The Stability Pact and Portuguese Fiscal Policy: the application of a VAR model

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Abstract

The Treaty on European Union forbids the Member States from incurring excessive government deficits. That prohibition is re-stated in the Stability and Growth Pact. The latter regulates the excessive deficit procedure. This regulation is analysed in detail. It brings us to the conclusion that its practical implementation shall lead the Member States to achieve the medium-term budgetary objective of close to balance or in surplus, so that automatic stabilisers can work without exceeding the 3% reference value for the deficit.

Next, whether stabilisation of the Portuguese economy has been achieved through the use of the budget expenditure or through the use of the receipts is evaluated. The correlation coefficients of the cyclical components of these variables with cyclical output are analysed. A VAR model between the output gaps of these three variables is also estimated. It seems justified to conclude, for the Portuguese economy, between 1953 and 1996, that the contribution of receipts to output stabilisation (achieved by the fiscal policy) has been greater than that of public expenditure.

Resumo

A proibição, expressa no Tratado de União Europeia, de os Estados-membros incurrerem em défices excessivos é reafirmada no Pacto de Estabilidade e Crescimento. Este visa regulamentar o procedimento a adoptar quando se verificarem défices excessivos. Esta regulamentação é analisada em detalhe. Conclui-se que a sua aplicação prática deverá levar os Estados-membros a alcançarem, a médio prazo, uma posição orçamental próxima do equilíbrio ou excedentária, de forma a que os estabilisadores automáticos funcionem, sem que seja infringido o valor de referência de 3% para o défice.

Em seguida procura-se avaliar, para o caso concreto da economia portuguesa, se a estabilização tem sido conseguida recorrendo às despesas ou às receitas públicas. Analisam-se os coeficientes de correlação das componentes cíclicas destas variáveis com a componente cíclica do produto. E estima-se um modelo VAR entre os hiatos (gaps) dessas mesmas variáveis. Parece ser legítimo concluir que, para Portugal, entre 1953 e 1996, a estabilização, alcançada pela política orçamental, tem estado mais a cargo da evolução das receitas do que das despesas públicas.
Introduction

For EMU participating countries the fiscal policy will be the main macroeconomic policy that remains in the control of the national authorities. However, there should be a solid budgetary discipline in order not to undermine price stability, nor to increase the level of interest rates. That purpose was clearly demonstrated in the Treaty on European Union by the imposition of a ceiling of 3% of GDP for the deficit and 60% for the public debt. The Treaty also outlines the fundamental principles of the excessive deficit procedure. These were recently clarified and regulated by the Stability and Growth Pact.

Firstly, we will examine that Stability and Growth Pact, trying to find out what its implications will be for the conduct of fiscal policy with stabilisation purposes.

Secondly, we will attempt to evaluate, for the Portuguese economy, if macroeconomic stabilisation has been achieved by the use of public expenditure or by the use of public receipts.

1 The Institutional Background

1.1 Treaty on European Union

Article 104c (1) of the Treaty on European Union, signed on 7 February 1992, states that in EMU “Member States shall avoid excessive government deficits”1. A budget deficit is excessive when the ratio of the planned or actual government deficit to gross domestic product (GDP) exceeds the 3% reference value, which was set by the “Protocol on the Excessive Deficit Procedure”2, and also when the ratio of government debt to gross domestic product is larger than 60% of GDP, “unless the ratio is sufficiently diminishing and approaching the reference value at a satisfactory pace”.

The 3% threshold can only be exceeded without causing an excessive deficit if “either the ratio has declined substantially and continuously and reached a level that comes close to the reference value; or, alternatively, the excess over the reference value is only exceptional

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1 “Member States” shall be read as “Member States without a derogation” (article 109k), and those Member States that do not fulfil the necessary conditions for the adoption of a single currency, established in article 109j (4), will benefit from a derogation.

2 Budget deficit means, in the terms of the Protocol (no. 5) of the Treaty on the Excessive Deficit Procedure, net borrowing from the general government, which “… is central government, regional or local government and social security funds, to the exclusion of commercial operations (…)”. 
and temporary and the ratio remains close to the reference value”  . These last three conditions may be designated as the exceptional, temporary and close to reference value conditions.

Article 104c outlines the excessive deficit procedure. The Commission should follow the budgetary position and the public debt stock of the Member States, and prepare a report if any Member State does not comply with EMU requirements. When the Council, acting by a qualified majority, decides that there is an excessive deficit, it will issue recommendations to the Member State concerned. If these recommendations are not followed they may be made public. If even so the recommendations are not followed, the Council will notify the Member State to take measures to reduce the deficit. However, if this notification is not followed, Article 104c (11) enables the Council: to require the Member State concerned to publish additional information, before issuing bonds and securities; to invite the European Investment Bank to reconsider its lending policy towards the Member State concerned; to require the Member State concerned to make a non-interest-bearing deposit with the Community; and, to impose fines. However, it does not set either the timetable for these measures nor their extension. The object of the Stability and Growth Pact is precisely this regulation.

1.2 The Stability and Growth Pact

The Stability and Growth Pact (SGP), whose basic principles were approved by the Dublin European Council of December 1996, has as it principal purpose the prevention of excessive budget deficits in the euro zone. However, in the event of the occurrence of an excessive deficit, the Pact intends to guarantee its rapid correction, regulating the above quoted dispositions of article 104c.

As we already mentioned article 104c only allows the 3% reference value to be exceeded without causing an excessive deficit if “… the excess over the reference value is only exceptional and temporary and the ratio remains close to the reference value”. The Stability Pact states exactly when a deficit above 3% might be tolerated. The excess of a government deficit over the 3% reference value shall be considered exceptional and temporary “when resulting from an unusual event outside the control of the Member State concerned and which has

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3 Article 104c (2a) of the Treaty.
a major impact on the financial position of the general government, or when resulting from a severe economic downturn\(^5\) causing an annual fall in real GDP of at least 2%.

Nevertheless the Council may consider exceptional an annual fall in real GDP of less than 2% “in the light of further supporting evidence, in particular on the abruptness of the economic downturn or on the accumulated loss of output relative to past trends.” There is however a compromise of the Member States saying that, as rule, a fall of less than 0.75% would not be considered exceptional\(^6\).

The excess over the reference value shall be considered temporary if budgetary forecasts provided by the Commission indicate that the deficit will fall below the reference value following the end of the unusual event or the severe economic downturn.

The SGP does not deal with the mentioned closeness condition. It sets, however, the time limits of the various steps of the excessive deficit procedure and the scale of sanctions. This procedure is initiated when a government deficit surpasses the reference value\(^7\). The Commission elaborates a report\(^8\). The Economic and Financial Committee makes use of a maximum of two weeks to express its opinion on this report. If the Commission considers that an excessive deficit exists, it shall address an opinion to the Council. If the Council, acting by a qualified majority, within three months counting from the forecasts reporting date, decides that there is an excessive deficit, it will issue recommendations to the Member State concerned. The Council will also give a maximum of four months “for effective measures to be taken”\(^9\) and one year for the correction of the excessive deficit, unless “there are special circumstances”\(^10\). Finished the stated period of four months, the Council will evaluate if those measures had or not been taken. If they were not, the Council may make its recommendations public, and within a month may decide to give notice to the Member State to take measures for the deficit reduction\(^11\) (see Figure 2, below\(^12\), on page 11).

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\(^5\) Article 2 (1) of Regulation (EC) No. 1467/97. Author’s italics.
\(^7\) The Member States must report to the Commission their planned and actual government deficits (and levels of public debt) twice a year, the first before 1 March and the second before 1 September [Council Regulation (EC) No. 3605/93, OJ No. L332, 31.12.1993, p. 7].
\(^8\) In the elaboration of the report, the Commission shall also take into account whether the government deficit exceeds government investment expenditure and the medium-term economic and budgetary position of the Member-State (Article 104c (3) of the Treaty). The first requirement will imply an assessment on the fulfilment of the so-called “golden rule” of public finance.
\(^9\) Article 3 (4) of Reg. (EC) No. 1467/97.
\(^10\) Article 3 (4) of Reg. (EC) No. 1467/97.
\(^11\) In the terms of Article 104c (9) of the Treaty.
\(^12\) The figure is accompanied by an illustration of the time limits for the several steps of the excessive deficit procedure, initiated on the occasion of the March notification.
non-compliance with the successive Council resolutions by a Member State incurring in excessive deficit shall lead the Council to impose sanctions, within ten months\textsuperscript{13} of the reporting dates of the deficit forecasts. These sanctions are, “as a rule”, a non-interest bearing deposit, which shall be converted into a fine if after two years the deficit remains excessive. The amount of the deposit “… shall comprise a fixed component equal to 0.2\% of GDP, and a variable component equal to one tenth of the difference between the deficit as a percentage of GDP in the preceding year and the reference value of 3\% of GDP”\textsuperscript{14,15} up to a maximum of 0.5\% of GDP\textsuperscript{16}. Each following year the Council will assess the budgetary position of the Member State. If the deficit is still excessive the Council will intensify the sanctions. The additional deposit will be equal to the referred variable component, also with an upper limit of 0.5\% of GDP. However, there is no limit for the total amount of the successive deposits\textsuperscript{17}.

This excessive deficit procedure will be held in abeyance if the Member State acts in compliance with the recommendations or notices of the Council. However if the measures are not being implemented, or in the Council’s view, are proving to be inadequate, the Council will immediately take a decision on issuing a notice or on imposing sanctions, respectively.

When the decision on the existence of an excessive deficit is abrogated, the Council will abrogate all outstanding sanctions. The fines will not be reimbursed to the Member State concerned\textsuperscript{18}.

\textsuperscript{13}“An expedited procedure shall be used in the case of a deliberately planned deficit which the Council decides is excessive”, Article 7 of Reg. (EC) No. 1467/97.
\textsuperscript{14}Article 12 (1) of the Regulation (EC) No. 1467/97.
\textsuperscript{15}The Council may also decide to supplement this deposit with the first two measures of article 104c (11), to which we allude in page 4.
\textsuperscript{16}This upper limit is achieved when the budget deficit is greater than or equal to 6\% of GDP.
\textsuperscript{17}This formula implies that the SGP does not consider pecuniary sanctions when an excessive deficit results from nonconformity with the debt ratio criterion.
\textsuperscript{18}According to Article 16 of Reg. (EC) No. 1467/97, the interest on the deposits, and the fines, constitute “other revenue” and will be distributed among participating Member States without a deficit that is excessive, in proportion to their share in the total GNP of the eligible countries.
Figure 1 – “Exceptional, temporary and close to reference value”: an illustration

Figure 1, reproduced from European Commission (1997b), illustrates the exceptional, temporary and close to reference value conditions. We should, however, bear in mind that the allowed excess beyond the 3% (the value of $\Delta$) was not regulated by the SGP. Therefore, there is some political margin for manoeuvre in case (c): it might not be considered a “transient” excessive deficit. However cases (d) and (e) are clearly excessive deficit situations, because in the year following the recession the deficit does not return below the 3% GDP threshold.

In conclusion, we can say that the Stability and Growth Pact is clearly a dissuasion instrument that it is hoped will never be enforced, because its enforcement is not a solution for the problems it is intended to avoid\(^\text{19}\). In particular, its application does not

\(^{19}\) There is even the opinion that the problems will be aggravated. That is the point of Von Hagen and Eichengreen (1996). They argue that the imposition of borrowing restraints by the Stability Pact will prevent the Member States from smoothing out the shocks over time. This impossibility will lead them to transfer to Brussels the responsibility for output stabilisation, along with some reluctance in the transfer of taxes. Such transfer of responsibilities, without the corresponding financial resources,
avoid the spillover effects on interest rates nor the threat to price stability. However, its existence increases the credibility of the no-bailout clause, expressed in article 104b.

The interesting question is that of knowing what the implications of the Stability Pact will be for the conduct of fiscal policy, namely how it might constrain counter-cyclical fiscal policy. Besides discretionary fiscal policy, there are a number of factors relevant to that issue, like the sensitivity of the budget to the economic cycle\textsuperscript{20}; the size and duration of cyclical fluctuations and its effects on the budget; and the level of the pre-recession deficit.

A retrospective application of the SGP exercise, carried out by the European Commission (1997b), has found some answers. The work was about identifying the behaviour of the budget deficit in the recession episodes over the period 1961-1996. Starting with an arbitrary “pre-recession deficit”, they attempt to evaluate if the deterioration of the deficit during the recession will push it to exceed the 3% reference value, and also if the deficit bounces back (below the 3%) once the recession is over. In other words, the Commission wanted to know if the deficit had behaved as in (b) or (c) of the Figure 1\textsuperscript{21}.

A balanced budget, which is consistent with the long-term budgetary target within EMU; a 2% deficit, the likely deficit level during the early years of EMU; and a country specific pre-recession budget surplus corresponding to the size of the cyclical budget component\textsuperscript{22}, were considered as starting points.

\textsuperscript{20} That is the size of the automatic budget stabilisers. For a brief discussion of this issue see, for instance, IMF (1997: 58)

\textsuperscript{21} It is a highly speculative exercise, as the Commission itself recognises, because the 3% reference value for the government deficit did not have any policy relevance in that period.

\textsuperscript{22} “… It is assumed that country chooses a structural balanced budget position and that the actual budget position corresponds to the cyclical component in the pre-recession year. Therefore, if the output gap is zero in the pre-recession period, this case is equivalent to the balanced budget exercise, while if the output gap is positive, as turns out to have been the case for past recessions, the starting point will be an actual budget surplus” (European Commission, 1997b: n. 15, p. 82).
For the case of a severe recession, that is a GDP decrease of at least 0.75%, the main results may be summarised as (European Commission, 1997b: 86):

a) The lower the pre-recession deficit, the lower the probability of breaching the 3% GDP threshold during the recession and in the year following the recession;

b) The early years of EMU, where several countries are likely to record deficits close to 2%, are likely to be problematic in the event of a severe recession;

c) A pre-recession balanced budget, or a country specific surplus, would have prevented all one year recessions from leading to an excessive deficit (both in the year of the recession and in the following year);

d) The risk of incurring an excessive deficit is higher for countries that face lengthy recessions, which result in significant negative output gaps and make it extremely difficult to re-absorb the deficit within the first year of recovery. That is the case of 9 of the 24 recession episodes considered. Moreover, in 5 of 9 occurrences, even starting with a balanced budget, and in 4 cases when starting from a pre-recession surplus, there is an excessive deficit.

Therefore “… the analysis (…) calls for a fast move to a balanced budget and for some attention to the problems that will be encountered during the early years of EMU in the event of a severe downturn” (European Commission, 1997b: 87).

The cases of “mild” recessions (a GDP decrease by less than 0.75%) and abrupt slowdowns were also studied. The latter are defined as corresponding to a fall in the GDP growth rate, which still remains positive but produces a worsening in the output gap by at least 2.5%. The main conclusion is that a pre-recession balanced budget will enable countries to go through the recession without incurring in excessive deficit, unless strong expansionary policies are carried out and not reversed after the recession. However, a 2% pre-recession budget deficit may lead some countries to incur excessive deficits.

Therefore, in order to comply with the Stability Pact, a pre-recession budget deficit may prevent the use of fiscal policy for stabilisation purposes.

We should also mention that any additional public debt offer, which is necessary to finance the deficit, made by a country that does not regard the 3% threshold, and for

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23 In the case of the Portuguese economy, starting with a balanced budget the 1983-4 recession would not imply an excessive deficit; the 1993 recession would imply a “transitory” excessive deficit (that reduces to less than 3% in the year following the recession); and a GDP decrease of 2% in 1975 would imply an excessive deficit. Whereas if we started with a 2% budget deficit, only the 1983-4 recession would not imply an excessive deficit. With a pre-recession budget surplus none of the above mentioned recessions would imply an excessive deficit.

24 For the Portuguese economy, with a 2% pre-recession budget deficit only the 1975 recession will imply an excessive deficit.
whom the Council’s resolutions have been made public, will be more and more burdensome. The increased risk premium is the market disincentive for the prolongation of an expansionary fiscal policy. In order to have the margin for manoeuvre to use the fiscal policy with stabilisation purposes it is necessary to attain a long-term balanced budget. This same purpose is politically recognised by a statement contained in the reason number 7 on which the Regulation that establishes the Stability Pact is based, introduced by the word “Whereas” and in the Council Regulation “on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies”\textsuperscript{25}. It is stated in the former that Member States committed themselves adhere to the medium –term objective of budgetary positions close to balance or in surplus, because that “contributes to the creation of the appropriate conditions for price stability and for sustained growth conducive to employment creation in all Member States and will allow them to deal with normal cyclical fluctuations while keeping the government deficit within the 3% of GDP reference value”. Or in other words, a medium-term budgetary position of close to balance or in surplus, will allow the automatic stabilisers to work, where appropriate, over the whole business cycle without breaching the 3 per cent reference value for the deficit.

Although the SGP will pose constraints to the use of counter-cyclical fiscal policies, the existence of large deficits in the past twenty-five years, in Europe, has imposed some constraints too. Therefore, it can be sustained that the increased discipline involved in adhering to the pact may well permit a greater stabilising role for fiscal policy than has been possible in most of the European countries for many years (IMF, 1997: 59).

Taking into account the previous discussion, the medium-term objectives of the Portuguese Stability and Growth Convergence Programme, of March 1997, which aims at a 1.5% of GDP budget deficit by the year 2000, does not observe the balanced budget goal, and may not be enough to prevent an excessive deficit from occurring in the case of a severe recession.

\textsuperscript{25} Article 2a of Reg. (EC) No. 1466/97 imposes the presence of that objective in every stability programme.
**Figure 2 – Excessive Deficit Procedure**

**Budget Deficit > 3% GDP**

Beginning of the procedure: Commission’s report (2 weeks)

Is it the result of an exceptional event or of a severe recession?

- No
- Yes

Is it temporary, meaning does it return below the reference value once the exceptional event or the severe recession is over?

- No
- Yes

Commission considers:

- **Deficit is excessive**

**Council’s evaluation about the existence of an excessive deficit** (within 3 months of the reporting dates)

**Deficit is excessive**

- Council Recommendation

**Deficit is not excessive**

**[1 March t+1]**

Council considers:

- Member State takes measures*
- Member State does not take measures

The Council makes public its recommendations and notifies the Member-State

**[1 October t+1]**

- Member-State complies with the notice
- Member-State does not comply with the notice

- Procedure held in abeyance
- Sanctions: non-interest bearing deposit (Each following year)

**[1 November t+1]**

- Deficit >3%
- Deficit <3%

**[1 January t+2]**

- Deficit >3%
  - Intensification of the sanctions
  -Fine (within 2 years of the imposition of sanctions)

**Abrogation** of the decision on the existence of an excessive deficit

*And is expected to correct the deficit within a year.*
2 Brief Analysis of the Use of the Fiscal Variables with Stabilisation Purposes in the Portuguese Economy

Taking into account the outlined institutional background, we try to analyse in the second half of this text the use of fiscal variables with stabilisation purposes. This analysis is not done through an evaluation of the size of the automatic budgetary stabilisers but by studying how the stabilisation has been achieved: through the use of public expenditure or by the use of public receipts.

2.1 Budget Variables and Economic Downturns

We begin with the identification of the years in which there was an inflexion in the economic growth of the Portuguese economy (see Table 1). The official INE data allow us to identify four years of GDP downturn between 1953 and 1996, representing three recessions, because the recession of the 1980’s extended for two years (1983 and 1984). However, only the first two of these three recessions may be considered “exceptionally severe” in the light of the Stability and Growth Pact definitions. If we use, however, the Bank of Portugal (BP) data (Pinheiro, 1997), the list of severe recessions will be restricted to the 1975 recession (GDP decreased by 5 percent).

Table 1 – Years of Economic Downturn– Portugal 1953-1996

<table>
<thead>
<tr>
<th></th>
<th>Source: INE</th>
<th>Source: BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>-4.3%</td>
<td>-4.9%</td>
</tr>
<tr>
<td>1983</td>
<td>-0.2%</td>
<td>+1.9%</td>
</tr>
<tr>
<td>1984</td>
<td>-1.8%</td>
<td>-0.3%</td>
</tr>
<tr>
<td>1993</td>
<td>-0.5%</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>

The most recent downturn in the GDP (in 1993) did not reach the 0.75% limit, therefore if the Stability Pact had been in effect, the Portuguese government would not have had been able to invoke the exceptional nature of the recession26. And in that year the ratio of the deficit on GDP increased by 3 percentage points.

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26 In the number 7 of the Resolution of the European Council, OJ No. C236, 02/08/1997, p. 1., “The Member States commit themselves not to invoke the benefit of Article 2 of the Council Regulation on speeding up and clarifying the excessive deficit procedure [the exceptional nature of the recession] unless they are in severe recession; in evaluating whether the economic downturn is severe, the Member States will, as a rule, take as a reference point an annual fall in real GDP of at least 0.75%”.
Figure 3– Portuguese Public Accounts 1953-1996

Figure 3 provides a brief description of the Portuguese Public Sector between 1953 and 1996. The graph on the left displays the evolution of total government receipts (RECY) and expenditure (EXPY) as a percentage of GDP. Their trajectory is clearly upwards, particularly after 1970. The graph on the right shows the real GDP growth rate (in per cent) and the budget deficit as a percentage of GDP. The rupture introduced by the April revolution of 1974 is clear. From 1974 onwards the budget balance has become negative, reaching a maximum of 12% of GDP in 1981.

2.2 Descriptive Statistics of the Variables after Extraction of the Trend

This section aims to describe statistically the cyclical components of GDP, total government receipts and expenditure.

The data source is the recent publication of the Bank of Portugal: Séries Longas para a Economia Portuguesa, Pós II Guerra Mundial, by Pinheiro (1997). The data covers the period 1953-1993. We have however updated the database until 1996 using the growth rates published by the Bank of Portugal. The data is on an annual basis.
The justification for the use of annual data, instead of quarterly or monthly data has to do not only with its availability\textsuperscript{27}, but also with the fact of the budget being an annual exercise. All variables are expressed in real values.

The trend has been extracted using the Hodrick-Prescott (HP) filter\textsuperscript{28}. The result is the three following tables\textsuperscript{29}.

**Table 2 – Descriptive statistics of the variables after extraction of the trend with the HP\textsuperscript{30} filter ($\lambda=400$). In logarithms, constant prices of 1986. Period: 1954-1996**

<table>
<thead>
<tr>
<th>(x)</th>
<th>Standard deviation (s.d.)</th>
<th>s.d. (x)/s.d. (GDP)</th>
<th>Correlation coefficient</th>
<th>Correlation coefficient between x(t) and GDP(t+i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.037</td>
<td>1.00</td>
<td>0.70</td>
<td>0.20 0.7 1.00 0.7 0.21</td>
</tr>
<tr>
<td>Receipts</td>
<td>0.038</td>
<td>1.03</td>
<td>0.48</td>
<td>-0.02 0.16 0.28 0.5 0.42 0.13</td>
</tr>
<tr>
<td>Expenditure</td>
<td>0.065</td>
<td>1.76</td>
<td>0.73</td>
<td>0.46 0.25 0.13 -0.03 -0.18 -0.31</td>
</tr>
</tbody>
</table>

**Table 3 – Descriptive statistics of the variables after extraction of the trend with the HP filter ($\lambda=400$). In logarithms, constant prices of 1986. Period: 1954-1973**

<table>
<thead>
<tr>
<th>(x)</th>
<th>Standard deviation (s.d.)</th>
<th>s.d. (x)/s.d. (GDP)</th>
<th>Correlation coefficient</th>
<th>Correlation coefficient between x(t) and GDP(t+i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.035</td>
<td>1.00</td>
<td>0.71</td>
<td>0.15 0.71 1.00 0.77 0.22</td>
</tr>
<tr>
<td>Receipts</td>
<td>0.028</td>
<td>0.81</td>
<td>0.50</td>
<td>0.29 0.11 0.15 0.43 0.62 0.58</td>
</tr>
<tr>
<td>Expenditure</td>
<td>0.054</td>
<td>1.54</td>
<td>0.63</td>
<td>0.43 -0.32 -0.44 -0.44 -0.36 -0.25</td>
</tr>
</tbody>
</table>

\textsuperscript{27} Quarterly data for the Portuguese economy is available only after 1977.

\textsuperscript{28} Although according to some authors, such as Guay e St-Amant (1997), the use of the HP filter raises a few questions when applied to macroeconomic variables, it is widely used in the economic literature, see for instance Dias (1997), and even by the European institutions, vide European Commission (1997a) that uses it for establishing the output gap. Nevertheless, we also tried the Beveridge-Nelson decomposition but the ARIMA model was not a good description of the receipts and expenditure. Even so, if we enforce an ARIMA(1,1,1), the resulting VAR model had autocorrelated residuals. This problem does not arise when we use the HP method. Another advantage of the HP decomposition method is that it can extract the same trend from a set of variables. If all variables have the same stochastic trend, a Beveridge-Nelson decomposition separately applied to each variable will not yield the same trend for each (Enders, 1995: 210). The value of the smoothing parameter ($\lambda$) is 400.

\textsuperscript{29} The design of the tables is inspired by Dias (1997).

\textsuperscript{30} The Hodrick-Prescott trend estimation method produces output gaps that are symmetric over the series, and therefore the cyclical component has a null average over the period 1954-1996. Moreover, it smoothes over structural breaks (European Commission, 1997a: 95).
Table 4 – Descriptive statistics of the variables after extraction of the trend with the HP filter \((\lambda=400)\). In logarithms, constant prices of 1986. Period: 1976-1996

<table>
<thead>
<tr>
<th></th>
<th>s.d.</th>
<th>s.d. (x)/s.d. (GDP)</th>
<th>Correlation coefficient</th>
<th>Correlation coefficient between (x(t)) and (GDP(t+i))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(s.d.)</td>
<td></td>
<td>(-1)</td>
<td>(-2)</td>
</tr>
<tr>
<td>GDP</td>
<td>0.038</td>
<td>1.00</td>
<td>0.79</td>
<td>0.20</td>
</tr>
<tr>
<td>Receipts</td>
<td>0.044</td>
<td>1.17</td>
<td>0.49</td>
<td>-0.11</td>
</tr>
<tr>
<td>Expenditure</td>
<td>0.073</td>
<td>1.93</td>
<td>0.74</td>
<td>0.41</td>
</tr>
</tbody>
</table>

As we can see from the correlation coefficients, the receipts present an *anti-cyclical behaviour* in the whole period: an increase in the cyclical component of GDP lead to an increase in the cyclical receipts, which tend to reduce the amplitude of the cyclical fluctuation of GDP. On the other hand, the public expenditure tends towards a *pro-cyclical behaviour*\(^{31}\).

This expenditure behaviour is however distinct in the periods before and after the April Revolution. Until 1973 the expenditure was anti-cyclical, and after 1976 it has a clear pro-cyclical behaviour.

The values of these correlation coefficients enable us to conclude that the receipts have made the bulk of the stabilisation efforts.

Expenditure has a greater relative variability than receipts. The variability is also higher in the most recent period than before the revolution.

With regard to persistence, we can say that expenditure has a much larger persistence degree than receipts (consider the coefficient values of the first and second order autocorrelation), which reflects the higher rigidity of expenditure.

\(^{31}\) The value of the contemporary correlation between expenditure and GDP is \(-0.03\). This value may suggest a slight anti-cyclical behaviour. With regard to the correlation of expenditure in the period \(t\) with the product of \(t+2\), which is also negative, we think that it is not as important as the correlation with the past and contemporary values of the product. If it had the same importance, it would imply that when discussing the 1998 budget the Government and the Members of Parliament had determined the public expenditure taking into account the value of GDP in the year 2000.
2.3 Description of the Data Used in the VAR Model

Firstly the data was detrended through the use of the HP decomposition method. Secondly, the gap between the cyclical component and the real trend value of each variable was calculated. The output gap (OUTPGAP) is defined as the difference between the actual level of real GDP and that of trend GDP, expressed as a percentage of trend GDP. RECGAP stands for receipt gap and EXPGAP means expenditure gap. Figure 4 below graphs these values. It will be these variables that will be used in the VAR model estimation.

Figure 4 – Output, Public Receipt and Expenditure Gaps

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32 The variables were deflated using the GDP deflator. Another good candidate would be the private consumption deflator, because the private consumption can be seen as the opportunity cost of public expenditure.
2.3.1 Order of Integration: Test for Unit Roots

Table 5– Augmented Dickey Fuller Test (ADF)

<table>
<thead>
<tr>
<th>Variable</th>
<th>lag</th>
<th>ADF</th>
<th>LM</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPGAP</td>
<td>2</td>
<td>-4.981</td>
<td>0.484</td>
</tr>
<tr>
<td>RECGAP</td>
<td>1</td>
<td>-4.450</td>
<td>0.729</td>
</tr>
<tr>
<td>EXPGAP</td>
<td>1</td>
<td>-2.79</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Note: LM denotes the p-value of the chi-squared of the (Lagrange Multiplier) test under the null of no first-order autocorrelation. The value of the lag was chosen by adding lags until the Lagrange Multiplier test failed to reject no serial correlation at the 5% significance level. The critical value at the 5% significance level for the ADF test, with no constant term, is −1.95. The critical value is from Mackinnon (1991).

In line with standard procedures we check for the stationarity prior to estimating the VAR, using the Augmented Dickey Fuller test (ADF), with no constant term. As shown in Table 5, we reject the null hypothesis of a unit root. Therefore we will consider variables as being I(0).

2.4 VAR Model with Cyclical Components

As already mentioned, with the purpose of evaluating whether the expenditure or the receipts had been used with stabilisation purposes, we will estimate a VAR model between the output gap and the expenditure and receipt gaps.

In the choice of the lag length, we began testing with two lags. The Likelihood Ratio (LR) test (Hamilton, 1994: 296-8), with the small sample correction suggested by Sims (1980: 17), along with the multivariate Akaike criterion, leads us to retain the three-lag model. The main results of this VAR estimation are in the following table.

Table 6 – Results of the VAR model (1957-1996)

<table>
<thead>
<tr>
<th></th>
<th>OUTPGAP</th>
<th>RECGAP</th>
<th>EXPGAP</th>
</tr>
</thead>
</table>

33 The LR test has a Chi-squared distribution with nine degrees of freedom. It had the value 17.6 with a significance level of 4%, which enable us to reject the restricted model (the two-lag model). The values of the Akaike criteria were −1461.9 and −1467.3 for the two and three lag models, respectively.

34 The results were obtained using RATS for Windows, version 4.30. PCFIML for Windows, version 9.0, was also used, namely for the parameter constancy and adjustment and forecast analysis. That graphical (and analytical) analysis, presented in the appendix, shows the good fit of the estimated model.
The F tests indicate that, at the 5% significance level, OUTPGAP Granger-causes itself, RECGAP Granger-causes itself and OUTPGAP (at the 10% significance level), and EXPGAP Granger-causes all variables in the system.

As to the relationship between RECGAP and EXPGAP we can see that while RECGAP is Granger-caused by the EXPGAP, this one is not Granger-caused by the first one.

Next we obtained the variance decomposition. In Table 7 we used the Choleski decomposition.

Table 7– Variance Decomposition (Choleski, ordering: OUTPGAP, RECGAP, EXPGAP)

<table>
<thead>
<tr>
<th>Year</th>
<th>Output Gap</th>
<th>Receipts Gap</th>
<th>Expenditure Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OUTP</td>
<td>REC</td>
<td>EXP</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>87</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>79</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>73</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>71</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>65</td>
<td>19</td>
<td>16</td>
</tr>
</tbody>
</table>

Although the Choleski decomposition has the disadvantage of being sensitive to the ordering of variables\(^{35}\),\(^{36}\), the presented values are resistant to different ordering\(^{37}\). Performing a structural decomposition of the Sims-Bernanke type, imposing the following restrictions\(^{38}\), we reach very similar results (Table 9).

\(^{35}\) The importance of ordering depends on the magnitude of the correlation coefficients among equation errors. If that correlation is zero the ordering is immaterial.

\(^{36}\) The ordering is a Choleski decomposition such that OUTPGAP innovations contemporaneously affect all others, RECGAP innovations contemporaneously affect EXPGAP, but EXPGAP innovations have no contemporaneous effects on the other variables.

\(^{37}\) We tried also the ordering OUTPGAP, EXPGAP, RECGAP and EXPGAP, RECGAP, OUTPGAP. However, even in the last ordering, which is more favourable to the expenditure, this variable explains 9 and 22% of the output gap at a 5 and 10 years horizon, respectively.

\(^{38}\) These restrictions are accepted by an LR test, with a significance level of 39.8%.
Table 8 – Restrictions Imposed in the Structural Decomposition

<table>
<thead>
<tr>
<th>The contemporaneous value of:</th>
<th>Is affected by the contemporaneous value of</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPGAP</td>
<td>EXPGAP</td>
</tr>
<tr>
<td>RECGAP</td>
<td>OUTPGAP</td>
</tr>
<tr>
<td>EXPGAP</td>
<td></td>
</tr>
</tbody>
</table>

Table 9 – Variance Decomposition ( Structural Decomposition)

<table>
<thead>
<tr>
<th>Year</th>
<th>Output Gap</th>
<th>Receipts Gap</th>
<th>Expenditure Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OUTP REC EXP</td>
<td>OUTP REC EXP</td>
<td>OUTP REC EXP</td>
</tr>
<tr>
<td>1</td>
<td>99 0 1</td>
<td>20 79 0</td>
<td>0 0 100</td>
</tr>
<tr>
<td>2</td>
<td>86 12 1</td>
<td>16 82 2</td>
<td>0 3 97</td>
</tr>
<tr>
<td>3</td>
<td>78 19 2</td>
<td>14 67 19</td>
<td>2 5 93</td>
</tr>
<tr>
<td>4</td>
<td>72 25 3</td>
<td>14 67 20</td>
<td>3 10 87</td>
</tr>
<tr>
<td>5</td>
<td>68 23 9</td>
<td>13 66 21</td>
<td>4 13 83</td>
</tr>
<tr>
<td>10</td>
<td>61 18 20</td>
<td>14 62 24</td>
<td>6 13 81</td>
</tr>
</tbody>
</table>

As can be seen in Table 7 at the 5-year forecast horizon the OUTPGAP forecast error variance is mainly explained by its own innovations. The budget variables explain as a group 29% of that variance. However, the RECGAP is the most prominent variable explaining 23% of the OUTPGAP variance, against a contribution of only 6% from the EXPGAP.

At the same time frame, the RECGAP forecast error variance is mainly explained, besides its own innovations, by the EXPGAP (19%). The OUTPGAP explains merely 14% of it.

The EXPGAP forecast error variance is also mainly explained by its own innovations. The OUTPGAP explains only 7% and the RECGAP 9%. These values are coherent with the Granger-causality results. As we have seen the expenditure Granger-causes unidirectionally all variables in the system.

The Sims-Bernake decomposition results (Table 9) enable us to reach the same conclusions.

The following step is the study of the system impulse responses. These enable us to examine the interactions between the variables. Plotting of the impulse response functions (see Figure 5) is the expeditious way to represent the behaviour of the series to the various shocks, which occur in each variable (Enders, 1995: 305-10).
A one standard-deviation shock in the output gap induces successive increases in the variable own value up to period 3. The same happens to RECGAP revealing an anti-cyclical behaviour for this variable. On the other hand, EXPGAP displays a pro-cyclical behaviour because it increases up to period 7, meaning that the expenditure is above its trend value.

A shock in RECGAP is not persistent; it is reversed immediately in period 3. However it has an odd positive effect in OUTPGAP, and a negative effect on the expenditure gap (but we should remember that RECGAP only explains about 9% of EXPGAP).

A shock in EXPGAP is a persistent one, because even after 5 years its positive effect does not disappear. It has a positive effect in RECGAP, due to the Granger-causality
unidirectional relation, mentioned above. That shock has also an initial positive effect in the output gap, which is reversed after period 4.

**Conclusions**

The prohibition of Member States incurring excessive deficit, expressed in the Treaty on European Union is restated in the Stability and Growth Pact. This Pact clarifies the excessive deficit procedure. We analyse this regulation in detail. The practical application of the Stability Pact shall lead Member States to achieve a medium-term budgetary objective of close to balance or in surplus, so that automatic stabilisers could work without exceeding the 3% reference value for the deficit.

The second section studies the contribution of government receipts and government expenditure to the output stabilisation, for the case of the Portuguese economy.

The importance of the receipts for the stabilisation policy is clear. The correlation coefficients of its cyclical component with cyclical output reveal an anti-cyclical behaviour.

A VAR model among the gaps of output, receipts and expenditure enables us to conclude that the receipts gap explains more of the output gap forecast error variance than the expenditure gap does.

The analysis of the impulse responses, of the same VAR model, reinforces the conclusion based on the correlation among the cyclical components of the variables: the receipts gap has an anti-cyclical behaviour, while the expenditure gap has a pro-cyclical behaviour.

Taking all these results into account it seems fair to conclude that, for the Portuguese economy, over the period 1953-96, it has been the evolution of government receipts, more than that of expenditures, which has been responsible for the output stabilisation achieved by the fiscal policy.

**Appendix**
The model was estimated until 1989, actual and fitted values are shown. From 1990 to 1995 1-step-ahead out-of-estimation-sample forecasts with their 95% confidence intervals (that is, ± 2 standard errors) are shown (Doornik and Hendry, 1997). The parameter constancy tests fail to reject non-constancy. The results were obtained using PCFIML for Windows, version 9.0.
Figure 7 – Adjustment and Forecasts\textsuperscript{40}

\textsuperscript{40} Forecasts from 1997 to 2005 with their 95\% confidence intervals as calculated by PCFIML for Windows, version 9.0 (see Doornik and Hendry, 1997).
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