CYCLICAL DEVELOPMENTS OF THE PORTUGUESE ECONOMY IN THE 1910-1958 PERIOD: BRIEF ANALYSIS*

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1. INTRODUCTION

The major purpose of this study is to analyse the cyclical developments of the Portuguese economy in the 1910-1958 period. This study was motivated by the release of National Account estimates for the above period in Batista et al. (1997). Previous studies on the behaviour of economic cycles either did not cover this period, as in Dias (1997), or used different series, as in Correia et al. (1992a) and Neves (1994).

This paper is organised as follows: Section 2 presents a brief description of the series utilised. Section 3 shows the major characteristics of the cyclical developments of the Portuguese economy over the period under review. Section 4 establishes a comparison with results obtained for other countries, for the same period. Finally, section 5 presents the conclusions.

2. BASIC INFORMATION

This analysis is based on annual data presented in Batista et al. (1997). These series cover the period from 1910 to 1958. According to the authors, the selection of the starting year reflects the significant improvement in economic statistics after the establishment of the First Republic. The final year coincides with a new period of real progress in the statistical coverage of economic activities in Portugal and, in addition, it also coincides with the start of the first Long Series for Portuguese Economy published by the Banco de Portugal in Santos et al. (1992). From a geographical point of view, due to data limitations, the Autonomous Regions of the Azores and Madeira were excluded and only Mainland Portugal was considered.

The methodology utilised by Batista et al. (1997) corresponds to a direct output-oriented estimation of Gross Domestic Product (GDP). In general, the indices were broken down at the most detailed level available, with a subsequent aggregation at the industry level. GDP was obtained by its weighting towards each sector. In terms of comparison with previous series for this period, stress should be laid on the clear advantage of the utilisation of a higher number of indicators broken down for the economy. Batista et al. (1997) present a thorough discussion on statistical selections.

Batista et al. (1997) presented production based National Accounts with a rather detailed sectoral breakdown. In addition, they presented output estimates for the major expenditure aggregates. It should also be noted that, in the case of exports and imports, data are presented at a relatively high breakdown level.

The analysis of the cyclical developments naturally requires a distinction between the trend component and the cyclical component. Since there is

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** Economic Research Department. This study was carried out when the second author participated in a training period at the Banco de Portugal.
no consensus as to the best methodology to identify these two components, the selection made in this study was restricted by the intention to allow their comparability with studies for other economies over the same period. That comparison is carried out in section 4 of the present study. The Hodrick-Prescott filter was thus selected, with a smoothness parameter equal to 400. Every variable is considered at constant 1958 prices. The series are expressed in per capita – using for the purpose the population series presented in Mata and Valério (1994) – and logarithm terms.

Chart 1 presents the fluctuations of output around its trend, obtained from the application of the Hodrick-Prescott filter. Chart 2 presents the cyclical component of output, i.e., output deviations from this trend. This chart shows that the cyclical component presents a relatively low persistence, with frequent changes in signal. As mentioned in the following section, the high weight of the agricultural sector on the productive structure of Portuguese economy in the first half of last century, associated with the intense volatility of the value added in this sector, determines a somewhat transitory behaviour of output.

In effect, the weight of the primary sector (agriculture, forestry, hunting and fishing) on Gross Domestic Product stood in 1910 at 37.1 per cent, decreasing gradually to 26.8 per cent in 1958. In turn, the weight of agricultural employment on total employment was clearly higher in Portugal than in major European economies. Therefore, whereas in 1910 the weight of agricultural employment was slightly below 60 per cent in Portugal – and close to, albeit above, the figures for Italy and Spain – in France, it stood at approximately 40 per cent, in Belgium and the Netherlands at around 25 per cent and in the United Kingdom at slightly below 10 per cent. In 1950, the share of agricultural employment in total employment stood above 48.8 per cent in Portugal, compared with 45.4 per cent in Italy, 28.3 per cent in France, 13.9 per cent in the Netherlands, 10.1 per cent in Belgium and 5.1 per cent in the United Kingdom.

Charts 1 and 2 illustrate the behaviour of the Portuguese economy in some specific periods.

(2) Data obtained in Maddison (1995) and Pinheiro et al. (1999).
(3) See, for instance, Reis (1995) and Lains (1999).
mer African territories, Brazil, Spain and the United Kingdom. During part of the 1930s and, albeit to a lesser extent, during the 1950s, economic activity seems to have exceeded the output trend.\(^{(4)}\) Neves (1994) presents similar results, although using different statistical series.

Chart 3 presents the trend of the implicit deflator of private consumption.\(^{(5)}\) Worthy of note are the very high inflation periods at the end of the 1910s and at the beginning of the 1920s. This trend chiefly reflected monetary issue financing of considerable budget deficits, in a context of domestic financial markets moderately developed and with much difficulty in obtaining external financing.\(^{(6)}\) It is interesting to note that, also in the first half of the 1920s, some European countries experienced hyperinflation periods, such as Austria, Germany, Hungary, Poland and Russia. The trend of prices in those five countries had some characteristics in common: the average monthly inflation rate stood at 50 per cent or higher, as a result of the monetary financing of very high budget deficits.\(^{(7)}\) In the Portuguese case, inflation did not reach such high levels, and therefore it does not fall within the definition of hyperinflation.

Chart 3 shows that, in the Great Depression period, there was no deflation in the Portuguese economy. In the latter part of the 1930s, as well as in the 1950s, Portugal registered a period of price stability. On the contrary, during World War II, the shortage of some goods led to periods of relatively high inflation that actually reached 20 per cent.

Chart 4 shows the degree of openness of the Portuguese economy, calculated from series at current prices. These charts clearly indicate that Portugal was a relatively closed economy, since the simple arithmetic mean of exports and imports fluctuated between 15 per cent and 20 per cent of GDP. Mention should be made of the degree of openness of the economy in the second half of the 1920s and early 1930s. This trend was the result of a rather significant increase in custom taxes, an important instrument in the financial stabilisation occurring during that period.\(^{(8)}\) For comparison purposes, the degree of openness of Portuguese economy at the end of the 1990s oscillated between 35 per cent and 37.5 per cent of GDP.

Net exports, defined as the difference between exports and imports and expressed as a percentage of GDP, are presented in Chart 5. It clearly illustrates the persistent trade deficit in Portugal, only interrupted in the early 1940s, in the wake of the wolfram episode.

\(^{(4)}\) The extension of the GDP series, as from the utilisation of Long Series for Portuguese Economy, does not imply significant changes in the cyclical component of GDP over the 1950s.

\(^{(5)}\) It should be noted that in Batista et al. (1997), private consumption and the changes in stocks are presented as a whole. Therefore, the series in question in this study is an approximate measure of the private consumption deflator.

\(^{(6)}\) See, for instance, Reis (1995) and Mateus (2001).

\(^{(7)}\) See, for instance, Blanchard (1997).

\(^{(8)}\) See, for instance, Mateus (2001).
3. ANALYSIS OF THE CYCLICAL DEVELOPMENT IN PORTUGAL

Table 1 presents the usual statistics describing the cyclical components of the variables considered: standard deviation (in absolute terms and in terms of the standard deviation of the cyclical component of GDP), autocorrelation coefficients, and correlation coefficients (contemporaneous and with a delay of up to two periods) with the cyclical component of output.

As regards the major aggregates on the expenditure side, the main results are as follows:

(a) In the period under review, every component of expenditure show a higher volatility than output; imports and gross fixed capital formation are the components with the highest relative volatility; on the contrary, private consumption is the expenditure component with the lowest relative volatility, albeit higher than that of output.

(b) The persistence of output is rather low. As previously mentioned, the high weigh of the agricultural sector on the productive structure and the extreme volatility of value added in this sector are the major factors behind this type of behaviour. Account should also be taken of the low persistence of consumption and, chiefly, of exports. The latter may reflect the very high weight on total exports of the sales abroad of foodstuffs – many of those affected by irregular agricultural production – and intermediate products. These goods accounted for approximately 95 per cent of total exports in 1910 and around 90 per cent in 1958.

(c) The expenditure variables reveal a pro-cyclical behaviour that is more marked in the values of contemporaneous correlations. Private consumption is the variable for which there is a more marked statistical association with output. In turn, the faint statistical association between the cyclical components of output and exports reflect the fact that Portugal is an economy relatively closed vis-à-vis abroad. During most of the period under review – except the latter part – exports were surely not the driving force of the Portuguese economy.\(^{(9)}\) Public consumption shows a counter-cyclical behaviour, with slightly higher correlations for output lagged values.

(d) Private consumption and GDP deflators reveal a very similar behaviour. They show a pro-cyclical behaviour, apparently moving ahead towards higher correlations with output lagged values.

The level of breakdown presented in Batista et al. (1997) also permits to make an analysis of the cyclical behaviour of the main productive sectors of the economy. The corresponding descriptive statistics are also presented in Table 1, with emphasis on the following results:

(a) Agriculture, industry and construction show clearly more volatile cyclical components than those observed in services.

(b) As previously mentioned, the persistence of the cyclical component of output is extremely low, largely reflecting the erratic and transitory behaviour (the first order autocorrelation coefficient is negative) of the agricultural sector. Note in this respect that, excluding from GDP the GVA of the agricultural sector, the first order autocorrelation coefficient of output will increase from 0.39 to 0.70.

\(^{(9)}\) For an analysis of the behaviour of Portuguese exports in the 1851-1913 period, see Lains (1995).
(c) Activity in the different productive sectors taken into consideration reveals a procyclical behaviour, in which the highest correlations are the contemporaneous ones. The services sector, however, is an exception, since it shows a null contemporaneous relationship and some advance indications. Indeed, the highest correlation coefficient is 0.43, leading output by two periods.

Net exports, as a percentage of GDP, show a negative, albeit slight, correlation with the cyclical component of output. Therefore, the trade balance (deficit) is counter-cyclical (pro-cyclical), reflecting the significant positive correlation between the cyclical components of output and imports.

Chart 6 presents the cyclical components of output vis-à-vis the five major components of expenditure, GDP and private consumption deflators, GDP excluding the primary sector and eight sectoral GVAs.

The cyclical synchronisation of the Portuguese economy with other economies is also an interesting issue for analysis. For the purpose, we used Maddison series (1995)\(^{10}\) and calculated the correlations of the cyclical components in Portugal by comparison with those of a set of 7 countries, presented in Chart 7. The values obtained for the contemporaneous correlations are also shown in Table

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**Table 1**

**DESCRIPTIVE STATISTICS OF THE MAIN MACROECONOMIC VARIABLES**

Calculation of trend with HP-400 filter

*Logarithm of per capita values at 1958 constant prices*

**Period: 1910 to 1958**

<table>
<thead>
<tr>
<th></th>
<th>Standard deviation (sd)</th>
<th>Sd(x)/sd(GDP)</th>
<th>Autocorrelation coefficient of x(t) with GDP(t+i)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>-1   -2</td>
</tr>
<tr>
<td><strong>Expenditure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>4.69</td>
<td>1.00</td>
<td>0.39  0.27</td>
</tr>
<tr>
<td>Consumption</td>
<td>7.84</td>
<td>1.67</td>
<td>0.56  0.36</td>
</tr>
<tr>
<td>Public consumption</td>
<td>13.83</td>
<td>2.95</td>
<td>0.70  0.36</td>
</tr>
<tr>
<td>GFCF</td>
<td>17.42</td>
<td>3.72</td>
<td>0.65  0.36</td>
</tr>
<tr>
<td>Exports</td>
<td>12.70</td>
<td>2.71</td>
<td>0.17  -0.06</td>
</tr>
<tr>
<td>Imports</td>
<td>18.40</td>
<td>3.93</td>
<td>0.61  0.23</td>
</tr>
<tr>
<td><strong>Price indices</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private consumption deflator</td>
<td>27.44</td>
<td>5.85</td>
<td>0.84  0.63</td>
</tr>
<tr>
<td>GDP deflator</td>
<td>26.38</td>
<td>5.63</td>
<td>0.84  0.63</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, forestry, hunting and fishing</td>
<td>8.72</td>
<td>1.86</td>
<td>-0.12 0.05</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>25.67</td>
<td>5.48</td>
<td>0.56  0.18</td>
</tr>
<tr>
<td>Manufacturing industry</td>
<td>6.20</td>
<td>1.32</td>
<td>0.74  0.27</td>
</tr>
<tr>
<td>Construction</td>
<td>14.31</td>
<td>3.05</td>
<td>0.74  0.37</td>
</tr>
<tr>
<td>Electricity, gas, water and sewage</td>
<td>6.93</td>
<td>1.48</td>
<td>0.72 0.57</td>
</tr>
<tr>
<td>Trade, financial intermediation and rents</td>
<td>3.83</td>
<td>0.82</td>
<td>0.34 0.17</td>
</tr>
<tr>
<td>Transports and communications</td>
<td>5.28</td>
<td>1.13</td>
<td>0.60 0.19</td>
</tr>
<tr>
<td>Services</td>
<td>3.25</td>
<td>0.69</td>
<td>0.57  -0.01</td>
</tr>
<tr>
<td>PIBcf excluding primary sector</td>
<td>3.74</td>
<td>0.80</td>
<td>0.70 0.29</td>
</tr>
<tr>
<td><strong>External sector</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net exports /GDP</td>
<td>3.53</td>
<td>0.75</td>
<td>0.63  0.18</td>
</tr>
<tr>
<td>GDP Germany</td>
<td>13.07</td>
<td>2.79</td>
<td>0.66  0.25</td>
</tr>
<tr>
<td>GDP France</td>
<td>12.42</td>
<td>2.65</td>
<td>0.75  0.40</td>
</tr>
<tr>
<td>GDP Italy</td>
<td>10.34</td>
<td>2.21</td>
<td>0.76  0.36</td>
</tr>
<tr>
<td>GDP Netherlands</td>
<td>11.25</td>
<td>2.40</td>
<td>0.71  0.32</td>
</tr>
<tr>
<td>GDP Belgium</td>
<td>7.43</td>
<td>1.58</td>
<td>0.72  0.36</td>
</tr>
<tr>
<td>GDP United Kingdom</td>
<td>5.54</td>
<td>1.18</td>
<td>0.75  0.43</td>
</tr>
<tr>
<td>GDP United States</td>
<td>11.53</td>
<td>2.46</td>
<td>0.79  0.43</td>
</tr>
</tbody>
</table>

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\(^{10}\)See also Maddison (2001).
Chart 6
CYCLICAL COMPONENTS (to be continued)
Cyclical development

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Private consumption
GDP

Public consumption
GDP

GFCF
GDP

Imports
GDP

Private consumption deflator
GDP

GDP deflator
GDP

GDPfc excluding primary sector
Chart 6 (continued)
CYCLICAL COMPONENTS (continued)
Cyclical development

Agriculture, forestry, hunting and fishing

Mining and quarrying

Construction

Manufacturing

Electricity, gas, water and sewage

Trade, financial intermediation and rents

Transports and communications

Services
Chart 7
CYCLICAL COMPONENTS OF OUTPUT
Cyclical developments GDP

Portugal, Germany, France, Italy, Netherlands, Belgium, United States, United Kingdom

-0.6 -0.5 -0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
The reading of this table permits to reach the following conclusions:

(a) Every country considered shows a higher variability of the cyclical component of output. For most European countries considered – except the United Kingdom – this result reflects the marked effects on economic activity of military conflicts that occurred during the period in question. In the case of the United States, the considerable variability of the cyclical component chiefly reflects the strong impact on real activity of the Great Depression and of the participation in the World War II.

(b) The persistence of the cyclical component of output is considerably lower in Portugal than in most of the countries considered.

(c) There is a very low correlation between the trend of economic activity in Portugal and in most other countries. The highest associations are with France and Belgium. This result reflects different factors: the relatively closed nature of the Portuguese economy during most of the period in question; the low weight of trade relationships with most of those countries, except the United Kingdom; the high weight of the agricultural sector in Portugal, that contributed to the little persistent nature of the cyclical component of output. In addition, it should be mentioned that the economies were subject to rather different shocks. Note, by way of example, that the military conflicts occurring in Europe in the period in question led to particularly marked cyclical components in countries such as Germany, Italy and even France, which contributed to a low statistical correlation.

Table 2 shows the contemporaneous correlations among the cyclical components of output in the different countries. These values permit to reinforce the notion of a low correlation between the trend of economic activity in Portugal and in the other countries, by comparison with high correlations between, for instance, the USA and the United Kingdom, on the one hand, and France, Belgium and the Netherlands, on the other hand. When you calculate the statistical association between the cyclical component of exports in Portugal and the cyclical component of output in the other countries, you continue to obtain low positive correlations. This result reflects the scarcely persistent nature of the cyclical component of Portuguese exports, as a result of its structure, the relatively closed nature of our economy and also the low weight of trade relationships with most of those countries, except the United Kingdom.

Table 2

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>France</th>
<th>Italy</th>
<th>Netherlands</th>
<th>Belgium</th>
<th>United Kingdom</th>
<th>United States</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>0.12</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>0.36</td>
<td>0.31</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.19</td>
<td>0.88</td>
<td>0.40</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>0.22</td>
<td>0.85</td>
<td>-0.06</td>
<td>0.71</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.42</td>
<td>-0.33</td>
<td>0.51</td>
<td>-0.30</td>
<td>-0.42</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>0.33</td>
<td>-0.50</td>
<td>-0.26</td>
<td>-0.50</td>
<td>-0.25</td>
<td>0.50</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>0.09</td>
<td>0.46</td>
<td>-0.18</td>
<td>0.35</td>
<td>0.57</td>
<td>-0.32</td>
<td>-0.21</td>
<td>1.00</td>
</tr>
</tbody>
</table>

1. In the 1905-1914 period, the major geographical destinations of Portuguese exports were the following: United Kingdom (23.1 per cent), Brazil (18.2 per cent), Spain (16.1 per cent) and African territories (15.5 per cent). See Lains (1995).

2. The calculation of the correlations may be somewhat affected by considerable cyclical components, reflecting, for instance, military conflicts. Chart 7 clearly illustrates this.
4. COMPARISON WITH CYCLICAL DEVELOPMENTS IN OTHER COUNTRIES

As previously mentioned, this section establishes a comparison of the results now presented for Portugal with those obtained for other economies. In particular, it makes a comparison with the results obtained in the analysis of economic cycles in the United Kingdom and in the United States, presented in Correia et al. (1992b).

The study by Correia et al. (1992b) presents the most relevant cyclical characteristics of the economic cycles in the United Kingdom and the United States for the 1850-1950 period. For comparison purposes, only the results for the 1914-1950 period will be analysed, since they coincide almost fully with the period of the sample used for Portugal.

Table 3 presents the descriptive statistics relative to the economic cycle in Portugal, the United Kingdom and the United States. Note that the series used in section 3 differ from those used in Correia et al. (1992b). Therefore, the values presented in Table 2 differ from those presented in Table 3. The major conclusions are the following:

(a) In Portugal, the real macroeconomic variables analysed present a cyclical volatility significantly lower than in the United Kingdom and in the United States. Exceptions are private consumption, for which volatility in Portugal is higher, and imports, for which,..
curiously, volatility is rather similar in the 3 countries.

(b) In terms of volatility vis-à-vis the cyclical component of output, it is worth noting the considerably higher volatility of private consumption in Portugal. A possible explanation may be the high weight of the agricultural sector on the productive as well as consumption structures, in a context of low trade flows with abroad.

(c) The price indices analysed (CPI and GDP) reveal a contrasting trend, since the volatility of the cyclical components of the output and CPI deflators was significantly higher in Portugal than in the United Kingdom and in the USA. This result may reflect the period of very high inflation in Portugal that did not occur in any of the other two countries.

(d) In Portugal, persistence was significantly lower in real variables. This result is particularly marked for the output series (even after exclusion of the agricultural sector), private consumption and exports.

(e) Price indices analysed show a considerable persistence in the three countries under study.

(f) Most expenditure components present a pro-cyclical behaviour in Portugal (except public consumption) and in the USA. On the contrary, in the case of the United Kingdom, the high positive correlation of public consumption and output, together with the fact that private consumption and investment variables are countercyclical, suggest that, in this country, the shocks induced by changes in public consumption were very significant.(13)

(g) Turning to prices, the results presented for the three countries point to a pro-cyclical behaviour of the private consumption deflator.(14) It should be noted, however, that the correlation is relatively low, especially in the Portuguese case. Contrary to developments in the United Kingdom and in the United States, price indices in Portugal behaved like advanced variables vis-à-vis activity.(15)

5. CONCLUSIONS

The major conclusions of this analysis are the following:

(a) The cyclical component of output in the 1910-1958 period, in Portugal, revealed a very low persistence, with frequent changes in sign. This trend results, to a large extent, from the volatility and low persistence of agricultural output. In particular, the persistence of the cyclical component of output is extremely low when compared with that observed in the economies of the United Kingdom and the United States.

(b) In Portugal, private consumption presented in this period a high volatility, both in absolute terms and in terms of output. The persistence of this macroeconomic aggregate is also low in international terms. A possible explanation may be the high weight of the agricultural sector on productive and consumption structures, against a background of low trade flows with abroad.

(c) The cyclical component of exports shows a low persistence, probably reflecting the high concentration of exports in foodstuffs – many of them affected by irregular agricultural production – and intermediate products. In addition, there is also a low correlation with the cyclical component of output, which also seems to reflect the closed nature of Portuguese economy during the period under review.

(d) The development of activity in Portugal does not reveal in the sample period a significant correlation with major economies in Europe and the United States, reflecting the fact that these economies were subject to shocks rather different to those occurred in Portugal (for instance, World War I, Great Depression and World War II). It should also be mentioned that during the period under

(13)See, in this respect, Correia et al. (1992b).

(14)It should be noted that this pro-cyclical behaviour of prices seems to be typical of the pre-second World War period, when prices presented, in general, a countercyclical behaviour (Backus and Kehoe (1989)).

(15)The calculation of these correlations may be influenced, in a non-negligible manner, by the observance of cyclical components of a very high magnitude.
review our economy was relatively closed vis-à-vis abroad and had strong trade links with other geographical areas (former African territories and Brazil).

(e) The price indices considered revealed a pro-cyclical behaviour in every country analysed.

REFERENCES


