ARTICLES

The Spanish Money Supply, 1874-1935

Pablo Martín Aceña
University Alcalá de Henares

I. Introduction

As in other countries, in Spain of money has played an important role in determining economic and political developments. The evolution of money has raised large controversies since its behaviour has affected the path of nominal income, prices and the exchange rate. In this paper we present a collection of recently compiled data on Spanish monetary aggregates. The time series assembled here come from the studies by Anes (1974), Tedde (1974) and Tortella (1974) for the period 1984-1899; and for the period 1900-1935 they are taken from Martín Aceña (1985). Although the statistics are well known to Spanish scholars they have not yet reached a broader audience. Hence, we have thought that it would be of interest to publish some of them here, so that non-Spanish readers can have easy access to them. [1] In addition to this trivial excuse there are other reasons that justify this paper. First we describe the evolution of the stock of money and its main components. Second we study the sources of growth in the money supply. Third we examine briefly the relationship between money, income and prices.

* I am grateful to Gabriel Tortella for comments on earlier drafts. Any errors are mine alone.

[1] More than a decade ago Bustelo and Tortella (1976) published a money supply series covering the period 1874-1972.

Our analysis follows the traditional approach developed by Friedman and Schwartz (1963) and Cagan (1965), where the growth of the stock of money is decomposed into the contribution of three monetary aggregates: the monetary base, or high-powered money, the deposit-currency ratio and the deposit-reserve ratio. This type of analysis has also been used by many other scholars studying the behaviour of money in different countries. [2] We define the money stock (M) as the sum of the public's holdings of currency (C) and total bank deposits (D). Currency includes both gold and silver coins in circulation and Bank of Spain notes. Bank deposits comprise four series: private current accounts at the Bank of Spain, demand and time deposits with the commercial banking system and saving deposits with the non-banking financial institutions. The monetary base (B) is set equal to the public's holdings of currency (C) and total bank reserves (R), which in turn include vault cash and bankers' balances at the Bank of Spain. The currency ratio (c) is obtained by dividing total deposits by currency holdings of the public, and the reserve ratio (r) is measured by total deposits divided by bank reserves.

We begin in 1874 because this year is the earliest for which we have a continuous series of estimates of the stock of money; furthermore, at that date the Bank of Spain was entrusted with the monopoly of issue of banknotes for the whole country. We take 1935 as the final date, because it is the last year before the outbreak of the Civil War, when most Spanish economic variables are interrupted. All aggregates are based on end-of year data, and the monetary unit used is the "peseta". The time series are shown in the Appendix, which also lists the sources.

Part II presents two figures which summarize the statistical information. The evolution and changes of the Spanish stock of

[2] See Jonung (1976) for Sweden, Klovland (1983) for Norway, Fratianni and Spinelli (1984) for Italy, Saint Marc (1983) for France, Sheppard (1971), Bordo (1981), Capie and Webber (1985) for the UK.

money is explained, and its rate of growth compared with that of other countries. Part. III uses all monetary aggregates to analyize the proximate determinants of the Spanish money supply between 1874 and 1935. An attempt is made to determine how much of the change in the money supply is attributable to the behaviour of private individuals, how much to the banking system and how much to the stock of high powered money or base money. Finally, Part IV looks at the relationship between money, income and prices.

II. The evolution of the stock of money

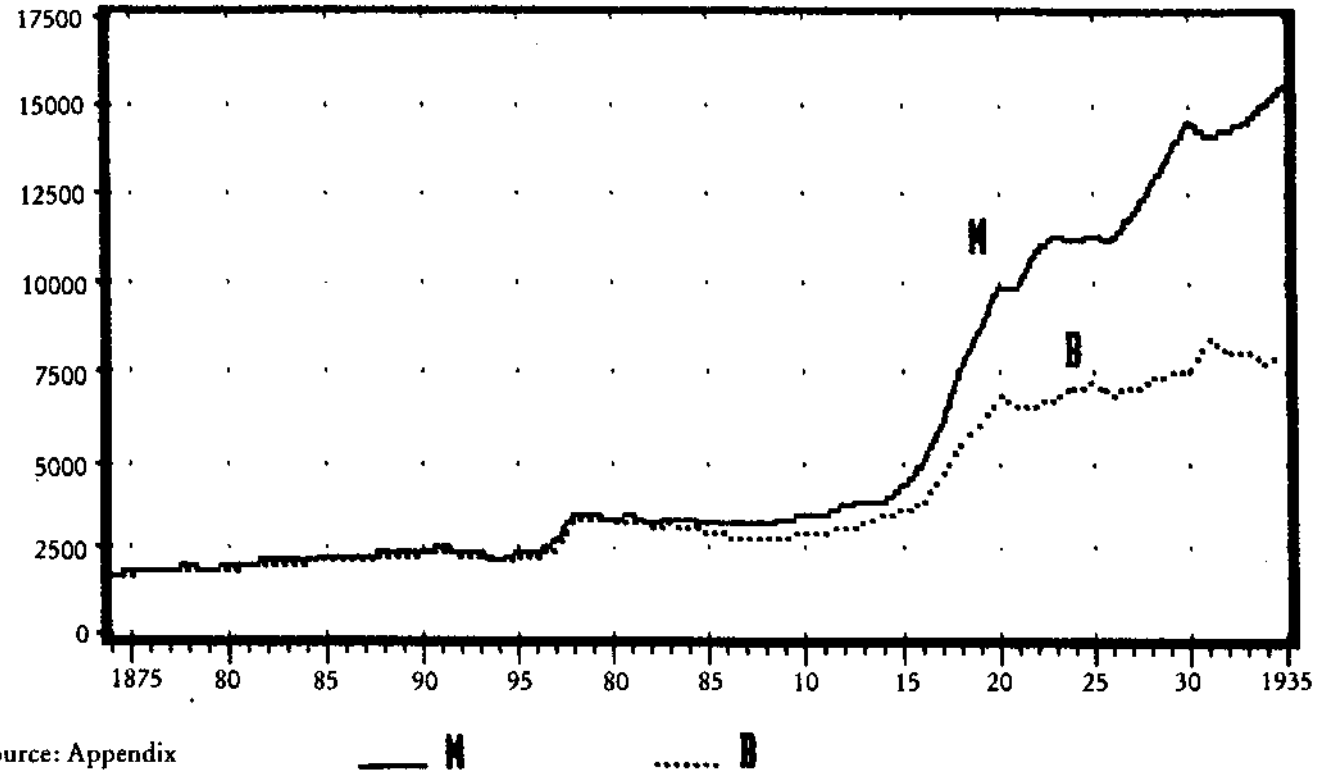
According to the data that we have included in the Appendix, in 1874 the public held about 1,605m (m = million) pesetas of currency (basically gold coins) and 164m pesetas of deposits in commercial banks and saving institutions, or a total of 1,769m pesetas of what we have defined as money supply. By the end of 1935 the public held about 4,769m of currency (consisting mostly of Bank of Spain notes and small amounts of fiduciary silver coins), and 10,848m pesetas of bank deposits, or a total of 15,617m pesetas of money supply. Therefore, the total money stock multiplied by almost 9-fold in the course of these six decades, or at the annual rate of 3.6 per cent. [3] During the same time, the population rose from 16.6, to 23.6m, [4] so that in per capita terms the stock of money multiplied some 6-fold, or at the annual rate of 3.0 per cent.

Figure 1 shows that the stock of money grew faster after 1910 than before. From 1874 to 1910 the estimated annual rate of growth is only 1.8 per cent, but it increased to 6.1 per cent in the fol-

[3] Unless otherwise indicated, the growth rates are computed by taking natural logarithms of the value of the ending date minus the natural logarithm of the starting date, and dividing by the number of years in the period. In this way the rates are compounded instantaneously.

[4] Population figures are for 1877 and 1930, and taken from Nadal (1973), p. 16.

Figure 1
MONEY SUPPLY AND HIGH-POWERED MONEY, 1874-1935.
(In million ptas)



Source: Appendix

lowing period (1910-35). The years of the First War World is the period when the acceleration is more noticeable. In the 1920s the stock of money grew at a rate of 3.9 per cent and it declined to 1.5 per cent during the 1930s. When these rates are compared with those recorded for other major countries (table 1), we see that up to 1900 the Spanish rate remained below that of the USA and Great Britain but above that of France and similar to the Italian rate. From 1900 to 1935 the Spanish money supply, as that of France and Italy, accelerated its pace, growing at a 4.5 per cent per year, which stood only one percentage point below the average for the other four countries. [5]

Table 1

THE STOCK OF MONEY IN FIVE COUNTRIES: RATES OF GROWTH
(percentages)

	1874-1900	1900-1939
Spain	2.5	4.3 *
France	1.6	7.1
Great Britain	3.3	3.7
Italy	2.2	5.5
United States	5.1	5.3

* 1900-1935

Sources: For the USA, Friedman and Schwartz (1963); for Great Britain, Sheppard (1971); for France, Saint Marc (1985); for Italy Fratianni and Spinelli (1984), and Mitchell (1975); and for Spain, Appendix.

The evolution followed by the stock of money which we have just described was accompanied by a significant change in its composition. Table 2 shows how at the beginning of the period the total quantity of money in the hands of the public was basically composed of gold and silver coins, while banknotes and bank deposits represented a mere 13.4 per cent. By 1900 this structure began to change: the total of banknotes has increased its share and, conver-

[5] A larger and comprehensive description of the secular trends in the money stock can be found in Tortella (1974) and Martín Aceña (1985).

Table 2
THE COMPOSITION OF THE SPANISH MONEY STOCK
(percentages)

	Gold and Silver coins in circulation	Banknotes	Demand deposits	Time deposits
1874	86.6	4.1	7.5	1.8
1900	23.4	47.2	26.9	2.5
1935	3.3	30.8	27.5	38.4

Source: Appendix.

sely, the share of metallic money in circulation has dropped substantially to 23.4 per cent; the weight of bank deposits has also increased to 35 per cent. Therefore, by the turn of the century the Spanish system had been transformed from being based almost entirely on gold and silver coins to one where "fiat money" predominated. As Tortella has rightly explained, this shift came, in part, as the result of the official policy with regard to the relative gold-silver price. After 1874, when silver prices in international markets fell, the Spanish authorities, instead of increasing the mint price of gold, maintained the old 1/15.5 gold to silver ratio unchanged, and consequently gold vanished from circulation. [6] The relatively slow growth of the banking sector before 1900 explains also why deposits have not come to represent a larger part in the stock of money. [7] The second stage in the modernization of the Spanish money structure took place between 1900 and 1935, and it was the result of the rapid development of the banking sector, particularly between 1914 and 1929. [8] By the end our period, the share of deposits was already 70 per cent, while that of coins and banknotes altogether has 30 per cent.

[6] Tortella (1974), p. 475 *et seq.*

[7] For the evolution of the Spanish banking system between 1874 and 1914, see Tedde (1974a).

[8] See Tortella and Palafox (1984), and Garcia Delgado (1973). For an overall analysis of the modernization of the banking system between 1830 and 1930 see Martin Aceña (1987).

In Figure 1 we can also see that from 1874 to 1914 high-powered money followed a path similar to the money supply. Its growth was rather slow until 1890 (1.8 per cent per year), but afterwards it increased to 3.4 per cent (1890-1900). Thereafter it remained relatively stable around 3,000m pesetas, but again with the start of First World War it rose very rapidly. The same Figure shows that the monetary base and the money supply parted ways after 1915, and that during the 1920s and 1930s both aggregates behaved differently, in contrast to what had happened in the previous sub-periods. [9]

Figure 2 (A and B) portrays the evolution of the money multiplier and the two money ratios. From 1874 to 1900 the monetary base multiplier, defined as the quotient between the money stock and the monetary base, shows a remarkable stability hovering around one, which is not at all surprising after what we have learned about the behaviour of the monetary base. The slight increase in the deposit-currency ratio from 0.1 in 1874 to 0.5 in 1900 is in part compensated by the decline in the deposit-reserve ratio, which falls from 1.4 to 1.2. Of course this implies that of the three proximate determinants of the stock of money, only the monetary base is responsible for the behaviour of the stock of money. After 1900 the value of the multiplier exhibits a clear upward trend, increasing to 1.5 in 1919 and to 1.9 before the outbreak of the Civil War. To this rise both the currency ratio, which jumped to 2.3, and the reserve ratio, which increased to 3.3 contributed. As we will see, for the period 1900-35 the role of high-powered money declined as a contributing factor to the money supply growth, and the two ratios acquired a more important part in accounting for its change.

[9] For a detail study of the behaviour of the monetary base and its sources of change, see Anes (1974), and Martin Aceña (1984 and 1985).

Figure 2 (A).
THE MONETARY BASE MULTIPLIER

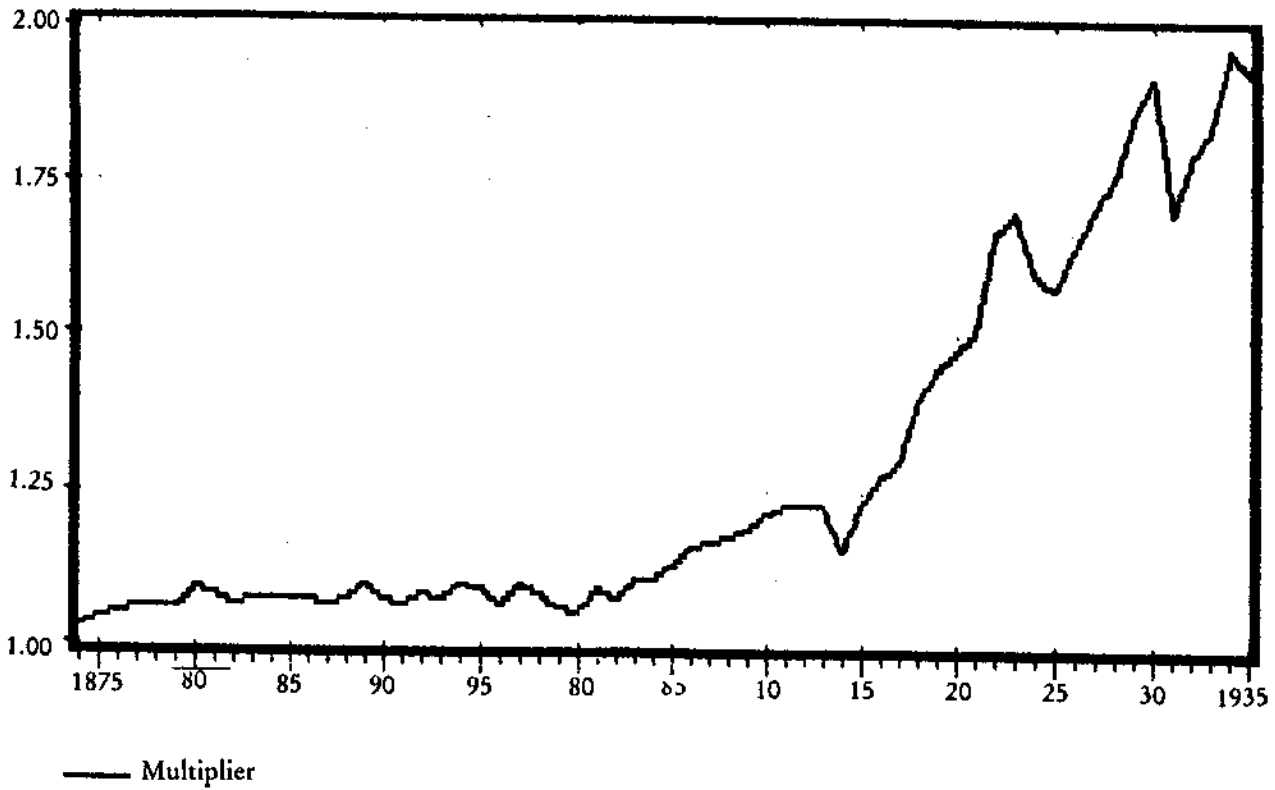
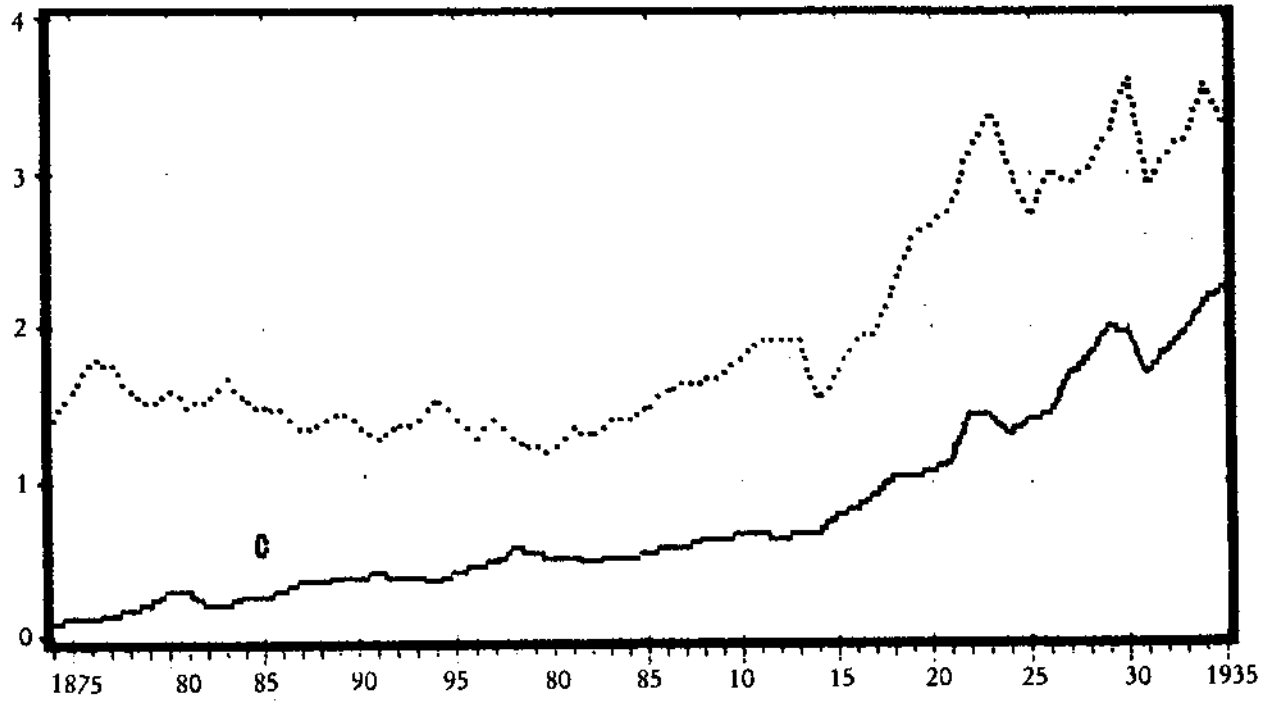


Figure 2 (B).
THE CURRENCY RATIO (C) AND THE RESERVE RATIO (R)



Spirce: Appendix

—— Currency ratio (c) ▪ ▪ ▪ ▪ ▪ ▪ Reserve ratio (r)

III. The money supply process

In this section we use all the data assembled in the Apendix to study the money supply process. According to the previous section, we define the money stock, M, and High-Powered money, B, as:

$$M = C + D \tag{1}$$
$$B = C + R \tag{2}$$

and from here it can be obtained that,

$$M = B \times \frac{{}^{D}/_{R} \times (1 - {}^{D}/_{C})}{{}^{D}/_{R} + {}^{D}/_{C}} \tag{3}$$

In expression (3), the money stock is related to three monetary aggregates, the monetary base, the deposit-reserve ratio and the deposit-currency ratio. [10] These three variables have been termed the proximate determinants of the money stock. As is well-known, in the Friedman-Schwartz-Cagan approach the monetary base is assumed to be under the control of the monetary authorities; the public is postulated to choose its desired currency ratio and the banking system to decide the ratio between reserves and deposits. Following the procedure of Friedman and Schwartz we have tried to ascertain the fraction of the monetary change which would have been produced by each of the proximate determinants if it alone had changed, over the period 1874-1935, and two sub-periods.

The contributions of the three proximate determinants to the secular growth rate of the Spanish money stock for the periods chosen are displayed in Table 3. As expected we confirm the large contribution of the monetary base to the secular growth in the money stock in relation to that of the deposit-currency ratio and deposit-reserve ratio. This pre-eminence holds for all periods, al-

[10] For a proof of the expression see FRIEDMAN and SCHWARTZ (1963).

though it is less pronounced for the second, 1900-1935, than for the first, 1974-1900. After high-powered money, the deposit-currency ratio predominates, accounting for approximately 20 per cent of the rise in the money supply. Most likely, this reflects increasing confidence of the public in the financial system and, hence, a willingness to hold large volumes of deposits relative to currency. Finally, we verify that the reserve ratio has played a minor role in the long term evolution of the money stock, although it has exerted an important influence in the short run, particularly in times of financial difficulties at home and abroad. [11]

Table 3

THE PROXIMATE DETERMINANTS OF CHANGES IN THE SPANISH MONEY SUPPLY

	Absolute contributions by				
	M	B	c	r	i
1874-1900	2.5	2.4	0.3	− 0.04	− 0.2
1900-1935	4.4	2.7	0.2	0.9	0.7
1874-1935	3.6	2.5	0.3	0.1	0.7

Notes: All lines computed as described in Friedman and Schwartz (1963), Appendix B
i − interaction
Source: Appendix.

Dividing the period in two we observe some differences. During the last quarter of the nineteenth-century the stock of high-powered money was the major factor accounting for changes in the stock of money; the monetary base multiplier being comparatively constant it hardly exerted any influence. Of the two ratios it is obvious that the deposit-currency coefficient made a positive contribution, while the deposit-reserve ratio offset part of this influence. After 1900, the contribution of high-powered money declined and the base multiplier provided an important impulse to the growth of money; in this period both ratios seems to have taken the larger part.

[11] For a detailed study, see Tortella (1974a), and Martin Aceña (1985).

IV. Money, Income and Prices

Now in this section we use the available data for the twentieth-century on the money stock, national income and prices. We are mainly interested in studying the relationship among these three variables, [12] and for that we can make use of the traditional framework provided by the quantitative equation, which can be written as:

$$MV = PNy, \tag{4}$$

where M stands for the stock of money, V is the income velocity, P represents an index of the level of prices, N stands for the population and y is the real per capita income. Taking logarithms in equation (4), we obtain:

$$\log M + \log V = \log P + \log N + \log y \tag{5}$$

and differentiating with respect to time, we reach the following formulation;

$$\frac{1}{M}\frac{dM}{dt} + \frac{1}{V}\frac{dV}{dt} = \frac{1}{P}\frac{dP}{dt} + \frac{1}{N}\frac{dN}{dt} + \frac{1}{y}\frac{dY}{dt}, \times \tag{6}$$

$$dm + dv = dp + dn + dy \tag{7}$$

The terms in (7) stand respectively for the annual rates of growth of the money supply, income velocity, prices, population and real per capita income.

Table 4 summarizes the calculations that we have performed for the whole period and two sub-periods. For 1901 to 1935 we can see that the rates of change of the money stock and nominal income are quite close and the difference is due, in part, to the decline in the V term, whose evolution seems to have followed that in other countries. With regard to the decomposition of the change in nominal income between prices and real income we can observe that during these thirty four years 40.5 per cent was absorbed by a

[12] This section follows Martin Aceña (1985), chap. 5.

Table 4

INCOME, MONEY AND PRICES: GROWTH RATES
(percentages)

	1901-1935	1901-1914	1914-1922	1922-1935
M	4.55	0.96	13.73	2.86
V	− 0.86	1.79	− 5.59	− 0.49
Y	3.65	2.71	7.49	2.27
P	1.48	0.07	6.63	− 0.18
N	0.84	0.73	0.66	1.05
Y	1.29	1.90	0.14	1.41

Notes: M − money supply; V − income velocity; Y − nominal income; P − implicit price index; N − population; y − real income per capita.
Sources: Alcaide (1976) for nominal income; Nadal (1973) for the population; Bustelo and Tortella (1976) for the price index; and the Appendix for the figures on the money stock.

change in prices, and the rest was taken by an increase in real income.

The results are somehow altered if, instead of the whole period, we look at the two shorter cycles; the first extends from the beginning of the century to the outbreak of the World War; the second includes the war years and the postwar cycle; and the third goes from 1922 to 1935. The close relation between the rates of change of the quantity of money and nominal income is maintained for 1922-35, but not for the other two cycles. From 1901 to 1914 the decline in the money supply is compensated by an increase in income velocity; in the following cycle, 1914-22, the changes are exactly the opposite; the money stock grows over nominal income while we see that income velocity falls. As expected, prices remained steady in 1901-14 and real income recorded an increase of about 2 per cent; the rise in the demand for real balances is what produces the rise in V. The development is the opposite from 1914 to 1922: more that 88 per cent of the increase in nominal income is absorbed in an increase in prices. Finally, for 1922-35 we see that prices fell and real income absorbed 62 per cent of the increase in nominal income.

Another way to capture the relationship between nominal income and the money supply is through the coefficient of correlation. In Table 5 we have produced estimates of this coefficient for several periods. We can observe the existence of a relatively high R^2 for the long period as well as for the first twenty years of the century; for 1920-35, however, the value of the coefficient is lower.

Table 5
MONEY AND INCOME

	R^2	SEE
1901-1935	0.926	0.131
1901-1920	0.957	0.085
1919-1935	0.404	0.052

Notes: R^2 = coefficient of determination; SEE = standard error of the regression.
Sources: The same as in Table 4.

Prices and money

It is well known that one of the basic propositions of extreme monetarism is that inflation is a monetary phenomenon. This is another way of stating the classical argument about the neutrality of money; that is, all changes in the stock of money are reflected in the level of prices and have no effect on real variables.

Using the Spanish data various scholars have estimated a range of different price equations with real income, the money supply and other variables as independent arguments. In all cases the results reported showed that although money played an important role in determining price variations, other economic and institutional factors also impinged upon its behaviour. [13] In Table 6 we

[13] Sebastian (1970), Boyer (1971), Argadoña (1975), Rojo and Pérez (1977).

have performed a similar exercise in order to examine the relationship between prices and money for the period under consideration. We have employed minimum least squares as the estimation procedure, and the equations used were of the form:

$$\log \dot{P} = a + b \log \dot{M} + c \log \frac{\dot{Y}}{P} \quad \text{, and}$$

$$\log \dot{P} = a + b \log \dot{M}_t + c \log \dot{M}_{t-1} + d \log \frac{\dot{Y}}{P} \quad \text{, where}$$

$\dot{P}$ = the rate of inflation, $\dot{M}$ = the rate of change in the money supply, and $(\dot{Y}/P)$ = the rate of change in real income. Our results are not very different from those reported elsewhere. As expected, the stock of money, although not the unique variable influencing the level of prices, is doubtless the most important single factor. According to the figures in Table 6, a unitary variation in the quantity of money would produce a variation in the level of prices which ranges between 0.6 and 0.8. These results also show that price and money changes are positively correlated, while income and price changes are inversely correlated.

Table 6

MONEY AND PRICES

Eq.	a	b	c	R^2	SEE	DW
	− 0.006	0.667	− 0.631	0.676	0.052	1.376
	(− 0.240)	(3.437)	(−5.733)			

Eq.	a	b	c	d	R^2	SEE	DW
	0.083	0.744	0.216	− 0.605	0.708	0.005	1.417
	(− 1.220)	(3.550)	(1.317)	(− 5.658)			

Notes: R^2 − coefficient of determination; SEE − standard error of the regression; DW − Durbin-Watson; figures in parenthesis are the values of the statistic «t».
Sources: The same as in Table 4.

Table 1

CURRENCY IN CIRCULATION. IN MILLION PESETAS

	1	2	3	4	5
1874	1167	465	52	1580	72
1875	1128	516	128	1516	128
1876	1089	563	104	1548	159
1877	1050	596	126	1520	157
1878	1011	640	142	1509	174
1879	972	657	218	1411	193
1880	933	657	236	1354	243
1881	894	660	226	1328	346
1882	855	707	125	1437	334
1883	816	745	111	1450	351
1884	777	773	168	1382	383
1885	737	785	152	1370	469
1886	698	794	239	1253	527
1887	659	787	310	1136	612
1888	620	798	324	1094	720
1889	581	792	276	1097	736
1890	542	820	247	1115	734
1891	503	853	321	1035	812
1892	464	859	376	947	884
1893	425	878	427	876	928
1894	386	912	536	762	910
1895	347	899	501	745	994
1896	308	930	495	743	1031
1897	279	949	538	690	1206
1898	342	1178	539	981	1444
1899	406	1276	769	913	1518
1900	395	1200	806	789	1592
1901	370	1200	801	769	1639
1902	395	1200	890	705	1623
1903	410	1200	888	722	1609
1904	455	1200	953	702	1599
1905	453	1200	1024	629	1550
1906	471	1200	1076	595	1525
1907	453	1200	1095	558	1557
1908	472	1200	1283	389	1643

1909	535	1200	1305	430	1671
1910	554	1200	1322	432	1715
1911	561	1200	1315	446	1763
1912	641	1200	1378	463	1863
1913	674	1200	1390	484	1931
1914	720	1200	1429	491	1974
1915	970	1200	1723	447	2100
1916	1341	1200	2082	459	2360
1917	2056	1200	2765	491	2799
1918	2315	1200	2956	559	3334
1919	2506	1200	3136	570	3867
1920	2540	1200	3144	626	4326
1921	2555	1200	3180	575	4244
1922	2561	1200	3217	544	4137
1923	2558	1200	3207	551	4353
1924	2569	1200	3220	549	4547
1925	2566	1200	3218	548	4440
1926	2592	1200	3267	525	4339
1927	2641	1200	3326	515	4202
1928	2654	1200	3352	502	4397
1929	2667	1200	3371	496	4458
1930	2524	1200	3223	501	4767
1931	2526	1200	3041	685	4993
1932	2544	1200	3145	599	4834
1933	2540	1200	3184	556	4825
1934	2549	1200	3226	523	4711
1935	2536	1200	3224	512	4837

Notes:
1. Gold Stock.
2. Silver Stock.
3. Gold and Silver held by the Bank of Spain.
4. Gold and Silver coins in circulation (4 = 1 + 2 − 3).
5. Bank of Spain Notes.

Sources: 1874-1899: Anes (1974c), tables III-4, III-5; Tortella (1974b), table IV-6.
1900-1935: Martínez Méndez; Martín Aceña (1985), table IV-1.

Table 2

BANK DEPOSITS. IN MILLION PESETAS

	1	2	3	4	5	6
1874	71	62	133	14	17	31
1875	87	81	168	18	24	42
1876	95	81	176	22	30	52
1877	102	92	194	23	37	60
1878	150	92	242	25	44	69
1879	148	88	236	26	50	76
1880	192	175	367	41	56	97
1881	214	160	374	45	60	105
1882	157	121	278	45	63	108
1883	144	125	269	49	66	115
1884	204	116	320	52	68	120
1885	234	112	346	56	73	129
1886	280	119	399	62	82	144
1887	328	125	453	68	89	157
1888	348	141	489	77	78	155
1889	363	173	536	79	91	170
1890	402	116	518	77	98	175
1891	443	132	575	79	102	181
1892	368	121	489	78	106	184
1893	343	128	471	76	109	185
1894	281	107	388	81	115	196
1895	361	136	497	91	118	209
1896	376	151	527	97	123	220
1897	443	177	620	103	127	230
1898	790	278	1068	128	124	252
1899	726	244	970	131	126	257
1900	662	246	908	128	131	259
1901	621	278	899	134	137	271
1902	539	225	764	148	149	297
1903	583	238	821	175	165	340
1904	559	242	801	190	175	365
1905	523	239	762	209	191	400
1906	494	275	769	229	202	431
1907	474	276	750	239	208	447
1908	447	300	747	253	234	487
1909	475	325	800	268	244	512
1910	437	372	809	286	264	550
1911	427	388	815	303	284	587
1912	439	384	823	314	311	625
1913	461	381	842	326	349	675
1914	581	347	928	282	342	624
1915	669	482	1151	355	401	756

1916	718	650	1368	400	446	846
1917	910	950	1860	444	523	967
1918	1124	1595	2719	590	606	1196
1919	1023	1951	2974	753	715	1468
1920	1121	2273	3394	950	808	1758
1921	987	2312	3299	996	924	1920
1922	1028	2642	3670	1709	1058	2767
1923	1006	2616	3622	1872	1185	3057
1924	915	2290	3205	1879	1294	3173
1925	1241	2238	3479	1689	1437	3126
1926	959	2375	3334	1760	1540	3300
1927	1009	2876	3885	1998	1670	3668
1928	878	3232	4110	2298	1841	4139
1929	894	3241	4135	2968	1998	4966
1930	774	3461	4235	3279	2160	5439
1931	1039	2763	3802	2824	2300	5124
1932	869	2962	3831	2979	2489	5468
1933	828	3026	3854	3192	2654	5846
1934	777	3289	4066	3410	2797	6207
1935	700	3588	4288	3674	2886	6560

Notes:
1. Private current accounts at the Bank of Spain.
2. Demand deposits at private banks.
3. Total Demand deposits (1+2).
4. Time deposits at private banks.
5. Deposits at savings institutions.
6. Total Time deposits (4+5).

Sources: 1874-1899: Tortella (1974a), tables V-6, V-11; 1900-1935: Martin Aceña (1985), table V-1.

Table 3

HIGH-POWERED MONEY. IN MILLION PESETAS

	1	2	3
1874	1652	70	1722
1875	1664	87	1731
1876	1707	95	1802
1877	1677	101	1778
1878	1683	154	1837
1879	1604	160	1764
1980	1597	211	1808
1881	1674	235	1909
1882	1771	170	1941
1883	1801	158	1959
1884	1765	216	1981
1885	1839	254	2093
1886	1780	300	2080
1887	1748	355	2103
1888	1814	371	2185
1889	1833	389	2222
1890	1849	434	2283
1891	1847	487	2334
1892	1831	396	2227
1893	1804	385	2189
1894	1672	315	1987
1895	1739	404	2143
1896	1774	485	2259
1897	1896	488	2384
1898	3425	846	3271
1899	2431	868	3299
1900	2381	814	3195
1901	2408	746	3154
1902	2328	714	3042
1903	2331	752	3083
1904	2301	744	3045
1905	2179	705	2884
1906	2120	676	2796
1907	2115	662	2777
1908	2032	673	2705
1909	2101	699	2800
1910	2147	671	2818
1911	2209	662	2871
1912	2326	681	3007
1913	2415	690	3105
1914	2465	913	3378
1915	2547	971	3518

1916	2819	1016	3835
1917	3290	1302	4592
1918	3893	1579	5472
1919	4437	1563	6000
1920	4952	1750	6702
1921	4819	1701	6520
1922	4681	1855	6536
1923	4904	1763	6667
1924	5096	1901	6997
1925	4988	2181	7169
1926	4864	1948	6812
1927	4717	2257	6974
1928	4899	2312	7211
1929	4954	2381	7335
1930	5268	2275	7543
1931	5678	2655	8333
1932	5433	2542	7975
1933	5381	2542	7923
1934	5234	2417	7651
1935	5349	2733	8082

Notes

1. Currency
2. Reserves (R)
3. High-powered money (B) (3=1+2)

Sources: 1874-1899: Anes (1974a), table VI-1; 1900-1935: Martin Aceña (1985), table IV-1.

Table 4

THE MONEY SUPPLY IN MILLION PESETAS

	1	2	3
1874	1605	164	1769
1875	1598	210	1808
1876	1674	228	1902
1877	1634	254	1888
1878	1640	311	1951
1879	1556	312	1868
1880	1513	464	1977
1881	1586	479	2065
1882	1690	386	2076
1883	1728	384	2112
1884	1688	440	2128
1885	1772	475	2247
1886	1702	543	2245
1887	1643	610	2253
1888	1710	644	2354
1889	1737	706	2443
1890	1769	693	2462
1891	1742	756	2498
1892	1733	673	2406
1893	1707	656	2363
1894	1606	584	2190
1895	1640	706	2346
1896	1672	747	2419
1897	1775	850	2625
1898	2218	1320	3538
1899	2273	1227	3500
1900	2204	1167	3371
1901	2274	1170	3444
1902	2211	1061	3272
1903	2240	1161	3401
1904	2211	1166	3377
1905	2097	1162	3259
1906	2039	1200	3239
1907	2045	1197	3242
1908	1954	1234	3188
1909	2028	1312	3340
1910	2068	1359	3427
1911	2131	1402	3533
1912	2244	1448	3692
1913	2310	1517	3827
1914	2344	1552	3896
1915	2416	1907	4323

1916	2678	2214	4892
1917	3138	2827	5965
1918	3731	3915	7646
1919	4264	4442	8706
1920	4769	5152	9921
1921	4624	5219	9843
1922	4485	6437	10922
1923	4692	6679	11371
1924	4858	6378	11236
1925	4733	6605	11338
1926	4599	6634	11233
1927	4389	7553	11942
1928	4491	8249	12740
1929	4547	9101	13648
1930	4854	9674	14528
1930	5235	8926	14161
1932	4987	9299	14286
1933	4893	9700	14593
1934	4772	10273	15045
1935	4769	10848	15617

Notes:
1. Currency held by the public (C)
2. Total Deposits at private banks and savings institutions (D)
3. Money supply (1+2) (M)

Sources: 1874-1899: Tortella (1874a), table V-9; 1900-1935: Martin Aceña (1985), table V-1.

Table 5

THE MONEY MULTIPLIER, THE DEPOSIT-CURRENCY RATIO AND THE DEPOSIT-RESERVE RATIO

	1	2	3
1874	1030	0100	1400
1875	1040	0130	1580
1876	1060	0140	1780
1877	1060	0160	1760
1878	1060	0190	1580
1879	1060	0200	1500
1880	1090	0310	1570
1881	1080	0300	1480
1882	1070	0230	1540
1883	1080	0220	1660
1884	1070	0260	1500
1885	1070	0290	1480
1886	1080	0320	1440
1887	1070	0370	1330
1888	1080	0380	1360
1889	1100	0410	1460
1890	1080	0390	1350
1891	1070	0430	1280
1892	1080	0390	1360
1893	1080	0380	1360
1894	1100	0360	1530
1895	1090	0430	1400
1896	1070	0450	1270
1897	1100	0480	1400
1898	1080	0590	1250
1899	1060	0540	1200
1900	1060	0530	1180
1901	1090	0510	1330
1902	1080	0480	1280
1903	1100	0520	1380
1904	1110	0530	1400
1905	1130	0550	1480
1906	1160	0590	1590
1907	1170	0590	1640
1908	1180	0630	1640
1909	1190	0650	1700
1910	1220	0660	1810
1911	1230	0660	1890
1912	1230	0650	1900
1913	1230	0660	1910
1914	1150	0660	1500

1915	1230	0790	1730
1916	1280	0830	1910
1917	1300	0910	1940
1918	1400	1050	2250
1919	1450	1040	2560
1920	1480	1080	2670
1921	1510	1130	2750
1922	1670	1440	3140
1923	1710	1420	3380
1924	1610	1310	2980
1925	1580	1400	2710
1926	1650	1440	3000
1927	1710	1720	2920
1928	1770	1840	3030
1929	1860	2000	3260
1930	1930	1990	3600
1931	1700	1710	2880
1932	1790	1860	3110
1933	1840	1980	3200
1934	1970	2150	3570
1935	1930	2270	3270

Notes:
1. The Money multiplier (m=M/b).
2. Deposit Currency Ratio (c=D/C).
3. Deposit Reserve Ratio (r=D/R)

Sources: Tables 3 and 4.

REFERENCES

ALCAIDE, J. (1976), "Una revisión urgente de la serie de Renta Nacional española en el siglo XX". In *Datos básicos para la historia financiera de España, 1850-1975* (vol. I). Madrid, Instituto de Estudios Fiscales.

ANES ALVAREZ, R. (1974a), "Una serie de base monetaria (1874-1914)". In *La banca española en la Restauración* (vol. II). Madrid, Banco de España.

ANES ALVAREZ, R. (1974b), "Balances sectorizados del Banco de España (1874-1915)". In *La banca española en la restrauraciòn.* (Vol. II). Madrid, Banco de España.

ANES ALVAREZ, R. (1974c), "Estimaciòn de la moneda del plata existente en España entre 1874 y 1915". In *La banca española en la Restauracion* (Vol. II). Madrid, Banco de España.

ARGANDOÑA RAMIZ, A. (1975), "La demanda de dinero en España". *Cuadernos de Economía*, III, 6.

BORDO, M.D. (1981), "The UK Money Supply, 1870-1914". *Research in Economic History*, 6, 107-125.

BOYER, M. (1971), "La interacciòn entre procesos monetarios y reales: la controversia teorica y la evidencia empírica en el caso español". In L.A. Rojo (ed), *El nuevo monetarismo*, Madrid, Instituto de Estudios Fiscales.

BUSTELO, F., and TORTELLA, "Monetary Inflation in Spain, 1800-1970". *Journal of European Economic History*, 1, 141-150.

CAGAN, P. (1965), *Determinants and Effects of Changes in the Stock of Money, 1875-1960.* New York, Columbia University Press.

CAPIE, F. and WEBBER, A. (1985), *A Monetary History of the UK, 1870-1982.* London, Allen & Unwin.

FRATIANNI, M. and SINELLI, F. (1984), "Italy in the Gold Standard Period, 1861-1914". In M.D. BORDO and A.J. SCHWARTZ (Eds), *A Retrospective on the Classical Gold Standards, 1821-1931.* Chicago, University of Chicago Press.

FRIEDMAN, M. and SCHWRTZ, A.J. (1963), *Monetary History of the United States 1867-1960.* Princeton, Princeton University Press.

JONUNG, L. (1976), "Sources of Growth in the Swedish Money Stock, 1871-1971". *Scandinavian Journal of Economics*, 78, 611-627.

KLOVLAND, J.T. (1983), "The Demand for Money in Secular Perspective: The Case of Norway, 1867-1980". *European Economic Review*, 22, 193-218.

KOMLOS, J. (1987), "Financial Innovation and the Demand for Money in Austria-Hungary, 1867-1913". *Journal of European Economic History*, 3, 587-606.

MARTÌN ACEÑA, *La politica monetaria en España, 1919-1935.* Madrid, Instituto de Estudios Fiscales.

MARTÌN ACEÑA, (1985), *La cantidad de dinero en España, 1900-1935.* Madrid, Banco de España.

MARTÌN ACEÑA, P. (1987), "Development and Modernization of the Financial System, 1844-1935". In N. SÀNCHEZ-ALBORNOZ, *The Economic Modernization of Spain, 1830-1930.* New York University Press.

MARTÍNEZ MENDEZ, "Una estimaciòn de la moneda de plata en circulaciòn". Unpublished manuscript.

MITCHELL, B.R. (1975), *European Historical Statistics, 1750-1970.* London, MacMillan Press.

NADAL, J. (1966), *La poblaciòn española (siglos XVI-XX).* Barcelona, Ariel.

ROJO, L.A. and PÉREZ, J. (1977), *La politica monetaria en España: Objetivo e instrumentos.* Madrid, Banco de España.

ROLDÀN, S. and GARCIA DELGADO, J.L. (1973), *La formaciòn de la sociedad capitalista en España, 1914-1920.* Madrid, Confederaciòn Española de Cajas de Ahorro.

SAINT MARC, M. (1983), *Histoire Monetaire de la France, 1880-1980.* Paris, Presse Universitaire de France.

SEBASTIÀN, C. (1970), "La demanda de dinero en España: una primera aproximaciòn". *Moneda y Crédito,* 113.

SHEPPARD, D.K. (1971), *The Growth and Role of the UK Financial Institutions, 1880-1962.* London, Methuen.

TEDDE, P. (1974a), "La banca privada española durante la Restauraciòn (1874-1914)". In *La banca española en la Restauraciòn* (Vol. I). Madrid, Banco de España.

TEDDE, P. (1974b), "Dinero legal en la caja de los bancos". In *La banca española en la Restauraciòn* (Vol. II). Madrid, Banco de España.

TEDDE, P., and TORTELLA, G. (1974), "Censo y balances normalizados de los bancos privados españoles (1974-1914)". In *La banca española en la Restauraciòn* (Vol. II). Madrid, Banco de España.

TORTELLA, G. (1974a), "Las magnitudes monetarias y sus determinantes". In *La banca española en la Restauraciòn* (Vol. I). Madrid, Banco de España.

TORTELLA, G. (1974b), "Estimaciòn del stock de oro en España (1874-1914)". In *La banca española en la restauraciòn* (Vol. II). Madrid, Banco de España.

TORTELLA, G. (1974c), "Una serie de cuentas de ahorro no bancarias (1874-1914)". In *La banca española en la Restauraciòn* (Vol. II). Madrid, Banco de España.

TORTELLA, and PALAFOX, J. (1984), "Banking and Industry in Spain, 1918-1936". *Journal of European Economic History,* 2, 81-112.