena (2005, Table 8.5).

period excluding 1930-1940, as in Cole et al (1999), growth rates higher than 2% are reported. Similar findings are reported if we exclude periods of depression from the entire available sample to compute the average growth rate of output, that is, the Great Depression (1930-1935), the trough in the Spanish Civil War (1936-1939) and the first period of autarky of the Franco regime (1940-1950). Thus, we choose 2% as the normal growth rate of the Spanish economy. Note that this rate is a conservative value compared to what economic agents might be expected in 1929 if they had extrapolated the 1919-1929 trend (2,99%) or after the autarky period trend 1951-2000 (4,05%).

### 3.2 Output and demand components

Let us first inspect the levels of output per capita and its components. All series are normalized to 100 in 1929. The undetrended and detrended measures of output components are presented in Table 2, and Table 3 and Figure 3 respectively. The figures show three features. First, the relative mildness of the depression from 1930 to 1932. Yet note that by 1933 the output was roughly 20% below trend, consumption fell by 17% of its trend value (a low drop ascribed in the literature to wage increase measures taken by the first republican governments), while government spending remained close to trend. Second, the collapse of imports and investment, and of exports from 1933. Observe the large decline in investment, whose level from 1932 to 1935 is lower than 55% below trend, and

	per capita	per working-age population	per worker
<i>By subperiods</i>			
1850-1929	1,28	1,27	1,23
1850-1913	1,13	1,14	1,08
1919-1929	2,99	2,88	2,65
<b>1930-1935</b>	-0,97	-1,17	-1,34
1941-1950	0,95	0,49	0,29
1951-2000	4,05	4,00	3,69
<i>Average</i>			
<b>All sample (1850-2000)</b>	1,94	1,87	1,75
Excluding 1930-1940	2,27	2,21	2,04
Excluding 1930-1950	2,38	2,35	2,20

Table 1: **Average yearly growth rate of GDP per capita, per working-age population and per worker.** Source: Own computations from Prados-de-la-Escosura (2003).

the decrease in the level of imports is over 49%. Third, there was a long period of output stagnation from 1933 to 1935.

Finally, Table 4 reports the share of output of demand components, and highlights two features: the share of investment and foreign trade (imports and exports) in output fell over the period, while consumption share stayed constant. The fall in investment may reflect the difficult internal political situation in the country, which would lower expectations about returns on investment projects. The decline in foreign trade may be due to bad future expectations in the case of imports, and to protectionist trade policies adopted by the Spain's main trading partners in the case of exports.

### 3.3 Input measures

Table 5 reports some of the input measures for the Spanish economy. Labor input, in number of workers and of hours, was unaffected by the slump, while productivity decreased. The drop in investment from 1931 on resulted in a decrease in capital growth.

### 3.4 Summary of main facts

The main facts for the Great Depression in Spain may be summarized as follows.

1. GDP per working-age population declined to 20% lower than its *normal* trend (Figure 3);

Year	GDP	Consumption	Govt. expend.	Investment	Exports	Imports
1929	100,00	100,00	100,00	100,00	100,00	100,00
1930	95,08	89,93	95,48	97,07	109,85	75,34
1931	91,43	91,82	91,34	65,88	104,02	61,70
1932	92,79	96,02	97,40	56,36	109,19	65,75
1933	89,85	90,59	107,74	61,04	79,54	55,39
1934	91,99	96,01	107,88	59,51	75,48	57,70
1935	92,94	96,34	111,95	60,97	70,40	55,50

Table 2: **Undetrended levels of real GDP and its components: 1929-1935.** All series are per working-age population, in millions of pesetas 1995. Source: Own computations from Prados-de-la-Escosura (2003).

Year	GDP	Consumption	Govt. expend.	Investment	Exports	Imports
1929	100,00	100,00	100,00	100,00	100,00	100,00
1930	93,21	88,17	93,60	95,16	107,70	73,86
1931	87,88	88,25	87,79	63,32	99,98	59,30
1932	87,44	90,48	91,78	53,11	102,90	61,96
1933	83,01	83,69	99,53	56,39	73,49	51,17
1934	83,32	86,96	97,71	53,90	68,36	52,26
1935	82,53	85,55	99,41	54,14	62,51	49,28

Table 3: **Detrended levels of real GDP and its components: 1929-1935.** All series are per working-age population, and were detrended by the average long-run growth rate of the Spanish economy 2,00%. Source: Own computations from Prados-de-la-Escosura (2003).

Year	Consumption	Govt. expend.	Investment	Exports	Imports
1929	70,61	14,28	4,37	7,02	7,11
1930	66,79	14,34	4,24	8,11	5,63
1931	70,91	14,26	2,87	7,99	4,80
1932	73,06	14,99	2,46	8,26	5,04
1933	71,19	17,12	2,66	6,21	4,38
1934	73,69	16,75	2,59	5,76	4,46
1935	73,19	17,20	2,65	5,32	4,25

Table 4: **Shares of output (in percent)**. Source: own computations from Prados-de-la-Escosura (2003).

	Workers <sup>a</sup>	Hours <sup>a</sup>	Productivity		Capital <sup>a</sup>
			(GDPfc/worker) <sup>b</sup>	(GDPfc <sup>b</sup> /hours <sup>a</sup> )	Growth rate (%)
1929	100,00	100,00	100,00	100,00	5,72
1930	96,95	97,56	95,41	99,68	5,02
1931	95,83	96,45	91,77	98,28	2,23
1932	99,64	100,43	92,50	96,56	1,41
1933	99,50	101,02	89,44	94,81	1,75
1934	105,90	107,71	91,52	92,44	1,59
1935	110,74	113,22	92,01	90,18	1,67

Table 5: **Input measures**. 1929=100 except for Capital in growth rates. Source: own computations from <sup>a</sup> unpublished data provided by Prados-de-la-Escosura and <sup>b</sup> Prados-de-la-Escosura (2003).

2. There was no sign of recovery of the Spanish GDP by 1935, just before the Spanish Civil War. This contrasts with the quick recovery of other economies (see Figure 2);
3. There was a dramatic drop in investment of almost 50%, mainly after 1931 (Figure 3); and,
4. Imports quickly dropped by 50% just after the Great Depression started, as happened in other economies, while exports dropped after 1933 (Figure 3).

### 3.5 Growth Accounting

We need to learn more about the cause of this depression, so we undertook a growth accounting exercise. The Appendix outlines our data sources. In our

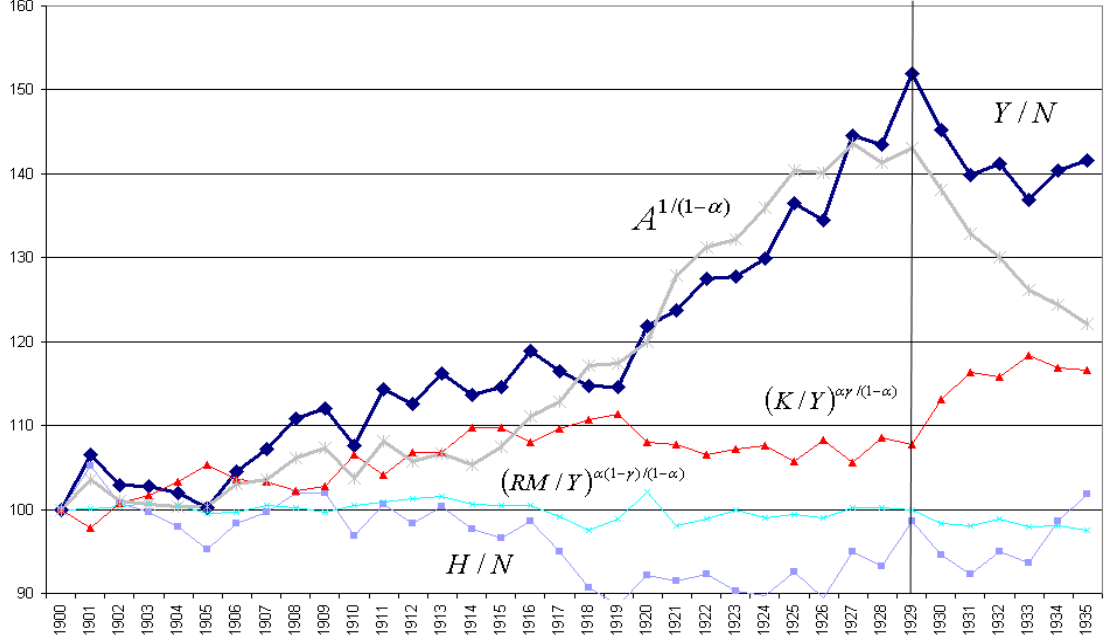


Figure 7: **Growth Accounting for Spain: 1900-1935.**

growth accounting exercise, we assume that the production function is given by

$$Y_t = A_t [K^\gamma RM^{1-\gamma}]^\alpha H^{1-\alpha},$$

where  $Y$  is aggregate output,  $A$  is TFP,  $K$  is aggregate capital,  $RM$  is the import of raw materials, and  $H$  is aggregate hours worked.

Once we have calibrated a capital and labor share parameters, we compute TFP:

$$A_t = \frac{Y_t}{[K^\gamma RM^{1-\gamma}]^\alpha H^{1-\alpha}}.$$

The growth accounting that we employ is based on that of Hayashi and Prescott (2002, 2007). We decompose output per working-age population into four factors: TFP factor, capital intensity factor, foreign input intensity factor, and active employment intensity, to rewrite the production function as

$$\frac{Y_t}{N_t} = A_t^{\frac{1}{1-\alpha}} \left(\frac{K_t}{Y_t}\right)^{\frac{\alpha\gamma}{1-\alpha}} \left(\frac{RM_t}{Y_t}\right)^{\frac{\alpha(1-\gamma)}{1-\alpha}} \left(\frac{H_t}{N_t}\right).$$

Notice that, in a balanced-growth path,  $(K_t/Y_t)^{\alpha\gamma/(1-\alpha)}$ ,  $(RM_t/Y_t)^{\alpha(1-\gamma)/(1-\alpha)}$  and  $H_t/N_t$  are constant, and growth in  $Y_t/N_t$  is driven by growth in  $A_t^{1/(1-\alpha)}$ .

Figure 7 and Table 6 depict the growth accounting for Spain over the same



	GDP	Hours worked	Capital/GDP	RM/GDP	TFP factor
1900-1935	0,37	0,05	0,28	-0,05	0,94
1900-1929	0,44	-0,05	0,16	0,00	2,02
1900-1914	0,91	-0,16	0,42	0,03	0,60
1914-1922	1,21	-0,94	-0,16	-0,24	4,56
1922-1929	2,50	0,95	0,10	0,10	2,02
1929-1935	-1,01	0,47	0,72	-0,23	-3,69

Table 6: **Growth Accounting for Spanish GDP per working-age population.**

period, 1900-1935. At least two features are worth noting. First, growth in real GDP per working-age person in Spain was rapid in this period until 1929, averaging 1.2 percent per year, mostly due to changes in total factor productivity  $A_t$ . Second, the sharp drop in  $Y_t/N_t$  from 1929 to 1935 was driven by both a fall in the productivity factor  $A_t^{1/(1-\alpha)}$ , and a fall in the foreign sector. Notice that internal and external factors account for the quantitative findings.

In summary, with regard to the period that concerns us, 1929-1935, the productivity factor seems to be the major contributor to the decline in output. These are the features of the Spanish data that we test our model against, both qualitatively and quantitatively. The policy changes or shocks that caused TFP in Spain to drop in 1929-1935 have yet to be identified.

## 4 The dynamic general equilibrium model

In this section we describe our dynamic general equilibrium framework for analyzing the depression in Spain for the interwar years. The basis for our analysis is a small open-economy with no international mobility of capital. There are four agents in the model, a foreign sector and three domestic agents: households, the productive sector, and the government.

*Domestic households.* The economy is populated by a continuum of households that maximize lifetime utility

$$\sum_{t=0}^{\infty} \beta^t U(\mathbf{C}_t, H_t) = \sum_{t=0}^{\infty} \beta^t \left[ \theta \text{Ln} \mathbf{C}_t + (1 - \theta) \text{Ln}(\bar{h}N_t - H_t) \right], \quad (1)$$

with  $\theta \in (0, 1)$ , where  $\beta < 1$  is the intertemporal discount rate,  $H_t$  is working hours, and  $\mathbf{C}_t$  is a composite consumption good resulting from the aggregation of consumption goods produced domestically  $C_{n,t}$ , and consumption goods produced by the foreign sector,  $C_{f,t}$ . The aggregation function is represented by

$$\mathbf{C} = \Phi(C_n, C_f) = C_n^\psi C_f^{1-\psi}, \quad (2)$$

with  $\psi \in (0, 1)$  a parameter that determines the shares of consumption goods. Total number of hours available for work is  $\bar{h}N$ , where  $N$  is working-age population and  $h$  is number of hours available for market work. One period of time is one year.

*Domestic firms.* Production in the *domestic sector* takes place according to the constant return-to-scale technology where capital, labor and foreign raw materials are the required inputs:<sup>9</sup>

$$Y = A \left[ K^\gamma RM^{1-\gamma} \right]^\alpha H^{1-\alpha}. \quad (3)$$

where  $1 - \alpha$  is labor share;  $A$  is total factor productivity;  $K$  and  $H$  are, respectively, input of capital and input of labor, and  $RM$  are the raw materials.

Investments are given from goods produced in the domestic sector and in the foreign sector. Aggregate investment is produced according to the constant return to scale technologies

$$\mathbf{I} = \phi(I_n, I_f) = B \left[ I_n^{\sigma_n} I_f^{\sigma_f} \right] \quad (4)$$

with  $\sigma_n + \sigma_f = 1$ ,  $B$  is a constant, and where  $I_n$  is the intermediate input used to produce investment goods and  $I_f$  is the intermediate input used to produce investment and produced by the foreign sector. The parameters  $\sigma_n$  and  $\sigma_f$  will determine the share of intermediate inputs.

Capital accumulation is given by

$$K_{t+1} = (1 - \delta)K_t + \mathbf{I}_t \quad (5)$$

with  $\delta \in (0, 1)$  representing capital depreciation.

*The foreign sector.* We assume that only trade exchanges are taking place, and there is no international mobility of capital (in accordance with the political decisions made by the interwar Spanish economic authorities, see Carreras et al 2004). In fact, according to data, imports mainly correspond to investment goods (machinery, fertilizers, etc.) and raw materials for industrial production (cotton, etc.), while exports mainly correspond to agriculture outputs (oranges, wine, etc.). The equilibrium of the foreign sector is then given by the balance in the trade account; that is,

$$P_{f,t}M_t = P_{n,t}X_t \quad (6)$$

where  $P_f$  is the price of the imported goods, and  $P_n$  is the price for the agriculture goods exported.

*The government.* The government may set a path of exogenous tariffs,  $\{\tau_t\}_{t \geq 0}$ ,

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<sup>9</sup>As in other production function specification, where intermediate inputs are considered, we assume some substitutability between capital and raw materials.

on imports,  $M$ , and rebate back the tariff revenue to households through lump-sum transfers,  $T$ . Consequently the government budget constraint is balanced every period; that is,

$$\tau_t P_{f,t} M_t = P_{n,t} T_t. \quad (7)$$

**Resource constraints.** Resource constraints are given by

$$C_{n,t} + I_{n,t} + X_t = Y_t \quad (8)$$

$$C_{f,t} + I_{f,t} + R M_t = M_t. \quad (9)$$

**Input markets equilibrium.** In each period  $t$ , the input markets clear

$$H_t^d = H_t^s \quad (10)$$

$$K_{t+1}^d = K_{t+1}^s. \quad (11)$$

## 4.1 The agents problem

*The domestic firms problem.* The optimization problem of the firms is static and consists of the choice of capital, labor and raw materials to maximize profits. That is, in the case of the domestic firm,

$$\Pi(K^d, H^d) = \max_{K^d, H^d} \left\{ P_n A \left[ K^d{}^\gamma R M^{1-\gamma} \right]^\alpha H^{d(1-\alpha)} - R K^d - W H^d - P_f (1 + \tau) R M \right\}$$

given the prices, where  $W$  is the nominal wage rate,  $R$  the rental rate of capital, and  $P_n$  is the price of domestic goods produced.

The first order conditions to the firms' problem satisfy

$$R K^d = \alpha \gamma P_n Y \quad (12)$$

$$W H^d = (1 - \alpha) P_n Y \quad (13)$$

$$P_f (1 + \tau) R M = \alpha (1 - \gamma) P_n Y, \quad (14)$$

jointly with the technology function (3).

*The domestic household problem.* Households choose the sequences of work hours supplied,  $H^s$ , intermediate inputs in the consumption function,  $C_n$  and  $C_f$ , amount of resources devoted to investing,  $I_n$  and  $I_f$ , and, consequently, stock of capital supplied next period,  $K_{t+1}^s$ , to maximize (1), subject to the sequence of budget constraints

$$P_{n,t} (C_{n,t} + I_{n,t}) + P_{f,t} (1 + \tau_t) (C_{f,t} + I_{f,t}) = W_t H_t + R_t K_t + P_{n,t} T_t \quad (15)$$

and to constraints (2), and (4) and (5); and given the sequence of prices  $\{W_t, R_t P_{n,t}, P_{f,t}\}_{t \geq 0}$ , and the initial stock of capital in each period,  $K_t$ , and where the sequence

of taxes  $\{\tau_t\}_{t \geq 0}$  is exogenous. It is straightforward to write down the necessary first-order conditions:

$$P_{f,t}(1 + \tau_t)C_{f,t} = \frac{1 - \psi}{\psi} P_{n,t}C_{n,t} \quad (16)$$

$$P_{f,t}(1 + \tau_t)I_{f,t} = \frac{1 - \sigma}{\sigma} P_{n,t}I_{n,t} \quad (17)$$

$$W_t H_t = W_t \bar{h} N_t - \frac{1 - \theta}{\theta \psi} P_{n,t} C_{n,t} \quad (18)$$

$$\beta \left[ \frac{R_{t+1}}{P_{n,t+1}} + \frac{1 - \delta}{\sigma} \frac{I_{n,t+1}}{\mathbf{I}_{t+1}} \right] = \frac{1}{\sigma} \frac{I_{n,t}}{\mathbf{I}_t} \frac{C_{n,t+1}}{C_{n,t}} \quad (19)$$

together with (4), (5), and (15). Substituting (16)-(18) into the budget constraint (15), we find

$$\frac{1 - \sigma + \theta}{\theta \psi} P_n C_n + \frac{1}{\sigma} P_n I_n = W \bar{h} N + RK + T. \quad (20)$$

*The foreign sector problem.* Observe that the maximizing problem of the foreign sector behavior is not-well characterized as there exist no demand for exports nor supply of imports functions. Then, we will assume that, at every period  $t$ , the supply of import goods is infinitely elastic at the relative price<sup>10</sup>

$$\frac{P_{f,t}}{P_{n,t}} = 1. \quad (21)$$

*Competitive equilibrium.* We determine the equilibrium of the economy with the first-order conditions for households and firms, along with the proper transversality conditions, and the equilibrium aggregate conditions for domestic and foreign goods (8)-(9), the equilibrium condition for the labor market (10), the financial equilibrium condition (11), and the balance of the government budget (7) and the foreign trade exchanges (6).

## 4.2 Steady state equilibrium

In the steady state, the aforementioned equilibrium reduces to determine 18 unknown variables and 18 equations. The unknowns consist of 7 unknowns determined by households  $\{H^s; K^s; C_n, C_f; I_n, I_f, \mathbf{I}\}$ , 4 unknown variables determined

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<sup>10</sup>To characterize the behavior of the foreign sector, Perri et al (2002) have proposed an alternative assumption. They assumed that the real demand for exports is always equal to the real demand for imports; that is,  $X = M$ . They interpret this restriction assuming the existence of two symmetric countries that are both affected by the same shocks and implement the same policies. If we take this assumption on the equilibrium condition in the trade sector (condition (6)), the price of imports becomes equal to domestic prices:  $P_f = P_n$ .

by firms  $\{H^d; K^d; RM; Y\}$ , 1 unknown variable from the government constraint,  $T$ , and 2 unknown variables from the foreign sector  $\{X, M\}$ . Finally, there are four markets so that there are four prices  $\{P_n, P_f, W, R\}$ . The equations are the following: the households' first order conditions (16)–(19) and budget constraint (20); investment function (4); capital accumulation (5); firms' first order conditions (12)–(14) jointly with the technology function (3); government budget constraint (7); and, lastly, the resource constraints (8)–(9), equilibrium conditions (10)–(11), the foreign market condition (6), and the supply of foreign goods (21).

Finally, in order to match the number of unknowns and equations, we know from Walras' Law that one market is redundant. Thus, we drop the budget constraint (20), and then the solutions are function to the relative prices  $P_f/P_n$ .

### 4.3 Calibration

We now describe the calibration process. The structural parameters were chosen so that the model matches certain steady state features of the Spanish economy at the beginning of the 20th century (see Cooley et al, 1995). The data on the Spanish economy that go into the following calibration are described in the Data Appendix.

The following parameters need to be calibrated: preference parameter between leisure and consumption ( $\theta$ ), depreciation rate ( $\delta$ ), discount factor ( $\beta$ ), labor share ( $\alpha$ ), elasticity between domestic and foreign goods ( $\psi$ ), elasticity between domestic and foreign investment in the aggregate investment function ( $\sigma$ ) and elasticity between capital and the imported raw input ( $\gamma$ ).

The preference parameter  $\theta$  is obtained from the equilibrium condition given by equation (18),

$$\theta = \frac{P_{n,t}C_{n,t}}{\psi_n(W_t\bar{h}N_t - W_tH_t) + P_{n,t}C_{n,t}}.$$

We average this equation over the 1900-1935 period and solve for  $\theta$ . The obtained value of  $\theta$  matches the fact that households dedicate around one-third of their time to market activities. The depreciation rate  $\delta$  is obtained as the sample average over the period from 1900-1935 of the ratio consumption of fixed capital over capital stock from the equation (5). The discount factor  $\beta$  is obtained from the intertemporal equilibrium condition given by equation (19)

$$\beta = \frac{C_{nt+1}}{C_{n,t}} \frac{\frac{I_{n,t}}{\mathbf{I}_t\sigma}}{(1-\delta)\frac{I_{nt+1}}{\mathbf{I}_{t+1}\sigma} + \alpha\gamma\frac{Y_{t+1}}{K_{t+1}}}.$$

We average this equation over the 1900-1935 period and solve for  $\beta$ . The share parameter  $\alpha$  is determined in the usual way, as the sample average over the period from 1900-1935 of the labor income share in GDP. The elasticity parameters  $\psi$ ,  $\sigma$  and  $\gamma$  are calibrated to match the following ratios of the Spanish economy for

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## Preferences

Individual Endowment of working hours a (hours)	$\bar{h}$	5200
Subjective Discount Rate	$\beta$	0.902
Substitution parameter between consumption and leisure	$\theta$	0.363
Share of domestic goods in consumption	$\psi$	0.978

## Technology

Capital share	$\alpha$	0.39
Raw Inputs Share in industrial aggregate capital	$\gamma$	0.91
Domestic capital rate of depreciation	$\delta$	0.0534
Share of domestic goods investment in aggregate investment	$\sigma$	0.62

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Table 7: **Parameters of the calibration.**

the sample 1900-1935:

$$\frac{C_n}{C} = 0,86; \quad \frac{I_n}{I} = 0,62; \quad \frac{RM}{M} = 0,35.$$

In a way to that as Perri et al (2002), the import tariff  $\tau$  is interpreted as representative of all forms of distortions to the purchase of foreign imports. We start with a value of  $\tau=0$  and then we calculate the increase of  $\tau$  to reproduce the fall in trade. This new value is equal to 0.15.

Table 7 summarizes the parametric values used.

## 5 The role of technology and foreign trade shocks

The key facts that characterized the Great Depression in Spain, shown in Section 3.4, are the following:

- (i) A drop of GDP by 20% lower than its trend;
- (ii) No sign of recovery of the Spanish GDP by the end of the period;
- (iii) A sharp drop in investment; and,
- (iv) A sharp decline in foreign trade.

We will judge the success of our framework in terms of how well it can account for these main features of the data. In this section, we will carry out a number of experiments to shed light on what could be the key factors in the process of the Great Depression in Spain.

The growth accounting exercise presented in Section 3.5 showed that the drop in GDP for the period 1929-1935 was mainly due to the fall in the TFP and, to a lesser extent, in the foreign trade. Thus, our first experiment is to measure the contribution of the TFP to the Great Depression. To this aim, we begin by exogenously introducing the series of productivity (average productivity) for the 1929-1935 period into the calibrated model. Then, we are interested in studying the contribution of the foreign sector, which has been signalled as the transmission trigger of the Great Depression in Spain (see Hernández-Andreu 1980). To this end, we undertake two experiments. First, to simulate the adoption of protectionist policies by the Spanish authorities, we introduce disturbances in the form of foreign trade barriers to observe the impact that the foreign sector could have on the economy in this period. Second, to simulate the adoption of protectionist policies by the Spanish foreign traders, we exogenously introduce the series of terms of trade for the 1929-1935 period into the calibrated model.

## 5.1 The role of technology shocks (exogenous TFP)

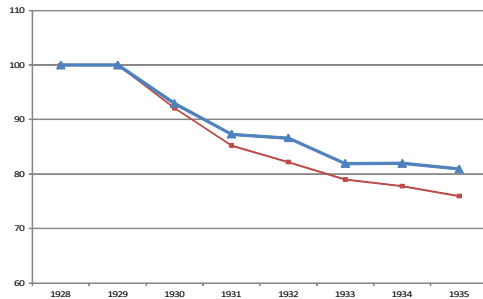
In this section we analyze the contribution of the TFP to the Great Depression in Spain. To do this, we simulate the model, taking measured productivity as exogenous. According to the results, see Figure 8(a), the fall in measured TFP in Spain can account for more than 90% of the fall in GDP per capita in the 1929-1935 period. Hence, the technology shock story qualitatively and quantitatively matches the Spanish experience, although the model predicts a slightly overestimated drop in GDP. This suggests that TFP can explain much of the economic downturn and the recovery pattern. Concerning imports and investment, the TFP could explain a large percentage of the fall in imports, overestimating the fall of investment in 1930 (see Figure 8(b) and 8(c)). Overestimation of the fall in investment in the first year after the shock might mean that other factors affects investment decisions, such as foreign trade as suggested by the foreign explanation.

The simulated model also does a good job of accounting for the labor input, see Figure 8(d). Note, however, that there is a fall in labor input reported in 1933, which is not captured by the model. We conjecture that this fall in actual hours worked is because of a legislative change: the Republican government passed a law in 1933 extending the the 8-hour maximum working day to those workers in the agricultural sector. However, from that year on, the labor input increased to recover its level in 1929. This issue is thus left unexplained.

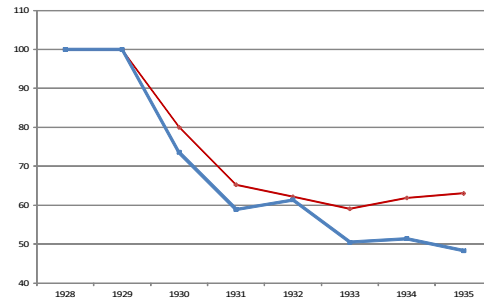
To summarize this section, we obtain one finding and one puzzle. The finding is that measured TFP can account to a great extent for reproducing the (non-)recovery pattern of the Spanish economy from 1929-1935, and it does a very good job of reproducing imports and labor input. Therefore, any explanation for the GDP in Spain should be consistent with TFP behavior. For instance, this finding might provide some support for the sociopolitical explanations (see Carreras et al 2004, Chap.5): the increasingly political and social turmoil environment in

the Spanish Republic thwarted any economic recovery, which contrasts with the experiences of other countries.

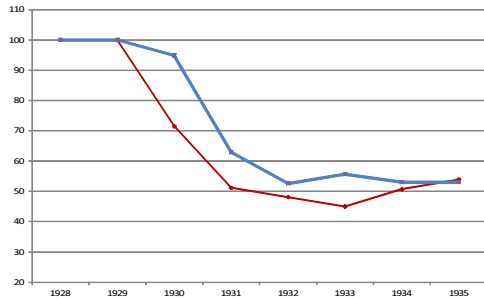
Yet it remains a puzzle to be solved: which mechanism is it that leads to the internal shock that causes a decline in the TFP? Did the World Depression account for the slump in the Spanish economy? Note that the TFP might reflect the deterioration in expectations induced from the internal and external events. To disentangle these effects, our model allows further exploration of the external explanation as a source of the Spanish recession, so we propose two experiments: how the Spanish economy was affected by protectionist policies adopted by the Spanish authorities, and how it was affected by foreign protectionist policies.



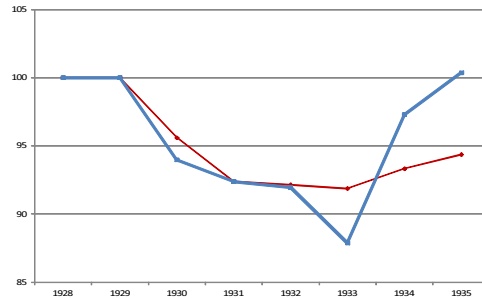
(a) Detrended GDP per working age population data 1929-1935 and the simulation with a technology shock.



(b) Spanish Imports data 1929-1935 and the simulation with a technology shock



(c) Spanish Investment data 1929-1935 and the simulation with a technology shock.



(d) Spanish Hours Worked data 1929-1935 and the simulation with a technology shock.

Figure 8: **The role of technology shocks (exogenous TFP).** Data (blue thick line) and model (red thin line).

## 5.2 The role of trade restrictions

The Spanish government put protectionist policies into practice in retaliation against those implemented by foreign countries against Spanish goods (e.g., De-



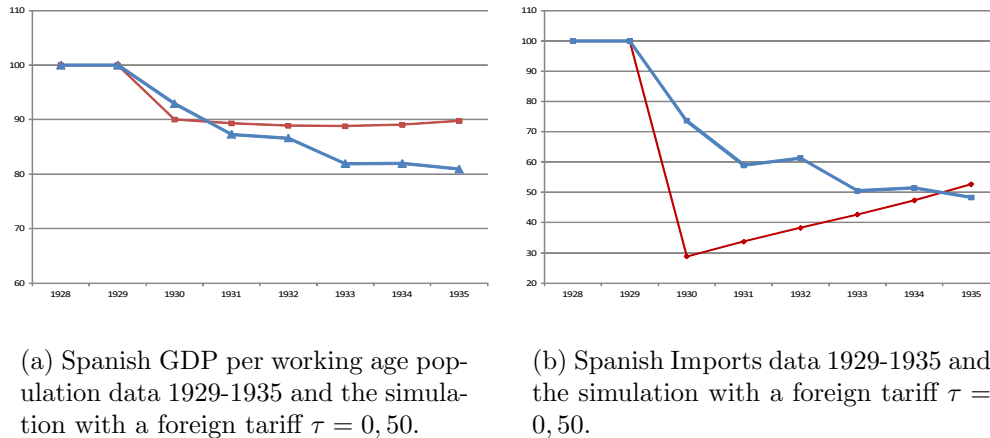


Figure 9: **The role of trade restrictions.** Data (blue thick line) and model (red thin line).

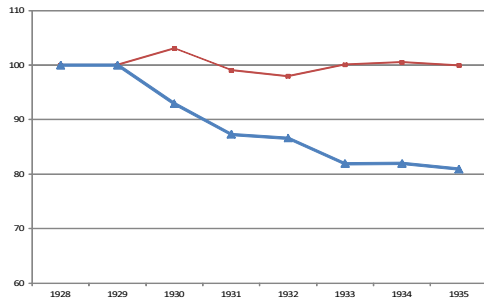
cree Law 23 December 1931 against French trade restrictions on Spanish exports to France). To investigate the importance of these policies in explaining the Great Depression, we conduct an experiment that is very similar to the one conducted for Italy by Perri et al (2002, Sec.5). Starting from the steady state in which  $\tau = 0$ , i.e. no trade barriers exist, we consider the unexpected and permanent introduction of an import tariff. We then study the reaction of the economy after introducing this tariff.

The new value of the tax set to reproduce the decline in imports in 1930 is  $\tau = 15\%$ . This tax, however, only allows us to predict an average decline of 5% of GDP throughout the period, much less than the value actually observed, and it cannot explain the fall in imports by 50% in 1935. An import tariff close to 50% would be required to reduce imports by half in 1935 and reproduce the steady decline of GDP in the 1930-1935 period, an implausible explanation for the process that imports followed in the period of the Great Depression. (See Figure 9.) Although the initial drop is reproduced, it suggests that an initial shock on foreign trade is not enough to explain the persistence of the fall in GDP.

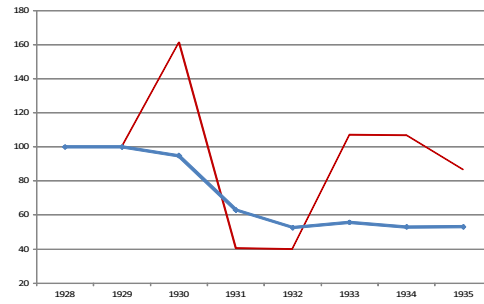
This finding, however, is not surprising. Spanish authorities were reluctant to impose trade sanctions because imports from other countries –mainly machinery and raw materials– were difficult to substitute. In addition, the ability to harm those other traders was very limited because participation of the Spanish exports into other countries trade balance was generally less than 2% (see Palafox 1991, Table 3.7).

### 5.3 The role of the shocks in the terms of trade. Data (blue thick line) and model (red thin line).

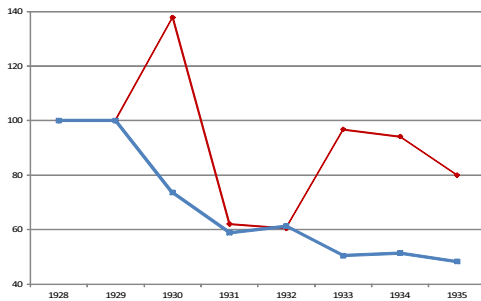
Spanish traders put protectionist policies into practice at the beginning of the 1930s (e.g., the Hawley-Smoot tariff in 1930, France contingent import plan 1931,



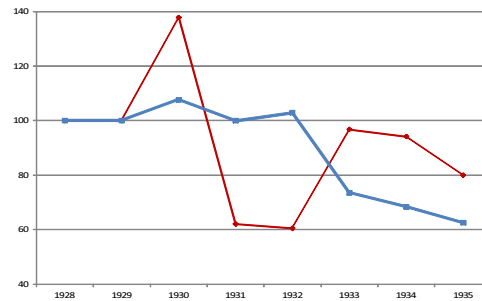
(a) Spanish GDP per working age population 1929-1935 and simulation with a shock in the terms of trade.



(b) Spanish Investment 1929-1935 and simulation with a shock in the terms of trade.



(c) Spanish Imports 1929-1935 and simulation with a shock in the terms of trade.



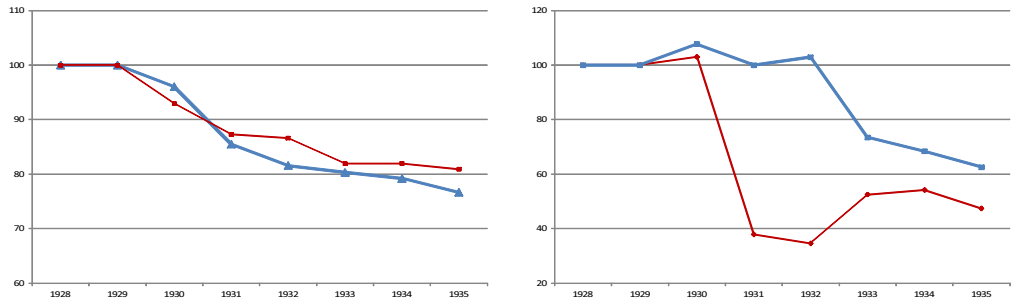
(d) Spanish Exports 1929-1935 and simulation with a shock in the terms of trade.

Figure 10: **The role of the shocks in the terms of trade.** Data (blue thick line) and model (red thin line).

and the Commonwealth countries at the Ottawa Conference June 1932). To investigate the importance of these policies in explaining the Great Depression, we conduct an experiment of introducing exogenously the terms of trade into the calibrated model.

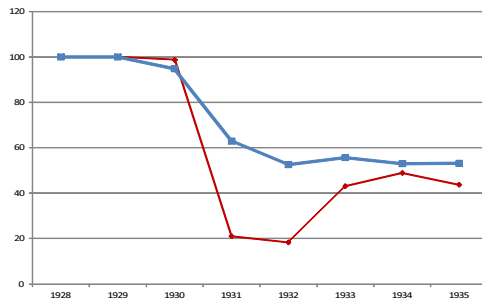
Our results suggest that the deterioration of the terms of trade cannot explain the economic downturn, although they can explain the delay in the drop in exports and investment (see Figures 10(a)-10(b)). Observe that the experiment of introducing the terms of trade exogenously into the model predicts a slight increase in output and investment in 1930 not observed in the data. These are precisely the finding of Choudhri et al (1980), also suggested by other proponents of the domestic-source explanation (e.g. Palafox 1991), who assert that the flexible-exchange regime isolated the Spanish economy from the international perturbations.

Finally, we additionally introduce the TFP path. The results improve substantially in terms of explaining the evolution of the GDP, as observed in Figures



(a) Spanish GDP per working age population data 1929-1935 and simulation with a shock in the terms of trade and TFP.

(b) Spanish Exports data 1929-1935 and the simulation with a shock in the terms of trade and TFP.



(c) Spanish Investment data 1929-1935 and the simulation with a shock in the terms of trade and TFP.

Figure 11: **The jointly role of technology shocks (exogenous TFP) and the shocks in the terms of trade.** Data (blue thick line) and model (red thin line).

(11(a))-(11(c)). However, although it predicts the initial drop in exports and investment, it overestimates their subsequent evolution to indicate larger declines in both variables.

## 6 Concluding comments

In this paper we have sought evidence regarding which factors caused the 20% slowdown in the Spanish economy in the decade of the '30s. We aimed to assess the following two issues concerning this period of the Spanish economy: did the World Depression account for the slump in the Spanish economy?; and, why did the Spanish economy, unlike others, still show no signs of recovery at the onset of the Spanish Civil War (1936-1939)? We have found that TFP accounts for most of the explanation regarding the slowdown throughout this period, and the

terms of trade explain the evolution of foreign trade. These findings suggest that (i) the origin of the Spanish downturn had a domestic source –with a drop in GDP, investment and imports–; (ii) the external economic and political situation affected the Spanish economy with some delay –with a drop in foreign trade and investment; and, (iii) the socio-political situation delineated the recovery pattern. These results also give some clues to future research. The introduction of institutional features in the model, such as the political change of regime as a source of uncertainty in the agents’ expectations, might account for further understanding this period.

## References

- [1] Amaral, Pedro S.; and James C. MacGee (2002) “The Great Depression in Canada and the United States: A Neoclassical Perspective,” *Review of Economic Dynamics*, vol. 5 (1), 45-72.
- [2] Beaudry, Paul; and Franck Portier (2002) “The French Depression in the 1930s,” *Review of Economic Dynamics*, vol. 5 (1), 73-99.
- [3] Bergoeing, Raphael; Patrick J. Kehoe, Timothy J. Kehoe; and Raimundo Soto (2002) “Decades Lost and Found: Mexico and Chile Since 1980,” *Federal Reserve Bank of Minneapolis Quarterly Review*, 26, n.1, pp.3-30.
- [4] Bernanke, Ben; and, Harold James (1991) “The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison.” In R. G. Hubbard, ed., *Financial Markets and Financial Crises*, Chicago: University of Chicago Press.
- [5] Carreras, Albert; and, Xavier Tafunell (2004) *Historia Económica de la España Contemporánea*. Editorial Crítica, Barcelona.
- [6] Choudhri, Ehsan U.; and, Levis A. Kochin (1980) “The Exchange Rate and the International Transmission of Business Cycle Disturbances: Some Evidence from the Great Depression,” *Journal of Money, Credit and Banking*, 12, num.4(1), pp.565-574
- [7] Cole, Harold L.; and Lee E. Ohanian (1999) “The Great Depression in the United States from a Neoclassical perspective,” *Federal Reserve Bank of Minneapolis Quarterly Review*, 23, 2-24.
- [8] Cole, Harold L.; and Lee E. Ohanian (2002) “The Great U.K. Depression: A Puzzle and possible Resolution,” *Review of Economic Dynamics*, vol. 5 (1), 19-44.
- [9] Comín, Francisco (1987) “La Economía Española en el Período de Entregueras (1919-1935),” en Nadal, Jordi; Albert Carreras and C. Sudrià (eds.) *La economía española en el siglo XX. Una perspectiva histórica*. Editorial Ariel, Barcelona, pp.105-149.
- [10] Comín, Francisco (1988) *Hacienda y Economía en la España Contemporánea (1800-1936)*. Instituto de Estudios Fiscales, Madrid.
- [11] Comín, Francisco (2002) “El Período de Entregueras (1914-1936),” en Comín, Francisco; Mauro Hernández and Enrique Llopis (eds.) *Historia Económica de España. Siglos X-XX*. Editorial Crítica, Barcelona, pp.285-329.

- [12] Cooley, Thomas F.; and Edward C. Prescott (1995) "Economic Growth and Business Cycles," in T. F. Cooley (ed.), *Frontiers in Business Cycle Research*, pp.1-39. Princeton University Press.
- [13] Fisher, Jonas D.M.; and, Andreas Hornstein (2002) "The Role of Real Wages, Productivity, and Fiscal Polity in Germany's Great Depression 1928-1937," *Review of Economic Dynamics*, vol. 5 (1), 100-127.
- [14] Fontana, Josep; and, Jordi Nadal (1976) "Spain 1914-1970," in Carlo M. Cipola (ed.) *The Fontana Economic History of Europe. Comtemporary Economies (Part Two)*. Glasgow, William Collins Sons, pp.460-529.
- [15] Harrison, Joseph (1983) "The Inter-War Depression and the Spanish Economy," *Journal of European Economic History* 12, pp.295-321.
- [16] Hayashi, Fumio; and, Edward C. Prescott (2002) "The 1990s in Japan: A lost decade," *Review of Economic Dynamics* 5 (January) pp.206-35.
- [17] Hayashi, Fumio; and, Edward C. Prescott (2007) "The 1990s in Japan: A lost decade," in Timothy J. Kehoe and Edward C. Prescott (eds.) *Great Depressions of the Twentieth Century*, Minneapolis: Federal Reserve Bank of Minneapolis, pp. 257-286.
- [18] Hernández Andreu, Juan (1980) *Depresión Económica en España 1925-1934*, Instituto de Estudios Fiscales, Ministerio de Hacienda, Madrid.
- [19] Kehoe, Timothy J.; and, Edward C. Prescott. (2002) "Great Depressions of the 20th Century," *Review of Economic Dynamics*, vol. 5 (1), 2-18.
- [20] Jones, Joseph M. (1934) *Tariff retaliation: Repercussions of the Hawley-Smoot bill*. Philadelphia: University of Pennsylvania Press.
- [21] League of Nations (1927) *Tariff Level Indices*, Geneve.
- [22] Mitchell, Brian R. (1998) *International Historical Statistics: Europe, 1750-1993, 4th ed.* MacMillan, London.
- [23] Palafox Gamir, Jordi (1980) "La Depresión Económica Internacional de los años treinta y la crisis industrial española," *Investigaciones Económicas*, n.11, 5-46.
- [24] Palafox Gamir, Jordi (1991) *Atraso Económico y Democracia. La Segunda República y la economía española, 1892-1936*, Editorial Crítica, Barcelona.
- [25] Prados de la Escosura, Leandro (2003) *El Progreso económico de España (1850-2000)*, Fundación BBVA, Madrid.
- [26] Perri, Fabrizio; and, Vincenzo Quadrini (2002) "The Great Depression in Italy: Trade Restrictions and Real Wage Rigidities," *Review of Economic Dynamics*, vol. 5 (1), 100-127.

- [27] Prescott, Edward C. (1999) "Some Observations on the Great Depression," *Federal Reserve Bank of Minneapolis Quarterly Review*, 23, 25-31.
- [28] Tena, Antonio (1989) "Comercio Exterior," en Albert Carreras (ed.) *Estadísticas Históricas de España Siglos XIX-XX*, Fundación Banco Exterior, Madrid.
- [29] Tena, Antonio (2005) "Sector Exterior," en Albert Carreras (ed.) *Estadísticas Históricas de España Siglos XIX-XX, Segunda edición*, Fundación BBVA, Bilbao.
- [30] Tortella, Gabriel; and, Jordi Palafox (1984) "Banking and Industry in Spain, 1918-1936," *The Journal of European Economic History*, 13, pp.81-111.

# Appendix.

## A.1 Data

Macroeconomic aggregates. Prados-de-la-Escosura (2003) provides the following time series (for 1850-2000): Share of economic sectors (Agriculture, Industrial, Construction and Services) in the GDP (at factor costs) (*Apéndice K*); and, real and nominal time series for the aggregate: GDP, Private consumption, Imports and Exports (*Apéndice M*).

Other foreign sector series.

Tena (1989) provides data (1910-1936) for the structure of Spanish foreign trade by import goods type.

Hernández-Andreu (1980) provides data (1926-1933) of aggregate imports of machinery (Table IV-10) and agriculture sector imports of machinery (Table IV-5), whose statistical source is Estadísticas de Comercio Exterior.

We made used of two series for the terms of trade. Tena (2005, Table 8.5) provides a series of net real terms of trade (Relaciones de intercambio netas), and we have computed the ratio of export over import price Deflator indices in Prados-de-la-Escosura (2003, Table 11.6).

## A.2 Calibration

We will first choose data time series that are consistent with our economic model. To this aim, we will make the following assumptions.

1. We disaggregate the series of imports (Prados-de-la-Escosura, 2003) into consumption of the foreign good, raw materials for domestic production and investment of the foreign good, making use of the shares of import of foodstuffs (Alimentos), raw materials (Materias primas), and manufactories (Manufacturas) provided by Tena (1989 Table 8.5).<sup>11</sup>
2. The series of consumption of the foreign good, both nominal  $P_f C_f$  and real  $C_f$ , are found by multiplying the import of foodstuffs ratio, at the structure of foreign trade ratios (Tena 1989, Table 8.5), by the nominal and real series imports (Prados-de-la-Escosura 2005), respectively.
3. The series of consumption of the domestic good, both nominal  $P_n C_n$  and real  $C_n$ , are found as the difference between the series of the aggregate consumption, nominal and real (Prados-de-la-Escosura 2005), and the series of consumption of the foreign good, nominal  $P_f C_f$  and real  $C_f$ .

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<sup>11</sup>The source of these series is Prados-de-la-Escosura (1986, Table AP-5 and AP-6 columns Total Imports) for the period from 1850 to 1914, and the annual statistics of Estadísticas del Comercio Exterior.



4. The series of investment of the foreign good, both nominal  $P_f I_f$  and real  $I_f$ , are found by multiplying the import of machinery ratio, at the structure of foreign trade ratios (Tena 1989, Table 8.5), by the nominal and real series imports (Prados-de-la-Escosura 2003), respectively.
5. The series of investment of the domestic good, both nominal  $P_n I_n$  and real  $I_n$ , are found as the difference between the series of the aggregate consumption, nominal and real (Prados-de-la-Escosura 2005), and the series of consumption of the foreign good, nominal  $P_f I_f$  and real  $I_f$ .
6. The series of raw materials, both nominal  $P_f RM$  and real  $RM$ , are found by multiplying the import of raw materials ratio, at the structure of foreign trade ratios (Tena, 1989), by the nominal and real series imports (Prados-de-la-Escosura 2005), respectively.
7. Exports equal imports in the model, so we take for exports the imports time series, both nominal and real. This means that the domestic GDP in the model, equilibrium condition (8), is the addition of the data series of aggregate consumption, aggregate investment and imports.
8. As long as the model considers that in the benchmark model no public sector exists, for calibration purposes we consider that GDP at factor costs equals GDP, both nominal and real.