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**FINANCIAL INNOVATION AND
MONEY DEMAND IN PORTUGAL:
A PRELIMINARY STUDY**

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Abstract

This paper consists of two parts. In the first part we briefly summarize the evolution of the portfolio of financial assets available to savers in Portugal. Portugal experienced a process of considerable financial innovation during the last quarter of the century. However, two time-periods should be considered when studying the recent development of the Portuguese financial sector: the one before 1985 and the one after. The description of this process (specially as far as it concerns financial assets), its sources and outcomes, is our main task in the first part of this paper.

In the second part of this paper we study an econometric model of the demand for narrow money in Portugal between 1970 and 1996. The main idea behind the model presented is that the velocity of circulation of narrow money can be seen as a stationary variable with a varying deterministic component. An error-correction model is estimated and tested under this hypothesis. The results show no signs of model instability. This outcome and the initial hypothesis are then discussed. According to our results, the shifts observed in the velocity of circulation seem to be unrelated to the development of financial innovation.

Resumo

Este estudo está dividido em duas partes. Na primeira parte, descrevemos a evolução das aplicações financeiras disponíveis para os aforradores em Portugal. Portugal conheceu um período de considerável inovação financeira no último quarto de século. No entanto, devemos dividir este período em duas fases: uma correspondente ao período anterior a 1985 e outra correspondente ao período posterior. A descrição deste processo de inovação financeira (em especial no que respeita às aplicações financeiras) é o nosso objectivo na primeira parte deste texto.

Na segunda parte deste trabalho, apresentamos um modelo econométrico da procura de moeda (em sentido estrito) em Portugal para o período 1970-96. A ideia fulcral do modelo é que a velocidade de circulação da moeda pode ser vista como uma variável estacionária com uma componente determinística inconstante. Um modelo de correcção do erro é estimado e testado sob esta hipótese. Os resultados não indicam a existência de instabilidade do modelo. Esta conclusão e a hipótese de partida são então discutidos. De acordo com os nossos resultados, as alterações da velocidade de circulação da moeda aparentam não estar relacionadas com o desenvolvimento da inovação financeira.

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Financial Innovation and Money Demand in Portugal: A Preliminary Study¹

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1. Introduction

There has been a growing interest in financial innovation since the mid-1970's. Its causes and consequences have been discussed at length by many researchers: see, e.g., Podolski (1986), Barata (1996) and Mullineux (1996). The debate has centered particularly on the impact of financial innovation on monetary policy. The main issue is whether financial innovation produced the collapse of money demand models. In this paper we try to extend research on this topic to the Portuguese case.

This paper is divided in two parts. In the first part we describe broadly the evolution of the Portuguese financial sector since the early 1970's. The analysis will follow with a special focus on the set of financial assets available to Portuguese savers. Our study will show that financial innovation is a relatively recent phenomenon in Portugal. Financial innovation was very limited in relevance and scope before 1985. It was limited in relevance in the sense that it did not have much influence on the financial structure and on the behaviour of economic agents. It was limited in scope for it affected only a restricted number of agents. The process of financial innovation was much influenced by short-term political and economic conditions. After 1985, there was political concern for the development of the financial sector. Financial innovation gained momentum with the creation of new financial assets by the Government and with the deregulation of the financial sector.

In the second part of this paper we study an error-correction model of the demand for narrow money in Portugal between 1970 and 1996. The study of that

¹ The author would welcome any comments on this paper.

model is motivated by the analysis of the behaviour of the velocity of circulation of narrow money. We argue that if we treat the velocity of circulation as a stationary variable with a changing deterministic component it is possible to find a stable model of the demand for narrow money in Portugal. Contrary to a proposition often heard in this context, narrow money demand appears not to have been affected by the development of financial innovation in Portugal.

2. Financial Innovation and Financial Assets in Portugal

2.1. The Financial Sector Before 1974

2.1.1. Framework

The 1960's were a period of consolidation of the Portuguese banking sector. Competition was fierce and this pressure contributed to the diffusion of banking services in Portugal. Banks were eager to attract new customers. But banks were also fighting for a share of the increasing saved portion of national income and of the considerable amount of funds that Portugal was receiving then. This influx resulted from emigrants' income sent to Portugal, tourism revenue and increased interest rates.

Several mergers and acquisitions took place during this period.² The consequence of this was a concentrated banking sector with 7 banks (in a total of 17) accounting for over 80% of total deposits.³ Not only was the banking sector concentrated, but it also nourished the main groups that dominated the Portuguese economy. Five of those groups had developed from a bank, while the other two had developed initially in industry and had later extended their activities to banking.⁴

According to Sousa (1995), emigration had a decisive influence on the development of the banking sector in Portugal. First, it was the will to collect their savings that urged Portuguese banks to branch overseas. Second, it was the money emigrants sent to Portugal that financed bank growth and the mergers and acquisitions that were mentioned.

² See Martins (1973: 69-70).

³ Martins (1973: 69).

⁴ See Martins (1973).

2.1.2. Financial Assets and Means of Payment

Before 1974, bank deposits were the dominant financial assets. That is to say most surplus agents would put their savings in a bank rather than purchase any other financial asset. There were two kinds of bank deposits: demand and time deposits.

In 1970, savings deposits were introduced. The depositors benefited from the higher interest rates paid on balances held in these deposits. Until 1972, the amounts placed on these deposits could only be withdrawn to pay for certain housing expenditures or to buy shares or bonds issued by Portuguese companies or by the Portuguese Government.

Bank deposits increased their share in the total means of payment available to the private sector between 1960 and 1973. This is shown on the next chart.

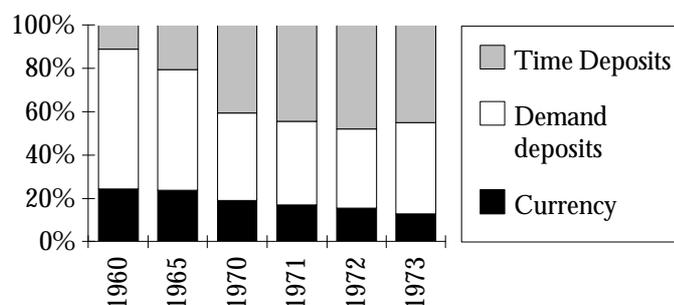


Figure 1 - means of payment, 1960-73
Source: *Annual Report*, Bank of Portugal

The weight of time deposits increased, while the weight of demand deposits and currency declined. According to Remédio (1981), this was the result of a higher interest-elasticity that prompted people to economize on transactions' balances.

In 1972 and 1973, the stock market was very active. But the boost of share prices was due mainly to speculation. It did not rely on a strong economic growth, neither was it matched by an increase in companies' will to welcome new shareholders. The next diagram shows the evolution of the nominal value and of the quantity of assets traded in the stock market.

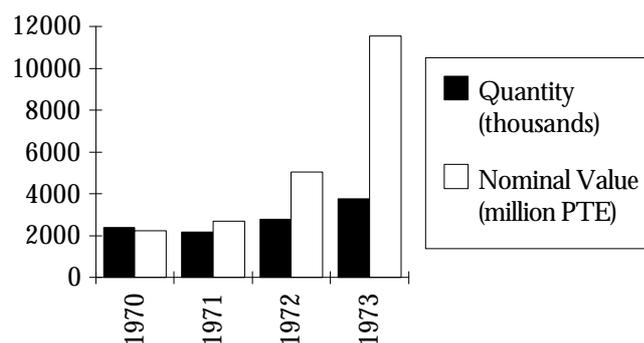


Figure 2 - Stock Market transactions
Source: *Annual Report*, Banco de Portugal

The growth of the nominal value of stock market transactions was clearly larger than the growth of the quantity traded. Such a divergent behaviour, we believe, could not have resulted from a sudden discovery that the shares were underpriced. It must have had a powerful speculative basis. Tomásio (1984) computed a speculation index (average annual share price divided by its book value) for 1971, 1972 and 1973. The next table shows the evolution of the stock market and speculation indices.

	1970	1971	1972	1973
Stock Market Index	156.4	170.0	220.6	394.1
Speculation Index	-	198	516	741

Table 1 - Stock Market and speculation indices
Source: Tomásio (1984)

The boom in the stock market was accompanied by the issue of legislation aimed at improving the functioning of the market and protecting small investors.

Nevertheless, things were quite different in the bond market. There was a reduced number of private bond issues. Not only there was little will to issue bonds, but also there was little demand (interestingly, for both private and Government bonds).

In the early 1970's, the issue of credit cards was regulated. By 1974, only banks were allowed to issue credit cards. In that year, a large number of banks came together to set up Unicre. This company was created with the purpose of centralizing the issue of credit cards. This activity was a Unicre's exclusive until 1988.

Before 1974, two new financial assets were introduced in the Portuguese financial market but neither of them received much attention: convertible bonds

appeared in 1971; in 1973, public and investment banks were authorized to issue certificates of deposit. Traditional bank deposits were still Portuguese savers' favourite financial assets.

2.2. The Revolution and Its Consequences (1974-1983)

2.2.1. 1974/75: The Context and the Evolution of the Means of Payment

The Revolution that took place on April 25, 1974, brought important changes to the Portuguese financial sector.⁵ The most important of those changes was the nationalization of most banks in September 1974 and in March 1975. Only foreign banks escaped nationalization. Many nationalized banks were then merged or absorbed by other nationalized banks.⁶ The nationalizations were followed in 1977 by legislation that forbade the private sector to set up new banks in Portugal.

The volume of demand deposits was affected by the events of 1974, having decayed markedly. Only Caixa Geral de Depósitos (CGD), the largest state-owned bank, saw an increase in its deposits in 1974 and 1975. The next chart shows the composition of M2 between 1973 and 1975.

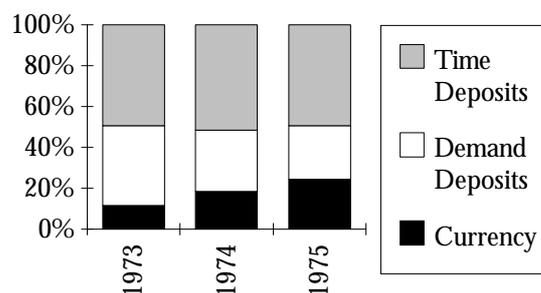


Figure 3 - the aggregate M2, 1973-75

Source: *Annual Report*, CGD

Several reasons for the behaviour of bank deposits and currency holdings were pointed out. First, private individuals considered currency holdings to be a good form of holding wealth: bank accounts might be frozen and banks might be shut down. Second, companies faced higher wage and energy bills and these required higher currency holdings (transfers and cheques were still uncommon). Third, emigrants

⁵ See Calixto (1990) for a short historical description of the evolution of the financial sector in Portugal.

⁶ See Martins and Rosa (1979).

were sending less money to Portugal.⁷ Finally, real interest rates became significantly negative in this period due to high inflation rates⁸ (Lopes, 1996: 213).

The *specialization principle*, introduced in 1957, which distinguished several kinds of financial institutions, was mitigated in 1975-1977. "Investment" banks were allowed to accept time deposits with a duration as short as 180 days (previously, the limit was one year) and, with some restrictions, they could also receive demand deposits. "Commercial" banks were allowed to engage in medium/long-term credit operations (assets maturing in ten years or less).

2.2.2. Capital Markets

The nationalization process brought about by the Revolution touched beyond the financial sector. It affected transports, tobacco, newspapers, television, radio, oil, chemicals, steel, electricity, cement, beer, glass, ship building, and other sectors (see Santos, Gonçalves and Marques (1991)).

The primary market for shares almost disappeared. This was the result of the nationalization of many potential issuers and of the reduction in investment. Moreover, companies were "closed to outsiders": most share issues (over 90%, even before 1974) were directed to current shareholders and not to the general public. This behaviour was seen as one of the causes of the underdevelopment of the Portuguese capital markets.

After the Revolution, the primary market for private bonds became totally inactive: between 1975 and 1980 there was not a single bond issue by the private sector. However, it must be said that bond issues had never played an important role in financing the Portuguese economy. As far as private investors were concerned, Government bonds did not represent a significant alternative since most of them were bought by the Portuguese central bank, the Bank of Portugal (Banco de Portugal). Therefore, the budget deficit was financed through money creation. The amount of Government bonds purchased by individuals and companies was very small: usually under 10%. The monetization of the budget deficit is reflected in the evolution of the monetary aggregates.

⁷ The need for foreign currency led to the creation of new bank deposits specially designed for emigrants. We will return to this subject later.

⁸ The inflation rate (measured by the Consumer Price Index) was 15% in 1973, 33% in 1974, 15% in 1975 and 21% in 1976.

	1971-73	1974-75	1976	1977	1978
Money supply growth	25.1%	13.1%	17.5%	23.1%	28.4%
In favour of the public sector	-0.8%	4.4%	7.4%	11.8%	13.6%
In favour of the productive sector	25.9%	8.7%	10.1%	11.3%	14.8%

Table 2 - money creation, 1971-78

Source: Cardoso (1979: table 1)

The monetization of the budget deficit was one of the main factors that caused money supply growth to accelerate: between 1973 and 1986 M2 grew 24% on average (Lopes, 1996: 222). This procedure was interdicted in 1990 by new legislation regulating the Bank of Portugal.

The secondary markets were suspended on April 29, 1974. Lisbon's Stock Exchange resumed trading in bonds in January 1976. Other transactions were allowed in February 1977. Oporto's Stock Exchange resumed operations only in January 1981. Until 1985, the markets' liquidity was very limited and depended mainly on Treasury bonds.⁹ These represented over 75% of the total value of transactions until 1981.

In the late 1970's and in the first half of the 1980's several steps were taken towards the development of the Portuguese financial markets: new legislation regarding the operation of capital markets was adopted, tax incentives were instituted and new financial intermediaries were allowed to operate (leasing societies in 1979, investment societies in 1979, and regional development societies in 1980). In 1981 occurred the first bond issues for public subscription made by state-owned companies since 1974. In 1983 the first share issue for public subscription took place. However, there was little demand for it: the general public bought less than 50% of the shares issued. Financial institutions had been issuing, since 1981, indexed long-term bonds and, since 1983, "obrigações de caixa" (cash bonds).¹⁰ Nevertheless, and despite negative interest rates, savers were still preferring time deposits.

2.2.3. *External Imbalances and Emigrants' Deposits*

After the Revolution, an external current account deficit emerged. It was the result of higher prices paid for energy and raw materials imports, fewer exports, lower tourism revenue and smaller emigrants' remittances. The international scenario was

⁹ See Carvalho (1987) on the secondary role of stock exchanges in the financing of the Portuguese economy.

¹⁰ See Fonseca (1991) for a detailed analysis of the Portuguese bond markets in the 1980's.

adverse due to the oil shock. Portugal was mistrusted and negative interest rates and an overvalued exchange rate made things even more difficult.

In order to eliminate the current account deficit several measures were taken. Among these was the introduction of new kinds of bank accounts for emigrants in 1975, 1976 and 1977. These accounts were replaced by an "emigrant-savings account" in 1986. The interest rates were also raised: for example, between December 1975 and May 1978 the interest rate on time deposits maturing in more than 180 days and no more than one year went up from 9,5% to 19%. In 1976 and 1977, the escudo was devalued several times. Namely, it was devalued 15% in February 1977 and later, in August 1977, another 4% . After that, a crawling peg exchange policy was followed.

The magnitude of the external imbalance made it necessary to establish a stabilization agreement with the International Monetary Fund in May 1978. The main objective of this agreement was to reduce the current account deficit from about US\$ 1 500 million in the period April 1977-March 1978 to US\$ 1 000 million in the period April 1978-March 1979. Among other measures, the monthly devaluation rate of the escudo increased from 1% to 1,25%, credit ceilings were imposed and interest rates were raised. This last measure, as well as the recovery of trust in Portugal, contributed to a considerable influx of funds originated in emigrants' savings.

At the time the stabilization agreement was deemed successful. However, the deterioration of the economic conditions, both internal and external,¹¹ made a second agreement with the I.M.F. inevitable by 1983. In 1983 and 1984, the escudo was again devalued,¹² internal and external credit to the economy was curtailed (see figure 4 below), money supply growth decreased (see figure 5 below), interest rates went up¹³ and state-owned banks acted as Government instruments.

¹¹ In 1980, the escudo was revalued in 6% and the monthly devaluation rate was set at 0,5%. According to Lopes (1996: 231) these measures were fundamental to the worsening of the external current account.

¹² Before that, in December 1981 the monthly devaluation rate went up to 0,75%. In 1982 the escudo was devalued twice: in June (9,4%) and in March (2%). In 1983 the monthly devaluation rate went up again to 1% in June and in July there was another devaluation of 12%.

¹³ The minimum interest rate on deposits maturing in more than 180 days but less than one year augmented from 21,5% (on April 1982) to 28% (on August 1983). However, the removal of interest rate controls began in 1984.

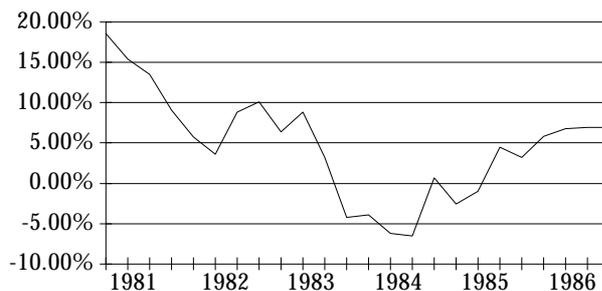


Figure 4 - domestic credit real growth rate

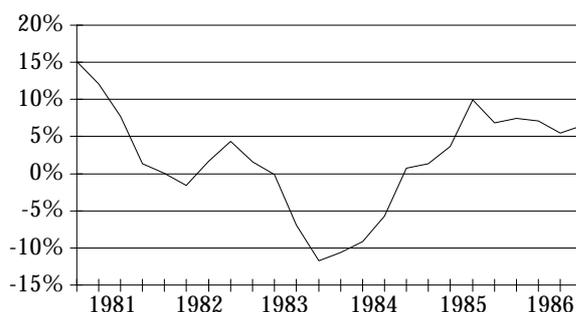


Figure 5 - M2 real growth rate

2.2.4. Normalization

We mentioned earlier that balances held in bank deposits decreased in most banks in 1974-75. But after that bank deposits started a new period of strong growth. The next chart illustrates this point.

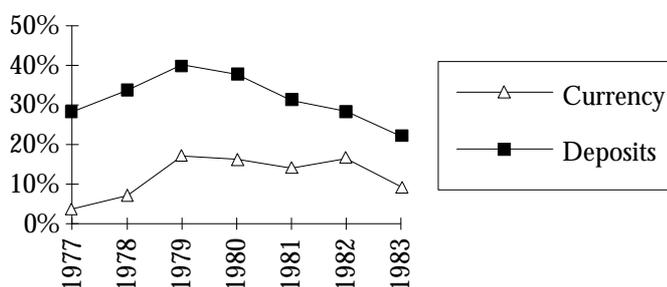


Figure 6 - growth rates

Growth accelerated between 1977 and 1979. In all of the period, bank deposits grew faster than currency holdings. Therefore, the share of bank deposits in total means of payment increased from 76% in 1976 to 91% in 1983.

Apart from the new types of bank deposits already mentioned, a number of other financial innovations were introduced in 1977, namely "participating bonds" and "bonds offering variable interest and repayments."

The growth of time deposits and the existence of credit ceilings caused bank reserves to become excessive. In order to alleviate this problem, interbank money markets were set up in 1977-78. But a secondary market for the assets used in transactions to transfer liquidity between banks came to existence only in 1980 after the first "Bilhetes do Tesouro" (Treasury bills) were issued. At the time, these Treasury bills circulated exclusively between banks.¹⁴

According to Lopes (1996), the credit ceilings contributed to prevent the monetization of the budget deficits from feeding inflation beyond any possibility of control. Besides that, it made banks' excess reserves available to the financing of the budget deficit at a low cost. Nevertheless, the credit ceilings distorted competition in the banking sector, caused a crowding out of private demand and resulted in a form of implicit taxation of the banking sector, though banks devised sidestepping strategies.

Modernization of the Portuguese financial sector continued at a slow pace. In 1982 Repurchase Agreements made their entrance. Asset Accounts With Price Guarantee followed in June 1983.¹⁵ These assets enjoyed popularity while credit ceilings were in place. When credit ceilings were removed the amount placed in these assets dropped considerably. Still in 1983, cash bonds were issued for the first time. Only certain types of financial institutions were authorized to issue these bonds (see Fernandes and Portela (1994)).

By 1983 bank deposits continued to be dominant among both savers' assets and banks' liabilities. The Portuguese financial system had yet a long way to go. State intervention was pervasive. Bank competition was limited and insufficient to fuel innovation and rationalization.

¹⁴ See Cabral (1981).

¹⁵ See Matos and Aguiar (1987).

2.3. Evolution since 1984

2.3.1. Modification of the Legal Framework

The main novelty of the post-1983 period was the reopening of the banking sector to private initiative. The legislative process that regulated the reopening began in 1983 and was completed in 1984. The only bank to benefit from the change still in 1984 was Manufacturers Hannover. But since then the number of banks has trebled.

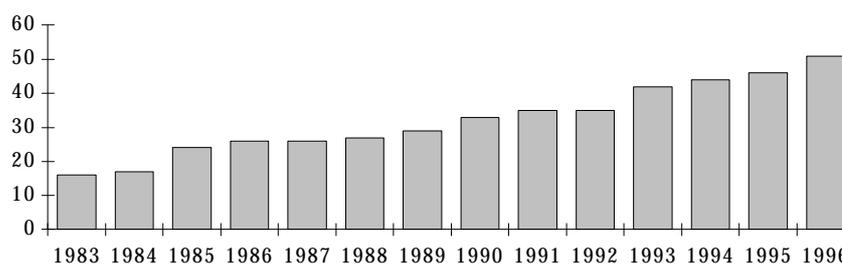


Figure 7 - banks operating in Portugal
Sources: Borges (1994) and *Annual Report*, Bank of Portugal

This increase in the number of banks contributed to sharpen competition. But other changes have added to competition. First, most state-owned banks have been privatised since 1988. Second, the financial sector regulation published in 1992 introduced the concept of "universal bank" and most banks have taken this opportunity to extend their activities. Third, credit ceilings were abolished in 1991. Fourth, the rate of reserve requirements was cut from 17% to 2% in November 1994.

The legislation regulating the Bank of Portugal since 1990 prevents the it from supplying credit to finance the budget deficit. However, it should be noticed that the share of public debt issued yearly and acquired by the Bank of Portugal had been decreasing since 1985: in 1984, it was 79%; in 1985, 30%; and in 1989, only 3%. The central bank's credit was replaced by new types of financial assets that we will address later.

2.3.2. Exchange Rate Policy and Foreign Exchange Market

In the post-1983 period, exchange rate policy has also known a change. The crawling peg system ended in 1989. The Bank of Portugal made its aim the stabilization of the exchange rate vis-à-vis other European currencies and in 1992 the escudo joined the European Monetary System. The monetary policy required to maintain exchange rate stability and fight inflation was very restrictive: the differential

between Portuguese and German short-term interest rates reached 7% in 1990-1991 and 4% in 1994; real interest rates reached almost 12% (Lopes, 1996: 226). High interest rates are reported to have attracted an influx of speculative funds.

A spot foreign exchange market was created in October 1985. A forward market started in February 1987. In October 1987, exchange rates, until then set by the Bank of Portugal, began to be the result of fixing sessions, thereby reflecting demand and supply conditions.

The liberalization of capital movements was a slow process that began in 1986 and ended in 1992. The speculative influx of funds referred to above caused this process to stagger in 1990 and 1991. This liberalization had a noticeable effect on foreign currency denominated deposits. These deposits increased by a factor of sixty between 1992 and 1995. However, afterwards they decreased even faster, perhaps as a result of the appreciation of the escudo.

2.3.3. Capital Markets in 1985/87

After years of stagnation, capital markets initiated a recovery in 1985. This surge was the result of a combination of factors: more favourable national and international economic environments; the introduction of new financial instruments and intermediaries; the effort of credit institutions to reduce the weight of time deposits in their balance sheets; tax incentives and improved regulations. Companies faced high real interest rates and the bullish mood that dominated the market, particularly in 1987, made it the ideal moment to substitute bonds and equity capital (which were cheaper) for bank credit. In 1986, the spread between banks' long-term lending rates and the rate of return in the bonds' market was 6%. In 1987 it was 3%: the reduction was due mainly to a cut in banks' long-term lending rates to 18% in December 1987 from almost 25% in the beginning of 1986.

The evolution of the amounts of financial assets issued for public subscription between 1985 and 1988 is shown in the next chart.

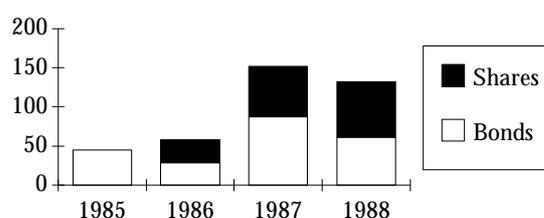


Figure 8 - financial assets issued (public subscription)
Source: *Annual Report*, Bank of Portugal

Investment funds reappeared in Portugal in 1985, after the first ones¹⁶ had been nationalized in 1974.

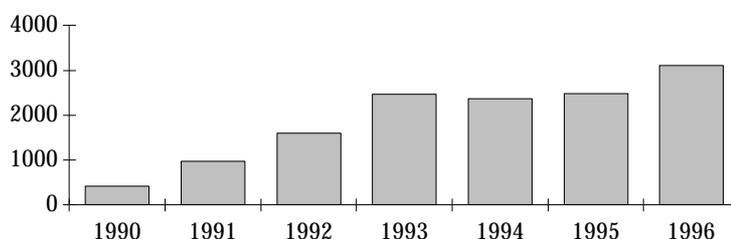


Figure 9 - investment funds - total assets

Source: *Annual Report*, Bank of Portugal

The evolution of investment funds' total assets shows a strong growth until 1993 and a stagnation afterwards, with another upsurge in 1996. However, while funds investing in monetary and financial assets have always been growing (though at a slower pace in 1995), funds investing in property suffered a significant decline in 1994.

In 1985, pension funds were also regulated. In 1986 insurance companies lost their monopoly over the creation and management of pension funds. The first pension funds were set up in 1987; five years later, more than two hundred pension funds were in the market.¹⁷

Still in 1985, tax incentives were granted to boost the capital markets. This drive continued in some respects in 1986 and 1987. Bonds issued by investment banks, investment funds, public limited companies and small companies issuing shares, and bonds issued in 1987 maturing in no less than eight years, were among the institutions and instruments that benefited from these measures. But in the second half of 1987, the incentives began to be removed. This possibility had already been envisaged in the Government budget for 1987 and this had contributed to the clustering of share issues in December 1986: 21 of the 30 issues that took place during 1986 occurred in that month. In 1986, bond issues had also been affected by cuts in tax benefits¹⁸: 13 of the 23 issues that took place during 1986 occurred in the first four months, before the

¹⁶ See Gaspar and Adegas (1973).

¹⁷ Rangel (1994).

¹⁸ The cut in tax benefits was one of the factors that determined the reduction in bond issues in 1986 (see the chart before the last). Other circumstances may have contributed to this reduction: the improvement of companies' financial situation and the flexibility of banks' lending rates - see the Bank of Portugal's *1986 Annual Report*, page 171.

1986 budget began to be executed. The budget ruled that interest received on bonds would be taxed.

Tax incentives had a noticeable effect on the share market: between January 1, 1987, and March 31, 1988, one hundred and three new companies were listed in Lisbon's stock market. During the previous six years, the average number of new companies listed was ten.¹⁹ During the period 1985-1987 there were also changes in regulations related to the functioning of the capital markets.

The setting just described contributed to the share market's rally in 1986 and 1987. Trade in shares surpassed trade in bonds, as the next chart shows.

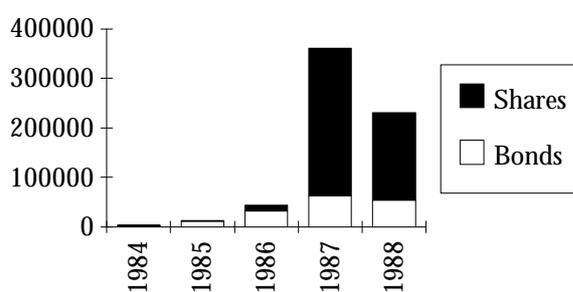


Figure 10 - amounts traded

Source: *Annual Report*, Bank of Portugal

However, in October 1987 the rally came to an end. The crash that followed was the result of heavy overpricing (prices were raised by market rules and by inexperienced and little informed investors) and of the crisis in stock markets abroad. The next chart shows the evolution of share quotes.

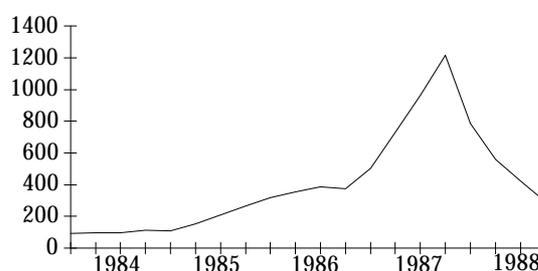


Figure 11 - Share Index - Lisbon's Stock Market
Computations based on: *Quarterly Bulletin*, Bank of Portugal

¹⁹ See Cunha (1996).

2.3.4. Capital Markets after 1987

The crash and the suspicion it brought about led to a change in the market's rules. In October and November 1987 the daily fluctuation limit of 5% and the "20% rule" were eliminated.²⁰ The daily fluctuation limit was reintroduced in February 1988, but it was increased to 15%. The whole structure of the capital markets was overhauled in 1988. Among other things, brokers' and dealers' activities were regulated and investment funds, share offerings and bids received a new legal framework.

The year 1988 was also the year of the first placement in Portugal of bonds issued by a non-resident entity, the European Investment Bank. This market has been growing, specially since the liberalization of non-residents' escudo denominated debt issues in 1994. According to Leitão et al. (1996) this market has contributed to the development of capital markets in Portugal, on account of both the dimension of transactions and the risk diversification it allows.

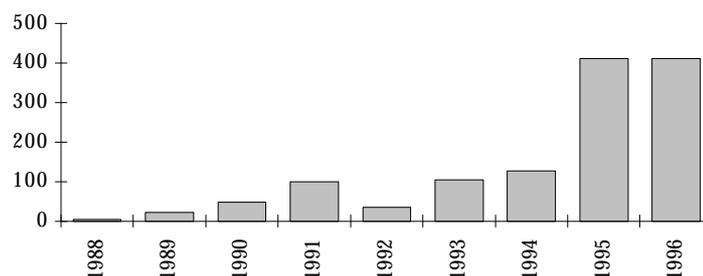


Figure 12 - net escudo denominated debt issued by non-residents (PTE bn.)
Source: *Annual Report*, Bank of Portugal

Activity in the stock market during 1989 was conditioned by new legislation, the Tax Benefits' Statutes. The market remained almost inactive while waiting for this new regulation. The Tax Benefits' Statutes granted tax exemptions and reductions to the issuers and buyers of several financial instruments, specially of shares of recently privatised companies. Nevertheless, though trade increased in 1990, most share prices fell, perhaps due to concerns over the Gulf War. A major contributor to the trade

²⁰ According to Nabais (1987: 58), when a share price varied 5% relatively to the previous session, there would be trade only if at least 20% of total orders were executed. This 20% rule reinforced the 5% rule and tried to prevent the execution of non-representative orders. In practice, these two rules were contradictory and the 20% rule could cause the accumulation of orders, thereby aggravating the situation.

increase in the share segment was the beginning of the privatisation process in 1989. Shares of one bank, two insurance companies and one brewery were sold. Demand for those shares exceeded offer seven times (at base price). The privatisation process aimed at developing the capital markets and enhancing citizens' participation in companies' capital. Sousa and Cruz (1995) concluded that the privatisation process did have a significant impact on the secondary market, but not on the primary market. According to GAFEEP (1996), 20% of listed companies in 1995 had been previously privatised. These companies corresponded to 41% of traded shares. Still according to GAFEEP (1996), the number of shareholders involved in privatisation operations exceeded 560 thousand, of which 85 thousand worked for those companies and 340 thousand were small investors.

In 1991 another pack of legislation relating to the capital markets saw the light. Again several tax benefits were awarded. A new kind of financial intermediary was regulated: the Operator Specialized in Assets Issued by the Treasury. The "freedom of issue principle" was enacted: apart from exceptions, issues are required only to be registered and to be accompanied by a prospectus. Among other novelties, a continuous trading system was introduced. However, in 1991 the primary market was still sluggish. It contrasted with the primary market and with balances held in time deposits, as the next table shows.

Growth rate of:	1990	1991	1992	1993
time deposits	11%	28%	25%	9%
net title issues	50%	-12%	15%	-7%
secondary market transactions (value)	53%	153%	19%	80%
credit to non-financial companies and individuals ¹	-2%	13%	8%	5%

Table 3 - growth rates

¹ real growth rate

Computations based on: *Annual Report*, Bank of Portugal

In fact, in 1991 there was a banking "reintermediation." Credit ceilings were abandoned in 1991. This meant banks had more freedom to expand their credits.²¹ In order to do that, banks tried to raise liquidity by attracting deposits. With this aim in view, new types of deposits were introduced and interest rates were lifted. For deposits maturing in more than six months and less than one year the nominal interest rate

²¹ The nominal growth rate of credit granted to non-financial companies and individuals doubled in 1991 (from 12% in 1990 to 24%). The real growth rate was slightly negative in 1989 and 1990 and became clearly positive in 1991, as the table showed. Meanwhile net issues diminished. Therefore, during 1991 companies substituted bank credit for funds raised in the capital markets.

went up from 13,7% in March 1990 (real interest rate: 1%) to 15,4% in March 1992 (real interest rate: 6%).²²

In 1994 there was another reorganization of the capital markets. The spot operations were concentrated in Lisbon's exchange market, while Oporto's exchange market was to focus on forward operations. A special market for the transaction of large quantities of bonds was created. In 1994 this market accounted for 34% of the total quantity of bonds traded. In 1995 it accounted for 63% and in 1996 for 73%. The quantity traded in the regular exchange market suffered a reduction of 37% between 1993 and 1996. Rangel and Barreiros (1995) argue that the non-exposed characteristic of this market (a trait of bilateral agreements) has resulted in prices that sharply deviate from those seen in the regular exchange market.

2.3.5. Interest Rate Liberalization

Another important change in the financial framework in Portugal occurred in June 1984. It was then that the process of interest rate liberalization began. This process extended for several years: it was completed only in 1992.

Perhaps owing to the liberalization of interest rates, the relation between interest rates and money seems to have changed in the mid-1980's. Let us focus on the next chart.

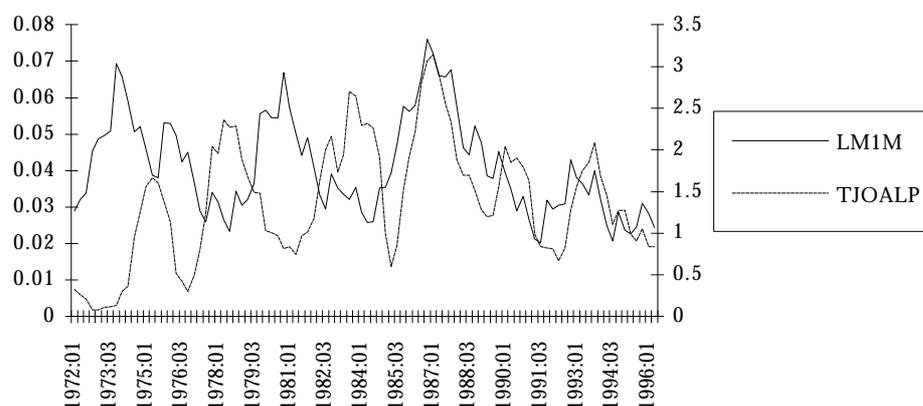


Figure 13 - standard deviations over the last eight quarters

The chart shows the evolution of the standard deviation over the last eight quarters²³ of the logarithm of M1 and of the long-term lending rate. Apparently, one

²² This increase was also due to the pegging of the escudo to the German mark.

²³ The computation of standard deviation over the last eight quarters has to do, on the one hand, with the need to smooth disturbances and, on the other hand, with the existence of lags in monetary policy.

may conclude that until the mid-1980's interest rate changes lagged behind money changes. Since then, interest rate and money changes seem to have become synchronous. This may have resulted from the interest rate liberalization since from then on banks could more easily adjust to market conditions. However, the reopening of the banking sector to private investors with the ensuing stronger competition and greater independence from the Government may also have accounted for it.

2.3.6. *New Financial Assets*²⁴

Since 1985 Portugal has witnessed a significant diversification of the portfolio of financial assets available to savers. The Treasury has played an important role in this evolution. The Treasury's behaviour reflected a change in the way the public sector deficit is funded. As we saw before, until 1985 the public sector deficit was mainly financed by the central bank. But afterwards the public sector resorted more often to the general public. Between 1975 and 1984, individuals and non-financial companies had bought a maximum of 10% of the public debt issued in each year. In 1985, the share reached 18% and in 1986 ascended to 45%. Notice that the central bank reduced financing the public debt prior to the new legislation concerning its activity.

Two changes in banking procedures (in the second half of 1985) contributed to the expansion of the new assets: the requirement of minimum balances on time deposits and the end of automatic time deposit renewal with interest added to the deposits.

In 1985, a new kind of *Bilhetes do Tesouro* was introduced that could be sold on the primary market only to authorized financial institutions, but now with the possibility of being resold to the general public, with or without a repurchase agreement. Initially, these bonds matured in 91 or 182 days. Since July 1986, their maturity has been extended to one year. The new *Bilhetes do Tesouro* quickly came to represent an important share of the Portuguese internal public debt: they accounted for 8,8% of internal public debt in 1985, for 21,9% in 1986 and for 27,8% in 1987. Since then, their share declined (in 1996 it was 15%).

Still in 1985, the *Títulos de Participação* were created. *Títulos de Participação* are an intermediate asset between equity and debt. They can be issued by enterprises controlled by the State. They are a form of long-term borrowing returning an yield with two different parts: a fixed different and a variable one. The variable part may depend on earnings, sales, or some other measure of company performance. This variable rate will apply to 20 to 40% of the nominal bond value. These assets are traded on the stock market.

²⁴ This section and the next can be complemented with Leitão et al. (1996). Another useful reference is Barata (1991).

In the period 1986-1988, a number of new assets representing Government debt were issued. This surge of debt instruments was a signal of the Government's desire to diversify the portfolio of financial assets available to investors, thus contributing to the modernization of the Portuguese financial system. A list of these new assets can be found on table 4.

Year	Asset	Remarks
1986	Obrigações do Tesouro - Capitalização Automática	Treasury bonds with interest automatically compounded. Last issued in 1992.
1986	Certificados de Aforro (série B)	Savings bonds. Interest is compounded quarterly. A time increasing bonus is added to the interest rate. Very attractive interest rate until 1992.
1987	Obrigações do Tesouro - Tesouro Familiar	Treasury bonds bought by individuals only. Maturing in 2 to 5 years. Time increasing interest rate bonus. Not tradable in the secondary market.
1987/88	Obrigações do Tesouro de Médio Prazo	Medium-term Treasury bonds. Market based fixed interest rate. Has been losing ground to variable interest rate Treasury bonds.
1988	Obrigações Bicentenário do Ministério das Finanças and Obrigações Tesouro Familiar - 1988 - Bicentenário	Indexed interest rate. Time increasing interest rate bonus.
1988	Crédito por Leilão ao Investimento Público (CLIP)	Revolving loan with a total maturity of 7 years.

Table 4 - Other assets representing Government debt issued in 1986-88

As far as private issuers are concerned, since 1988 it is possible to issue loan stock with warrants and paperless financial assets. In 1990 "obrigações hipotecárias"

(mortgage bonds) were introduced, a measure aimed at boosting the real estate market. They can be traded in the secondary market and can be issued with a maturity ranging from 3 to 30 years.

In 1989, the "Plano Poupança-Reforma" (a "saving for retirement" plan) was created. It gives the holders the possibility to delay taxation on the amounts invested in this plan. According to Gouveia (1997), the tax benefits are regressive: most of the investors belong to the higher taxation levels. Gouveia adds two other problems regarding this scheme. First, the plan is the more beneficial the more attractive to those closer to retirement. Second, it contributes in a very limited way to increase savings: most of the funds invested in these plans were diverted from other investments. More recently, in 1995, another type of savings plans was created: the "Plano de Poupança em Acções", an equity investment plan aiming at channelling funds to the stock market. Therefore, over 50% of the plan's portfolio must be held in listed shares. This long-term investment (up to 9 years) is thus riskier than the "Plano Poupança-Reforma" (which can invest in listed shares no more than 25% of its funds).

We will terminate this brief reference to financial assets introduced in Portugal since 1985 with a note on commercial paper. This financial asset was formally introduced in 1992 and quickly gained importance as an alternative way of raising funds. However, the percentage of commercial paper issued held by private individuals is insignificant (less than 1%). Therefore, it seems that commercial paper is more a funding alternative for companies than an investment alternative for individuals.

2.3.7. Diversification of Bank Deposits

In 1986, the legal framework was changed to allow for "specific bank deposits." This new category is intended to stimulate competition and innovation in banking. The specific bank deposits are deposits with particular characteristics, determined by each bank, with a view to better adjusting their products to the needs of different customers.

But the Government have also regulated some specific bank deposits. The "contas poupança-habitação" (housing savings accounts), introduced in 1986, enjoy tax benefits and higher interest rates than normal time deposits. However, the funds placed in these accounts can only be withdrawn to pay for housing related expenditures. The "contas poupança-reformado" (retired savings accounts) give retired people (receiving pensions up to a certain limit) tax benefits.

Savers welcomed these types of savings accounts: between 1986 and 1990 their share went up to over 20% of total deposits held by private individuals in escudos.

This share increase was accompanied by a correspondent reduction of the share in time deposits.

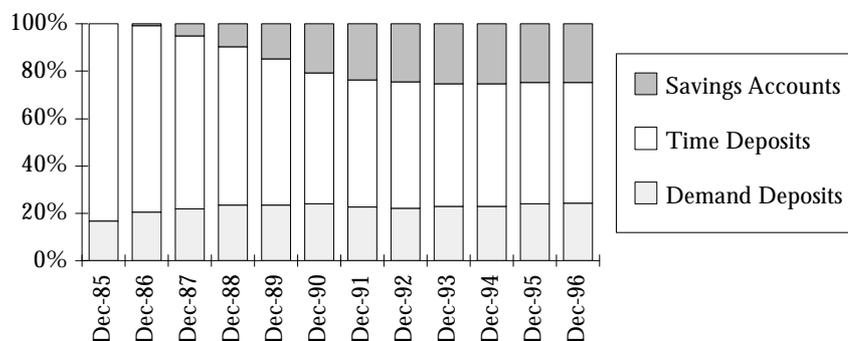


Figure 14 - composition of total deposits held by private individuals
Source: *Statistical Bulletin*, Bank of Portugal

Certificates of deposit were reintroduced in Portugal in 1987. Until 1992, the amount placed on certificates of deposit increased significantly. However, since then it has declined, perhaps due to the reduction in the spread between the interest rate on certificates of deposit and the interest rate on time deposits (maturing in less than 30 days). The next chart shows the evolution of this spread and of the amount placed on certificates of deposit.

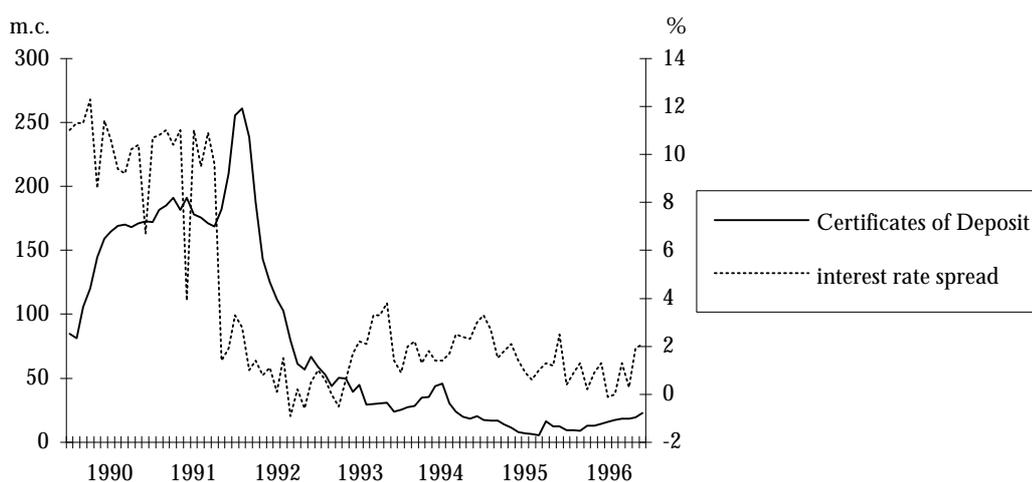


Figure 15 - interest rate spread and amount placed on certificates of deposit
Source: *Statistical Bulletin*, Bank of Portugal

The possibility of a substitution between certificates of deposit and time deposits maturing in less than 30 days is confirmed by the evolution of the amounts placed on each of those assets:

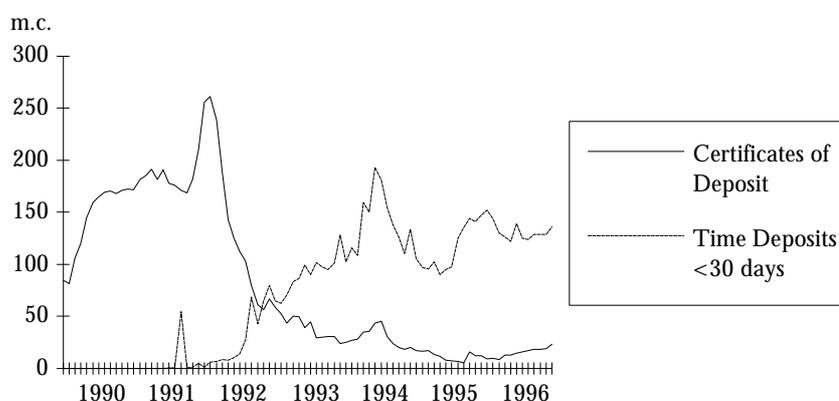


Figure 16 - amounts placed on certificates of deposit and time deposits
Source: *Statistical Bulletin*, Bank of Portugal

2.3.8. New Financial Institutions and New Technologies

After 1985, benefiting from the evolution of the legal framework and from favourable economic conditions, the activity of new financial institutions witnessed a rise. The most important years in terms of legislation changes were 1986, 1988, 1991 and 1994.

We agree with Leal (1989) that there have been two different trends characterizing the evolution of the Portuguese financial system, both of which demonstrate the importance of changes in legislation. The first trend is the development of universal banking, which we mentioned earlier. This development led to an increase in competition and innovation. The working of this trend relies, therefore, on market behaviour. The second trend is related to the fact that some economic agents may benefit from the impossibility for other economic agents to enter certain markets. This helps explain the development of new financial institutions in markets in which banks were not allowed to be present. The Government helped the development of new financial institutions in order to improve the functioning of the financial sector and to give the private initiative the chance to undertake certain financial operations, at a time when the private sector was not allowed to own banks.

Besides the emergence of new types of financial institutions, there has been also an increase in the application of technological innovations to the provision of financial services. This increase was aided by the action of SIBS - Sociedade Interbancária de

Serviços, a company which was founded in 1983 by a set of banks. The business of this company is mainly concerned with the setting up of payments systems. The network of ATMs "Multibanco" started to operate in 1985. Other examples of the application of new technologies to the payments system are "Via Verde" ("green-light way" - a system allowing drivers to proceed through motorway tolls without stopping since the amount due is electronically controlled and automatically charged to their bank account), "Credifone" (telephone credit card) and the "porta-moedas automático" (electronic purse - a smart card that allows small payments to be made electronically). Home banking services are also being offered by a number of banks.

We conclude this section with a chart that reveals the rapid adoption of these new technologies in recent years.

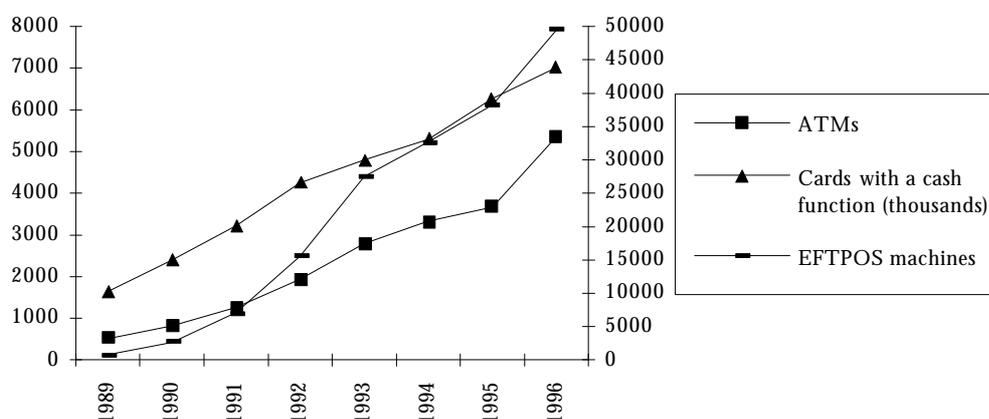


Figure 17 - adoption of new technologies in Portugal
 Values for EFTPOS machines are indicated on the right-hand side scale.
 Source: European Monetary Institute

3. The Velocity of Circulation and Money Demand

3.1. Introduction

We will now develop an econometric model of the behaviour of narrow money ($M1^*$) in Portugal. The data is quarterly and covers the period 1970-1996. The main ingredient of the model to be presented is the velocity of circulation of money (measured relative to GDP). However, its inclusion in the model is preceded by an adjustment of that variable. This adjustment aims at removing the non-stationarity of the original variable. We do not attempt to explain why the velocity of circulation has

behaved as if there had been shifts in its mean. That will require further research, for, on chronological grounds, it looks to us that the elements reviewed in the first part of this paper concerning financial innovation in Portugal do not seem to be able to explain those shifts.

3.2. The Velocity of Circulation of Narrow Money

If one looks at the evolution of the logarithm of the velocity of circulation of narrow money in Portugal since 1970 (figure 1) one is led to think that it passes through three different phases. In the first period, between 1970 and 1976, the velocity of circulation seems to oscillate about a constant mean. In the second period, between 1976 and 1983, the velocity of circulation rises significantly. Closer inspection reveals the existence of three subperiods: the first between 1976 and 1979; the second between 1979 and 1981 (during which the rise is interrupted); and the third between 1981 and 1983. During the last phase, after 1983, the velocity of circulation seems to oscillate again around a constant (or perhaps slightly decreasing) mean; more recent data may help settle the issue.

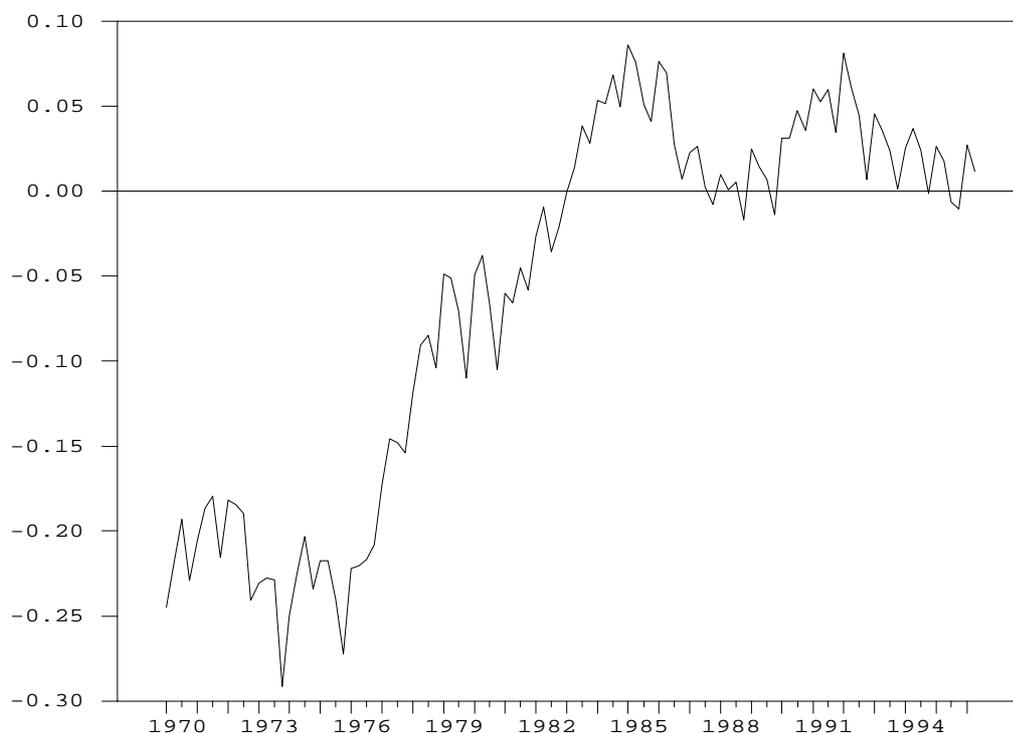


Figure 18 - logarithm of the velocity of circulation of M1

As we said, we will not attempt to explain the behaviour of the velocity of circulation here. We will think of the observed shifts in mean as reflecting the effect of (unknown) variables on the velocity of circulation and we will approximate the effect of those unknown variables by a deterministic function. In practice, we will be looking at the velocity of circulation as if it was a stationary variable with shifts in its mean.



Figure 19 - deterministic component of the (symmetric of the) velocity of circulation

Figure 2 shows the configuration selected for the deterministic component of the velocity of circulation. Choosing the deterministic component that maximized the R^2 of the regression of the velocity of circulation on it, we divided the sample in five periods: 1970:1 to 1976:2; 1976:3 to 1979:1; 1979:2 to 1981:2; 1981:3 to 1983:4 and 1984:1 to 1996:2. The stochastic component, obtained by difference, is shown in figure 3.

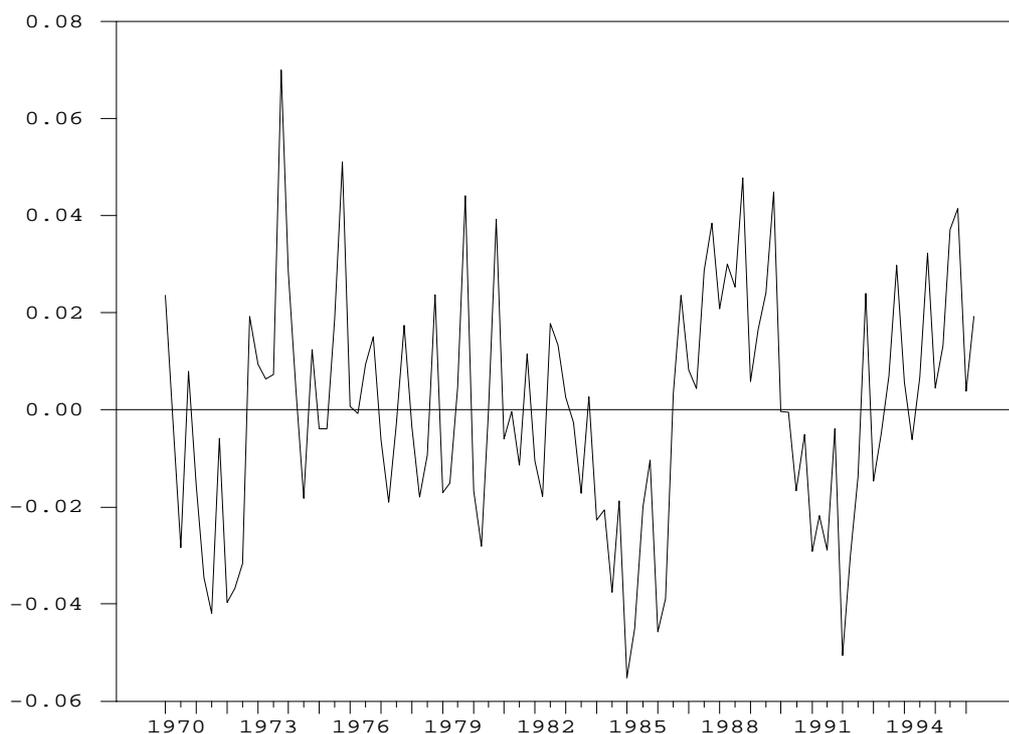


Figure 20 - stochastic component of the symmetric of the velocity of circulation

This new series appears to be stationary. This hypothesis is confirmed by the stationarity tests carried out: ADF - Augmented Dickey-Fuller; KPSS - test proposed by Kwiatkowski, Phillips, Schmidt and Shin (1992) in which the null hypothesis is stationarity; S-B - Sargan-Bhargava test; and P-P - Phillips-Perron *t*-test. The results appear in the next table.

Test	Statistic	Critical Value (5%)
ADF ^{1,2}	-3.1912	-1.9434
KPSS ¹	0.08251	0.463
S-B	1.0569	0.26
P-P ^{1,2}	-6.58853	-1.9434

¹ 7 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

² test without constant (the constant was not significant)

Table 5 - stationarity tests of the stochastic component

A problem with these tests is the choice of critical values. Some unit-root tests (e.g. Perron (1989), Lumsdaine and Papell (1997)) allow for the possibility of trend breaks. However, we do not believe they apply to a situation such as this one with several trend breaks in a very small sample.

If we accept the procedure followed as a valid one, we are accepting the hypothesis of cointegration between narrow money, nominal GDP and a set of unknown variables. Moreover, we are accepting the hypothesis of unitary real GDP and price level elasticities of money demand. The next step is to estimate a money demand model that incorporates this information. This will be done through an error-correction mechanism.

3.3. The Econometric Model

The starting point of our study will be the following equation for narrow money:

$$\Delta m_t = c + \sum_{i=1}^4 a_i \cdot \Delta m_{t-i} + \sum_{i=1}^4 b_i \cdot \Delta y_{t-i} + \sum_{i=1}^4 c_i \cdot \Delta p_{t-i} + \sum_{i=1}^4 d_i \cdot \Delta r_{t-i} + \sum_{i=1}^3 e_i \cdot S_i + d \cdot VCM_{t-1}$$

m is the logarithm of narrow money; y is the logarithm of real GDP; p is the logarithm of the implicit GDP deflator; r is a long-term bank's lending rate; S_i are three seasonal variables; VCM is the symmetric of the adjusted velocity of circulation of narrow money (in logarithm). The variable VCM will correspond to the deviation from the long run equilibrium:

$$VCM_t = m_t - y_t - p_t - D_t$$

$$m_t^e = y_t + p_t + D_t$$

where m_t^e is the equilibrium value of money holdings and D_t represents the effect of the set of unknown variables that we approximated by a deterministic function.

For our study to be valid it is necessary that the variables (in levels) are integrated of order one, in which case the variables included in the equation are stationary. The next table shows the results of unit-root tests for the levels of the variables.

Variable	ADF	KPSS	S-B	P-P
m	-1.9846 ¹	2.21503 ¹	0.0032	-0.72946 ¹
y	-1.6849 ¹	2.17025 ¹	0.0098	-1.96654 ¹
p	-2.2250 ¹	2.21018 ¹	0.0012	-1.35089 ¹
r	-2.0179 ¹	0.82831 ¹	0.0484	-1.68844 ¹

¹ 4 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

Table 6 - stationarity tests of the variables in levels

The non-stationarity of the levels of all four variables seems indisputable. The next table shows the results of unit-root tests for the first differences of the variables.

Variable	ADF	KPSS	S-B	P-P
Δm	-3.5436 ^{1*}	0.21776 ^{1*}	2.6279*	-16.23067 ^{1*}
Δy	-3.6718 ^{1*}	0.33697 ^{1*}	2.8333*	-17.38586 ^{1*}
Δp	-2.4783 ¹	0.70143 ¹	1.4996*	-8.06170 ^{1*}
Δr	-2.7819 ^{1,2*}	0.53898 ¹	2.4258*	-12.40779 ^{1,2*}

¹ 3 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

² test without constant (the constant was not significant)

* = stationarity hypothesis accepted (or not rejected)

Table 7 - stationarity tests of the variables in differences

All the tests indicate that narrow money (m) and real GDP are integrated of order one. As to the interest rate (r), only the KPSS test rejects the stationarity of its first difference. Therefore, and also because this does not appear to be very plausible, we shall consider the interest rate to be integrated of order one. Finally, there is the question of the order of integration of the price level (p). This is a more difficult decision: while the ADF and KPSS tests reject the stationarity hypothesis, the Sargan-Bhargava and Phillips-Perron tests accept it. We will assume that the price level is also integrated of order one. We base our decision on the results of auxiliary tests presented in the next table.

Variable	ADF	KPSS	S-B	P-P
m-p	-2.6011 ¹	0.30956 ¹ *	0.2306	-2.04399 ¹
$\Delta(m-p)$	-2.8021 ^{2,4} *	0.33697 ¹ *	2.5771 *	-15.01300 ^{2,4} *
y+p	-2.4725 ³	1.86139 ³	0.0012	-2.09049 ³
$\Delta(y+p)$	-3.0316 ² *	0.70416 ³	1.9715 *	-10.18127 ² *

¹ 4 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

² 3 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

³ 5 lags were included (so that the Lagrange Multipliers test for 4th order autocorrelation would not fail)

⁴ test without constant (the constant was not significant)

* = stationarity hypothesis accepted (or not rejected)

Table 8 - auxiliary tests of stationarity

Knowing that a linear combination of two variables, one integrated of order two and the other integrated of order one, will be integrated of order two, we would expect real money holdings ($m-p$) and nominal GDP ($y+p$) to be integrated of order two if the price level is integrated of order two, since m and y are integrated of order one. Overall, the results of the auxiliary tests indicate that real money holdings and nominal GDP are integrated of order one. Therefore, we accept the results of Sargan-Bhargava and Phillips-Perron tests that point to the price level being integrated of order one.

3.4. Results

The estimation and subsequent reduction of the model with data from 1971:2 to 1996:2 lead to the results presented in the next table:

Variable ¹	Coefficient	Standard Deviation	t-statistic	Significance Level
Constant	0.015388	0.0035461	4.340	0.0000
Seasonal	-0.034816	0.0069400	-5.017	0.0000
Seasonal{1}	-0.019030	0.0046404	-4.101	0.0001
Seasonal{2}	-0.013051	0.0043729	-2.984	0.0036
$\Delta m\{4\}$	0.27522	0.091144	3.020	0.0033
$\Delta r\{1\}$	-0.0024067	0.0010445	-2.304	0.0234
VCM{1}	-0.25527	0.069574	-3.669	0.0004

$R^2 = 71\%$ $F(6,94) = 227.77^*$ $DW = 1.93$

¹ the number in brackets is the lag of the variable

Table 9 - estimation results, 1971:2-1996:2

The model obtained may be termed a "minimal model" for it contains only two variables besides the deterministic components and the error-correction term. The coefficient of this error-correction term is negative (as expected) and shows that money holdings are adjusted towards the long run equilibrium about 25% each quarter.

The next table shows the diagnostic tests for the estimated model.

Test	Value
Autocorrelation (1 to 5) F(5, 89)	0.34947
ARCH 4 F(4, 86)	1.3965
Normality χ^2 (2)	0.026162
Heteroscedasticity F(11, 84)	1.4383
Functional specification F(21, 72)	1.0211
RESET F(1, 93)	0.9579

Table 10 - diagnostic tests

None of the tests shows signs of the existence of problems with our model. Visual inspection of the normalized residuals (figure 4) of the model shows that these residuals are almost completely within reasonable bounds. The recursive residuals and Chow tests (figure 5) also do not reveal misspecification of the model. The recursive estimation of the coefficients shows some instability in 1983-1985 (figure 6). This is perhaps due to the implementation of the second stabilization agreement with the International Monetary Fund.

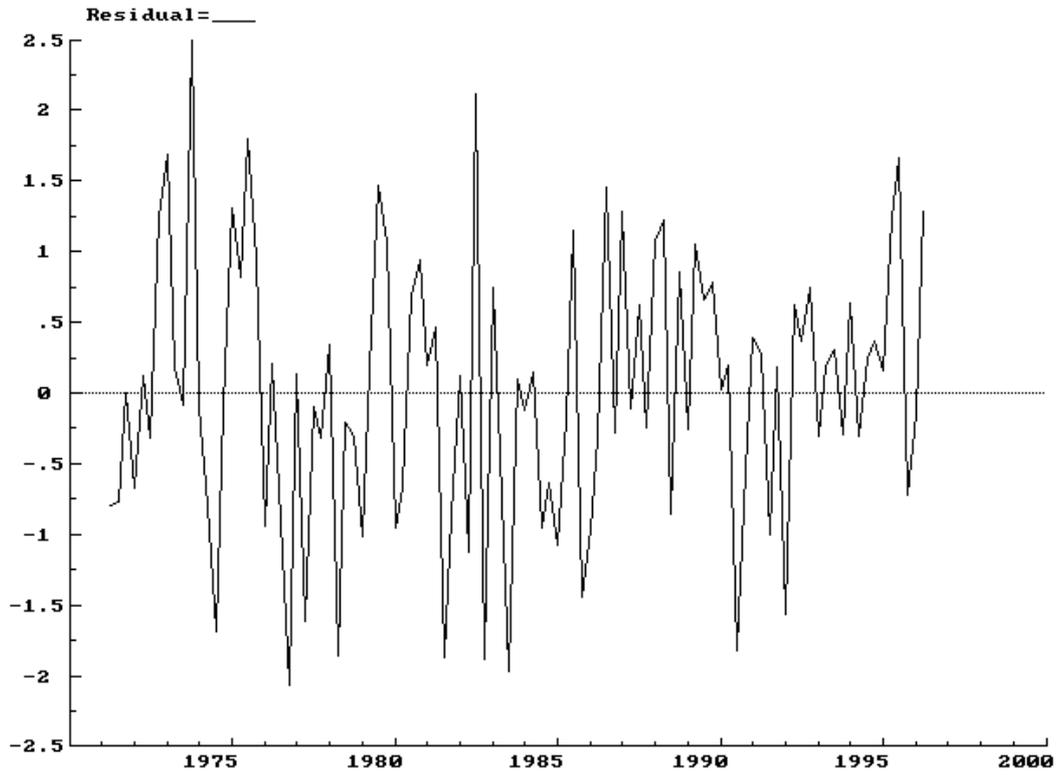


Figure 21 - normalized residuals

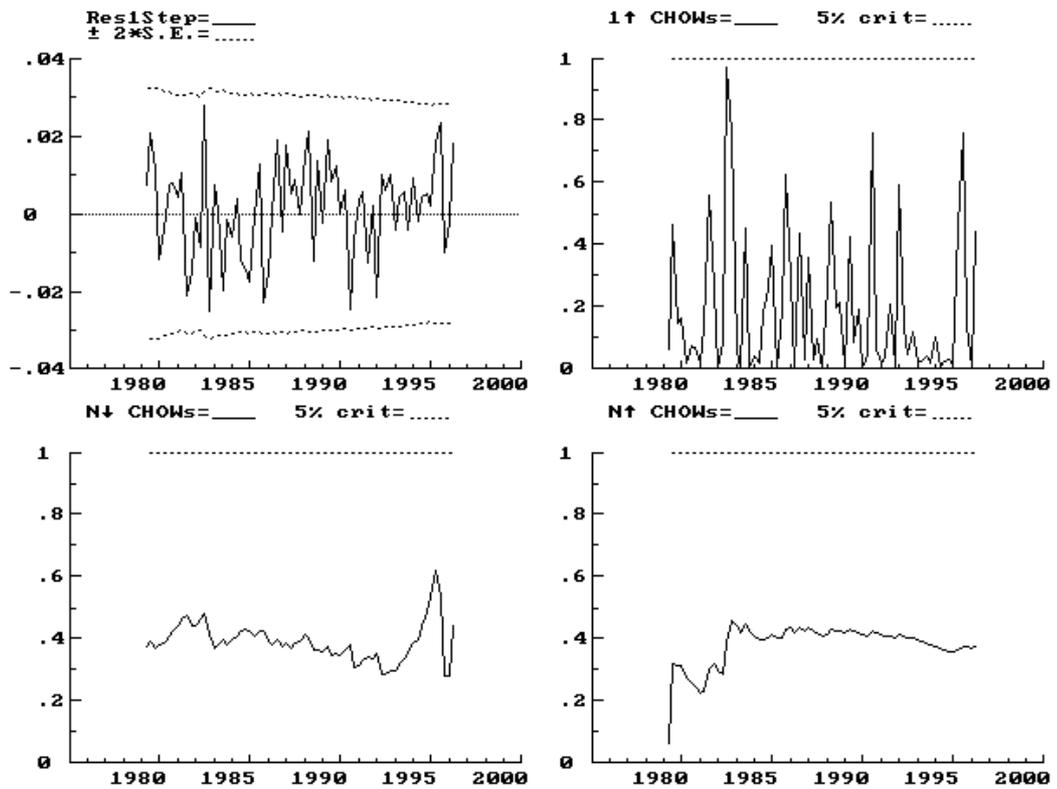


Figure 22 - recursive residuals and Chow stability tests

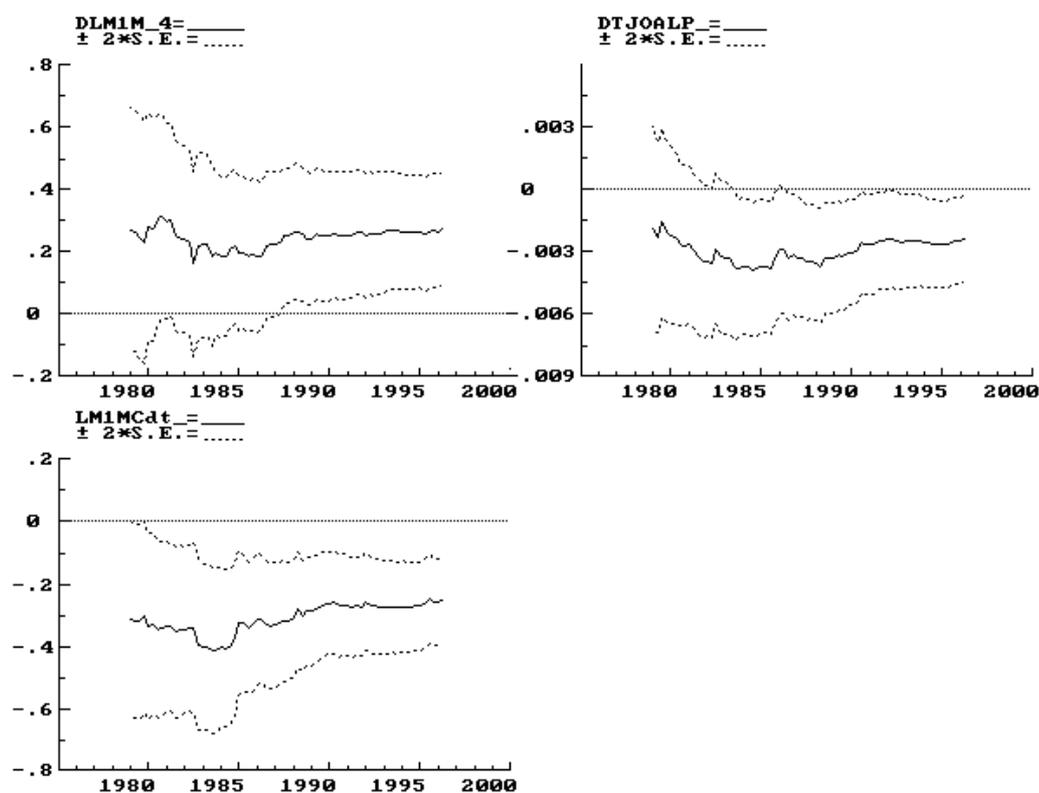


Figure 23 - recursive estimation of the coefficients

As a last test of our model, we estimated it using data previous to 1990 and used the rest of the data to evaluate its out of sample prediction ability. The estimated coefficients are shown in the next table.

Variable ¹	Coefficient	Standard Deviation	t-statistic	Significance Level
Constant	0.016271	0.0042287	3.848	0.0003
Seasonal	-0.035653	0.0081037	-4.400	0.0000
Seasonal{1}	-0.022925	0.0058268	-3.934	0.0002
Seasonal{2}	-0.013424	0.0053049	-2.531	0.0137
$\Delta m\{4\}$	0.25054	0.10444	2.399	0.0192
$\Delta r\{1\}$	-0.0030230	0.0012779	-2.366	0.0209
VCM{1}	-0.26158	0.083847	-3.120	0.0027

$$R^2 = 69\% \quad F(6,68) = 179.58^* \quad DW = 1.93$$

¹ the number in brackets is the lag of the variable

Table 11 - estimation results, 1971:2-1989:4

The results of the diagnostic tests were the following:

Test	Value
Autocorrelation (1 a 5) F(5, 63)	0.39624
ARCH 4 F(4, 60)	1.404
Normality χ^2 (2)	0.30256
Heteroscedasticity F(9, 58)	1.054
Functional specification F(21, 46)	0.87833
RESET F(1, 67)	0.41507
Forecast χ^2 (26)	16.396
Chow F(26, 68)	0.57709
t(25)	0.786

Table 12- diagnostic tests

Again, none of the tests (including the prediction ability tests) shows signs of problems. The forecasts are well within the 95% confidence interval (figure 7).

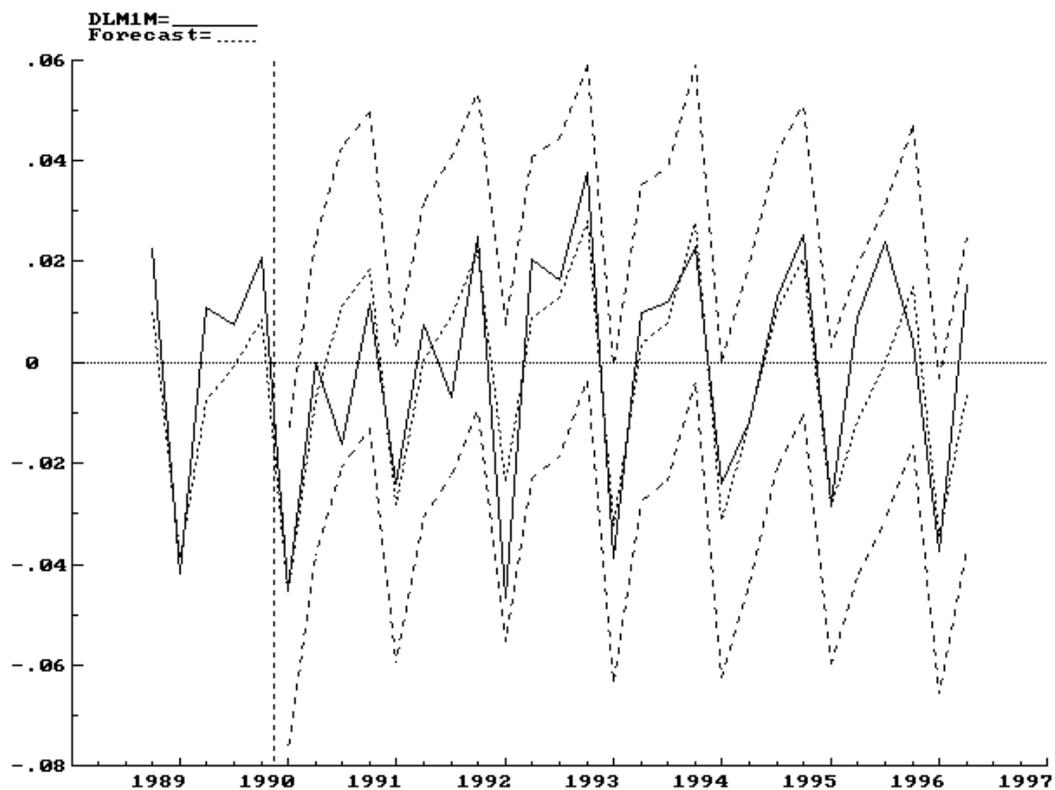


Figure 24 - *ex post* forecasts

3.5. Discussion of the Results

Money demand has been the subject of many empirical studies (see, e.g., Mullineux (1996)). The controversy around this type of studies increased considerably when the estimated models began to exhibit signs of forecast failure. The episode known as "missing money" became famous. It consisted in a significant over-prediction of narrow money in the United States in the mid-70s (see, e.g., Goldfeld and Sichel (1990)). An often referred explanation for that is the influence of financial innovation. Narrow monetary aggregates have been pointed as the most affected by innovations in financial markets. Reports issued by the Bank of Portugal have echoed this view.

In this study we focused on modelling narrow money demand. Its velocity of circulation has grown since 1970, albeit irregularly. We have split the sample in subperiods but the border dates do not seem to be related to the introduction of financial innovations in Portugal that we surveyed earlier. Other explanations, for example, relating to institutional developments²⁵ and general economic conditions, may deserve greater attention.

After we had taken into account the shifts in the velocity of circulation, what looked like a stable demand function for narrow money emerged. However, the methodology employed is questionable. Moreover, it does not allow much confidence to be placed on out of sample forecasts for it is based on a deterministic approximation to unknown factors that affect the behaviour of the velocity of circulation.

4. Conclusion

Financial innovation has been notorious in Portugal over the last years. It developed in Portugal later than in other countries, namely the United States. In the early 70's, while traditional banking services were still spreading in Portugal, economists in the United States were already blaming the "case of the missing money" on financial innovation.

The first part of this paper surveyed the development of financial innovation in Portugal since 1970, although focusing on financial assets. It seems clear to us that the development of financial innovation has been most of the time led by Government intervention. This was the case with emigrants' accounts at a time when external imbalances were the main policy problem. This was also the case when budget deficits

²⁵ In the line of the institutional approach of Bordo and Jonung (1987).

started being financed through bond issues instead of money creation. Other examples could be given to support this view. Nevertheless, in recent years, after Governments' stance shifted to market oriented policies, away from the more interventionist policies followed after the Revolution of 1974, the market gained a very important role in the development of financial innovations.

In the second part of our study, we estimated and tested an econometric model of the demand for narrow money in Portugal. The error-correction mechanism used was based on an adjusted velocity of circulation. The velocity of circulation was adjusted for several shifts, caused by unknown factors. We approximated these factors by a deterministic function and obtained a model that passed the diagnostic tests. The timing of the shifts in the velocity of circulation does not appear to be related to the financial innovations mentioned in the first part of this paper. Therefore, further research to find the nature of those factors is required. The econometric methodology employed is debatable. It serves only as a starting point of a more rigorous study of money demand in Portugal.

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