

MONTHLY HISTORICAL TIME SERIES FOR THE PORTUGUESE ECONOMY*

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1. INTRODUCTION

The existence of time series with a reasonable length is crucial for empirical macroeconometrics, for macroeconomic policy formulation and for developing an historical perspective of the economic evolution. Even though the importance of collecting long time series was realised quite some time ago, the existence of periodic revisions, bases changes, enquiries updates, and concept and classification adjustments undermines the possibility of gathering historical time series for most variables.

In this context, the aim of this article is to build monthly historical time series, from several pieces of data series, for the Portuguese economy⁽¹⁾. In the choice of the series considered the focus is placed on general economic indicators, which are already released in the *Statistical Bulletin* of Banco de Portugal and for which building historical time series is a feasible ambition. In particular, the dataset covers the following variables: industrial production index (IPI); industrial and retail trade turnover indices (ITI and RTTI); consumer price index (CPI); number of nights spent (tourism); and qualitative variables from the manufacturing industry,

construction and public works, and trade opinion surveys⁽²⁾.

Until now, although was possible to gather more past information, only the most recent piece of these series was released in the *Statistical Bulletin* because of the methodological breaks, such as base changes, which hindered the possibility of accessing directly to consistent historical time series. The historical time series dataset presented in this article will be released and regularly updated in the *Statistical Bulletin* (see www.bportugal.pt).

Linking separate pieces of information, which reproduce different realities and concepts, is undeniably controversial and difficult. When choosing a method, one faces many options and, quite frequently, it is not possible to choose the “right” method simply because it does not exist. Therefore, regarding the methods, in this article the focus is placed on appealing and straightforward methodologies. Different approaches are applied for dealing with different kinds of data, namely quantitative and qualitative data, all assuming that the most recent piece of the time series is always kept unchanged.

The remainder of the article is organised as follows. Section 2 presents a description of the methods used and discusses the results obtained: section 2.1 considers the quantitative variables (economic activity indicators (section 2.1.1) and the

* This paper represents the views and analysis of the author and should not be thought to represent those of the Banco de Portugal. I would like to thank Cristina Fernandes (INE – the National Statistical Institute), Teresa Nascimento, António Rua, Fátima Cardoso, Hugo Reis and Luís Morais Sarmiento and Paulo Esteves for their precious comments and suggestions. The usual disclaimer applies.

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(1) This text shares the same spirit of the annual Historical Time Series for the Portuguese Economy Post World War II (Pinheiro et al., 1999) and the Quarterly Series for the Portuguese Economy 1977-2003 (Castro and Esteves, 2004).

(2) Although this article focus mainly on monthly series, a few quarterly series are also considered, for the manufacturing industry, and trade surveys, in order to analyse exhaustively the group of selected series that are released in the *Statistical Bulletin*.

consumer price index (section 2.1.2)), while section 2.2 deals with the qualitative variables. Finally, section 3 concludes.

2. COMPILING HISTORICAL TIME SERIES

Any method designed for compiling long time series relies on the assumption that the several original pieces of data series represent the same series, that is, the same phenomenon. As the true historical time series are unknown, to make the compilation process feasible, it is assumed that the latest piece of data series shares the basic features of the true historical time series.

This assumption has two direct implications: first of all, this implies that the most recent piece of data series must be kept unchanged; second, the evaluation of key features of the previous pieces of data series is done by using the features of the current piece as a benchmark.

For checking the similarity between the common period series, three kinds of tests are performed⁽³⁾. Firstly, it is performed the correlation coefficient test to evaluate the significance of the correlation between the common period series. Instead of just testing if the correlation coefficient is equal to zero (null hypothesis) or higher than zero (alternative hypothesis), it is also performed a more demanding test, through which is evaluated if the correlation coefficient is higher than 0,5. Secondly, it is performed the two-sample test for the difference of means, considering unknown variances, to evaluate if the differences of means between the common period samples are significant. Finally, it is also tested the equality of the samples variances, for the same period, to assess potential differences between the volatility of the different series⁽⁴⁾.

If the results of the tests point to the maintenance of the general features of the series, break after break, then it can be said that there is evidence supporting the compilation of the long time series. However, the results of the tests are not always conclusive and change as the tests become more demanding. Therefore, less favourable re-

sults (for example, not so strong correlation) do not necessarily endanger the compilation of historical time series. Therefore, even for the series that present less conclusive test results, it is made an attempt to provide historical time series. Nevertheless, a word of caution - the user must be more careful when using these series.

2.1 Quantitative variables

2.1.1 Economic activity indicators

2.1.1.1 Methodology

For obtaining consistent historical time series for the economic activity indicators it is followed a simple procedure. As it was mentioned before, the current piece of series is kept unchanged. Subsequently, monthly rates of change of the older pieces are used to extrapolate from the most recent one backwards. Analytically, denoting the current series as x_t ($t = 1, \dots, i, \dots, T$) and assuming that the current series starts in period i , the compilation method of the historical time series is the following:

$$x_t^h = \begin{cases} x_t, & t = i, \dots, T \\ \frac{x_{t+1}^h}{1 + \Delta_{t+1}}, & t = 1, \dots, i - 1 \end{cases}$$

$$\Delta_t = \frac{\tilde{x}_t - \tilde{x}_{t-1}}{\tilde{x}_{t-1}},$$

where x_t^h is the value of historical time series for moment t ($t = 1, \dots, i, \dots, T$) and Δ_t is the monthly rate of change calculated from the previous series (\tilde{x}_t). If, instead of monthly growth rates, were used year-on-year rates of change, the results would not be the same. While using year-on-year rates of change for compiling the historical time series keeps the year-on-year behaviour of the original series, using monthly rates of change preserves not only the monthly behaviour of the long time series, but also their year-on-year evolution, except for base changing years.

2.1.1.2 Results

a) Industrial production indices:

The industrial production index (IPI) tries to capture the evolution of value added at factor cost

(3) The common period is the period of time during which the pre- and post-break series are collected simultaneously.

(4) It is worth noting that the reduced number of common period observations may affect the validity of all tests performed.

in industrial activity. The *INE* has been compiling IPI data series for several years now. The first time this index was released was in 1976 in the Monthly Statistical Bulletin (*INE*), where one can find series since January 1968. The first base was 1970=100 (from January 1968 to December 1985), but others have followed, namely 1985=100 (from January 1985 to December 1993), 1990=100 (from January 1990 to December 1998), 1995=100 (from January 1995 to August 2002) and, currently, 2000=100 (started in January 2000).

Concerning the industrial production, the series considered include the overall index and other nine indices resulting from two kinds of disaggregations: by Main Industrial Groupings (MIGs)⁽⁵⁾ and by economic activities. In the first case, five different groups are analysed - consumption goods, durable consumption goods, non-durable consumption goods, intermediate goods, investment goods and energy. In the second case, the underlying classification is the Portuguese Classification of Economic Activities (CAE rev. 2). Only three of the categories made available by this classification are released in the *Statistical Bulletin* of Banco de Portugal, and, therefore, analysed in this article: mining and quarrying; production and distribution of electricity, gas and water; and manufacturing.

All series are adjusted for working days. Currently, *INE* uses specific software (X12 ARIMA - Demetra) for performing working day adjustment. However, in the past, other methods were used for this purpose, namely proportional methods. Therefore, in order to increase the coherence of the linking procedure, the working day adjusted series used to obtain the historical time series are not the ones originally released by *INE*. Alternatively, the series used result from correcting the raw IPI series always with the same method. The working day correction method considered is similar to the one currently used by *INE*⁽⁶⁾.

(5) See Commission Regulation (EC) n° 586/2001 of 26 March 2001.

(6) In fact, it is not possible to replicate exactly *INE*'s results, in particular for the current base, because *INE* obtains the working day adjusted aggregated series by aggregating working day adjusted disaggregated data (indirect approach). In this article, due to data constraints, the working day correction is applied directly to the aggregated series. However, for the current base series, the differences detected are not significant.

After this adjustment, it is possible to proceed with the compilation of the long IPI time series and perform the above-mentioned tests. The test results are: (i) there is evidence of the existence of a strong relation between the monthly rates of both the old and the new base series (see Table 1). Only the "Mining and quarrying" series occasionally present less favourable results; (ii) the mean test shows that, for a significance level of 5%, the null hypothesis (equality of the means) is never rejected; (iii) the same happens in the variance test, except in the case of mining and quarrying for 1990=100 vs. 1995=100, where the respective null hypothesis (equality of the variances) is rejected⁽⁷⁾ (see Table 1).

Hence, long IPI time series starting at January 1968 (at least for some of the categories) are compiled (see Table 2). Even though, in some cases, the test results are not so positive, the compilation procedure is also applied to the "Mining and quarrying" series. Nevertheless, regarding this series, the users must be more cautious.

b) Industrial turnover indices:

The industrial turnover index (ITI) purpose is to measure the monthly evolution of industry sales, being an important short-term indicator of overall economic activity. The ITI is also released by *INE*. The first ITI series start in January 1990 and their base year is 1990 (1990=100). Two more bases followed this first one: 1995=100 (from January 1995 to August 2002) and, currently, 2000=100 (started in January 2000).

Concerning the industrial turnover, the nine series that are released in the *Statistical Bulletin* are: the overall index and eight other series that result from its disaggregation by economic purpose of the output (MIGs⁽⁸⁾) (as in the case of IPI) and by economic activities (CAE rev. 2). In this latter case, only two of the categories available in CAE rev. 2 are compiled: mining and quarrying, and manufacturing.

The correlation coefficient, mean and variance tests are also performed (see Table 1). In spite of base changes, evidence indicates that the behav-

(7) The null hypothesis is rejected for a significance level of 5%, but not for a level of 1%.

(8) See footnote 5.

our of the ITI series kept stable. In fact, the null hypothesis of the correlation coefficient test is always rejected, the null hypothesis of the difference of means test is never rejected, and the variance tests suggest that the series volatility is not affected by base changes⁽⁹⁾.

Subsequently, by applying the methodology presented above, historical time series are built for ITI (see Table 2).

c) Retail trade turnover indices:

The aim of the retail trade turnover index (RTTI) is to assess the monthly evolution of retail trade sales, which makes it a key short-term indicator of household consumption. The first RTTI series were released by *INE* with base 1995=100 (from January 1995 to August 2002). These series substituted the Retail Trade Sales Indices (RTSI), which were available from January 1991 to December 1997 (base 1990=100). The current base series (2000=100) started in January 2000. Considering the information disclosed in the *Statistical Bulletin*, eleven series are considered: the overall index and its disaggregation by economic activities (CAE rev. 2) (see Table 2).

Concerning the transition from the RTSI to the RTTI, an important remark must be made. While the overall index of the former indicator included sales of "Automobiles, motorcycles and bicycles with or without engine" and "Fuel", the overall index of RTTI excludes these items. To make things comparable, it is calculated the overall index of RTSI excluding these two categories. This transformation, among with the base changes, seems to have not affected the general characteristics of the RTTI series (see Table 1). In fact, it can be said that, with few exceptions, the mean and variance seem to remain stable and the correlation coefficients between the rates of change of the common period series are rather significant⁽¹⁰⁾.

By applying the methodology described in the previous section, it is possible to compile long

RTTI time series starting in January 1991 (at least, for some of the series considered) (see Table 2).

d) Number of nights spent (tourism):

Apparently, since the number of nights spent is measured in volume, there would be no need for using a backward extrapolation method in order to obtain consistent historical time series. One of the reasons that can justify using this kind of method is a change in the underlying concept; but this did not happen either. The number of nights spent refers to the number of people that during a specific period of time (from the 12 hours of one day to the 12 hours of the next day) stay in a lodging and this concept has remained stable. However, in 2002, the methodology used for obtaining tourism data series changed significantly. In particular, it was incorporated an estimate for the unit non-responses (a non-response happens when a sampled unit fails to respond) in order to avoid non-response bias (for details, see *INE*, 2003a). The new number of nights spent series were released by *INE*, in 2002. Nevertheless, it were made available data series from January 2001. The previous series were released from January 1964 (some series) to December 2001. These changes render historical comparisons impossible and that is why tourism series need to be harmonised.

As it can be seen from the striking results of the tests performed (see Table 1), this methodological alteration does not greatly affect the general features of the series. The correlation coefficients between the rates of change of the old and the current series are all extremely high and there is no evidence of mean and variance changes.

Resorting to the methodology above described, it is possible to recompile long number of nights spent time series, which in the *Statistical Bulletin* are disaggregated by country of main residence of the tourists, from January 1964 (at least, for some of the series) to the most recent period available at the time of the elaboration of this article (see Table 2).

(9) The null hypothesis of the variance test is only rejected twice: for the intermediate goods series (1990=100 vs. 1995=100) and for the energy goods series (1955=100 vs. 2000=100). In spite of these results, historical time series for the intermediate and energy goods are also compiled. Nevertheless, these series must be looked upon more carefully.

(10) There is evidence of higher variability for "Textile, clothing, footwear and leather products" (1990=100 vs. 1995=100), "Foodstuffs, beverages and tobacco in specialized establishments" (1995=100 vs. 2000=100), and "Non-foodstuffs, beverages and tobacco in non-specialized establishments" series (1995=100 vs. 2000=100) and "Mail trade" series exhibit a weaker correlation. In spite of these results, it is made an attempt to build historical time series for these series too.

2.1.2 Consumer price index

2.1.2.1 Methodology

The consumer price index (CPI) is the key indicator to measure inflation. The *INE* releases monthly CPI series since 1977. Due to geographic, population and product coverage extension, to weighting updates and to methodological alterations, several base changes occurred since then until now. The first CPI series (January 1977 - December 1987) are based on 1976 prices (1976=100). Up to now, there are more four bases: 1983=100 (January 1988 - December 1991), 1991=100 (January 1991 - December 1997), 1997=100 (January 1997 - December 2002) and 2002=100 (started in January 2002).

For obtaining consistent historical CPI time series, which will allow one to calculate the inflation rates (monthly, year-on-year and twelve months moving average) that are released in the *Statistical Bulletin*, it is used a simple method that relies on the existence of a common period between the consecutive base series. Considering this common period, it is calculated a linking coefficient that is the ratio between the old and the new base series. If one assumes that the common period coincides with the base year of the new series, then multiplying the old base series by the linking coefficient implies that the base of the old series becomes the same as the one of the new series. As before, the current base series are kept unchanged and are used as benchmark. In this case, this means that the long CPI series are based on 2002 prices (2002=100). Furthermore, the previous base series are consecutively made compatible with the current base series. Let i_t be the historical CPI based on 2002 prices and i_t^b be a certain base index ($b = \{1976=100, 1983=100, 1991=100, 1997=100 \text{ and } 2002=100\}$). So,

$$\hat{i}_t^{2002=100} = \begin{cases} i_t^{2002=100}, t = 2002:1, 2002:2, \dots \\ i_t^{1997=100} \cdot \frac{100}{i_{2002}^{1997=100}}, t = 1997:1, \dots, 2001:12 \\ i_t^{1991=100} \cdot \frac{100}{i_{1997}^{1991=100}} \cdot \frac{100}{i_{2002}^{1997=100}}, t = 1991:1, \dots, 1996:12 \\ i_t^{1983=100} \cdot \frac{100}{i_{1991}^{1983=100}} \cdot \frac{100}{i_{1997}^{1991=100}} \cdot \frac{100}{i_{2002}^{1997=100}}, t = 1988:1, \dots, 1990:12 \\ i_t^{1976=100} \cdot \frac{100}{i_{1983}^{1976=100}} \cdot \frac{100}{i_{1991}^{1983=100}} \cdot \frac{100}{i_{1997}^{1991=100}} \cdot \frac{100}{i_{2002}^{1997=100}}, t = 1977:1, \dots, 1987:12 \end{cases}$$

where \bar{i}_τ^b is the average of period τ ($\tau = 1983, 1991, 1997$ and 2002). This method, also used by *INE*, has the advantage of preserving the annual rate of change of the indices. On the other hand, since these calculations are based on the index levels, the monthly rate of change of the base change month is not preserved.

2.1.2.2 Results

Concerning the rates of change of CPI series released in the *Statistical Bulletin*, thirteen series are analysed: the overall index and its disaggregation by items (twelve items) (see Table 2). This particular disaggregation is present only at the last two bases (1997=100 and 2002=100) and obeys to the Classification of Individual Consumption by Purpose (COICOP). For the previous bases other disaggregations were considered (nine items for the bases 1991=100 and 1983=100 and four items for the base 1976=100). So, it is necessary to rearrange the items of the bases 1991=100, 1983=100 and 1976=100, to obtain harmonised items for all bases. In the case of the base 1991=100 this work is already done by *INE*, who released CPI series base 1991 harmonised with base 1997=100. In order to harmonise the items for the bases 1983=100 and 1976=100 it is used a similar procedure to the one used by *INE*, which consists in regrouping the available indices with a higher disaggregation level, according to the new items characteristics⁽¹¹⁾. In addition to items harmonisation, other assumptions are made, in particular about rents. This item started to be observed with a monthly frequency in 1997. This enabled *INE* to release a monthly overall index, from this date onwards. Between 1988 and 1997, this index was only observed annually and before 1988 it was not even observed, due to methodological constraints. So, for the period between 1988 and 1997, the annual index of the item "Rents" is transformed in a monthly index and is introduced in the calculus of the historical overall index. This transformation assumes that rents are revised all at the same time, once a year,

(11) Applying the regrouping procedure (used for the indices with base 1983=100 and 1976=100) to the indices with base 1991=100 leads to results approximate to the ones released by *INE*. This happens because *INE* uses a disaggregation level higher than the one used in this work.

in January. Before 1988, for the obvious reason, the index “Rents” is not considered in calculus.

More two remarks need to be made. The first remark refers to the geographic coverage of the CPI. Only from the 1997=100 base onwards the National CPI is the reference index for inflation. Before this base, the CPI for the Mainland was the reference. Finally, again starting at 1997, the price reductions (sales and promotions) were introduced in the CPI. This introduction changed the seasonal behaviour of some indices, namely “Clothing and footwear” item.

Using this harmonised CPI dataset, and regarding the methodology described in section 2.1.2.1, long CPI time series are recompiled from January 1977 (in some cases) (see Table 2).

2.2 Qualitative variables

2.2.1 Methodology

Qualitative information assumes an important role in short-term economic analysis mainly because its disclosure is not affected by significant lags. Another important reason that helps to explain its relevance is the fact that it provides useful insights into economic agents’ expectations, giving, for example, early signs of turning points.

In this context, *INE* conducts several opinion surveys, namely the manufacturing industry survey, the construction and public works survey, and the trade survey. The results of these surveys are presented as balance of respondents, which is the difference between the percentage of positive and negative answers.

Every time a new survey is implemented, as a result of the introduction of new questions in the questionnaire, or the enquiry of a new sample, or by some other reason, a break occurs. However, as long as a certain question remains the same in the different questionnaires, it is possible to calculate historical time series for the results associated with that question.

The methodology used to compute consistent historical time series for the qualitative indicators is quite straightforward. As before, since the true historical time series are unknown, the current series continue to be used as a benchmark for assessing the resemblance between the several pieces of data series. Hence, the current enquiries series are

kept unaltered. Furthermore, for checking if the old and the new series have a similar behaviour, the correlation coefficient, the difference of means and the equality of variance tests are performed⁽¹²⁾.

So, depending on these tests results, two different compiling approaches can be followed, for calculating the long time series. If both the old and the new series have similar behaviour and level, then the old ones would just be juxtaposed with the new ones, without any changes. In the other hand, if the tests reveal that the new and the old series do not have equal mean or equal variance (or both) then the old series are modified before being linked with the current survey series. This modification aims to make the old series mean and variance equal to the mean and variance of the new ones (the benchmark), considering the common period sample. Analytically,

$$x_t^h = \begin{cases} x_t, & t = i, \dots, T \\ \left(\frac{\tilde{x}_t - \bar{\tilde{x}}_t}{\tilde{\sigma}_t} \right) + \bar{x}_t, & t = 1, \dots, i - 1 \end{cases}$$

where x_t^h is the value of historical time series for moment t ($t = 1, \dots, i, \dots, T$), x_t and \tilde{x}_t represent the current and previous enquiry series, respectively, $\bar{\tilde{x}}_t$ and $\tilde{\sigma}_t$ stand for the mean and standard error of the old enquiry series, and, finally, \bar{x}_t and σ_t are the mean and standard deviation of the new enquiry series.

2.2.2 Results

Anticipating some results, generally, for the three surveys considered, there seems to be evidence of quite significant correlation between the old and the new series. Nevertheless, a small number of series presents lower values for the correla-

(12) Adding to the generic variance test, other two tests are performed, comparing the variance of the old and new enquiries series in the first and in the second half of the common period. A priori, it could be expected a higher variability of the new enquiry series in the first half of the common period, due to the lack of enquiry answering skills. If this was true, then maintaining the entire current enquiry series unaltered could be a questionable standard procedure. However, for all surveys, test results do not point to the existence of statistically significant differences between the variances in both halves of the common period, corroborating the choice of keeping unchanged the most recent piece of the series when building the long time series.

tion coefficient. Even so, it is made an attempt to build historical time series for these series too.

a) Manufacturing industry survey:

Concerning the manufacturing industry survey (MIS), *INE* conducts two kinds of surveys: the monthly and the quarterly enquiry. The information collected is organised according to a breakdown by type of good. According to this breakdown, there are five main categories: total, consumption goods, intermediate goods, vehicles manufacturing and equipment goods other than vehicles. Nevertheless, the vehicles manufacturing and equipment goods other than vehicles categories are not considered because these categories were made available just with the current survey.

In relation to the monthly survey, the inquired variables relevant for this article are: production trend, order books, export order books, production expectations, finished products stocks and selling-price expectations⁽¹³⁾. As regards the quarterly survey, this article covers one variable only — the rate of capacity utilization in manufacturing.

For all categories considered, the correlation coefficient tests showed that both the current and the previous survey series are quite correlated. Regarding the mean and variance tests, the results are mixed. The variance revealed to be quite stable. In fact, according to the test results, there is no need to correct the variance of any of the series considered. In contrast with variance stability, the mean of several variables changes with the questionnaires. It can be seen in Table 1 that about 50% of the series (11 in 21 series) seem to need mean correction.

Therefore, by applying the methodology described in the previous section, long monthly MIS time series are compiled from January 1987 and quarterly MIS time series from the fourth quarter of 1987 (see Table 2).

b) Construction and public works survey:

As regards this survey, four variables are considered - activity appraisal, order books, employment expectations and price expectations. Each variable is evaluated in four different sectors: total, residential buildings, non-residential buildings and public works. In total, sixteen series are analysed.

Once more, correlation coefficient, mean and variance tests are performed. The conclusions drawn from test results are not far from the expected. First of all, in general, correlation coefficient test results point to the existence of evidence favourable to the compilation of long time series⁽¹⁴⁾. For this survey, adding to the mean correction, the variance of some of the old series is also adjusted (see Table 1).

Hence, it is possible to recompile long construction and public works survey (CPWS) time series from February 1991 to as recent as possible (see Table 2).

c) Trade survey:

In what concerns the trade survey (TS), *INE* conducts two kinds of enquiries: the monthly and the quarterly enquiry. In both cases, there are separate questionnaires for the wholesale and retail trade. In relation to the monthly survey, the inquired variables, released in the *Statistical Bulletin*, are: sales, stocks, placing orders, selling prices, current business situation and expected business situation. In what concerns the quarterly survey, two variables are considered - sales and price expectations. In this case, there is more than one previous enquiry; to be more precise, there are two previous enquiries (from 1976:1 to 1989:4 and from 1988:4 to 1996:1).

The usual tests (correlation coefficient, mean and variance) are performed. In general, the correlation results show that the common period series are quite correlated. Exceptional cases exist, where the correlation coefficient values are lower than what would be desirable. In these cases, the user must be more careful when dealing with the series. Regarding the other tests, the variance reveals to be quite stable. Actually, the variance adjust-

(13) Even though the variable "Domestic order books" is also released in the *Statistical Bulletin*, it is not possible to compile long time series for this variable because the question associated with it was only introduced in the current survey.

(14) Again, it is made an effort in order to compile long time series also for the series that present lower correlation values.

ment is performed in one case only. Different means are, by far, more frequent (see Table 1).

Considering the existing data constraints, long monthly and quarterly TS time series are compiled, from January 1989 and from the first quarter of 1976 (for some series), respectively, to the most recent data available at the time of the elaboration of this article (see Table 2).

3. CONCLUDING REMARKS

The main goal of this article is to build long time series for some Portuguese data series. In particular, the series considered are the IPI, the ITI, the RTTI, the number of nights spent (tourism), the CPI, and several series from the opinion surveys (manufacturing industry, construction and public works, and trade opinion surveys). The methods that guide the compilation of the historical time series are also presented. To try to reduce as much as possible the subjectivity intrinsic to this kind of work, the historical time series are compiled resorting to simple methodologies. This way, it is made an attempt to produce a coherent dataset, which can be useful for future research.

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Annex
Table 1
CORRELATION COEFFICIENT AND MEAN AND VARIANCE TESTS - to be continued

	Correlation coefficient	Test Statistics	
		Mean	Variance
Industrial production index			
1970=100 vs. 1985=100			
Overall	0,95*	-0.051	1.707
Mining and quarrying	0.43	0.144	0.965
Production and distribution of electricity, gas and water	0,98*	0.031	0.797
Manufacturing.....	0,95*	-0.061	1.856
1985=100 vs. 1990=100			
Overall	0,98*	-0.077	1.269
Mining and quarrying	0,84*	0.711	0.356
Production and distribution of electricity, gas and water	0,92*	-0.026	1.093
Manufacturing.....	0,99*	-0.185	1.456
1990=100 vs. 1995=100			
Overall	0,97*	-0.054	1.001
Mining and quarrying	0,57'	-0.158	1,805*
Production and distribution of electricity, gas and water	0,80*	-0.243	0.988
Manufacturing.....	0,98*	0.067	0.758
Consumption goods.....	0,96*	0.052	0.691
Intermediate goods.....	0,97*	-0.002	0.915
Investment goods	0,94*	0.193	0.686
1995=100 vs. 2000=100			
Overall	0,99*	0.001	0.980
Mining and quarrying	0,87*	0.112	0.658
Production and distribution of electricity, gas and water	0,85*	-0.009	1.244
Manufacturing.....	0,99*	0.003	0.956
Consumption goods.....	0,98*	-0.046	1.284
Durable consumption goods.....	0,99*	0.025	0.862
Non-durable consumption goods	0,97*	-0.052	1.362
Intermediate goods.....	0,99*	0.021	0.946
Investment goods	0,98*	0.053	0.662
Energy.....	0,79*	-0.024	1.331
Industrial turnover index			
1990=100 vs. 1995=100			
Overall	0,99*	0.007	0.979
Mining and quarrying	0,97*	-0.157	1.252
Manufacturing.....	0,99*	0.001	0.989
Consumption goods.....	0,98*	0.045	0.855
Durable consumption goods.....	0,93*	-0.146	1.335
Non-durable consumption goods	0,97*	0.059	0.823
Intermediate goods.....	0,98*	-0.232	2,072*
Investment goods	0,99*	-0.019	1.070
1995=100 vs. 2000=100			
Overall	0,99*	-0.068	1.427
Mining and quarrying	0,96*	0.072	0.863
Manufacturing.....	0,99*	-0.045	1.157
Consumption goods.....	0,96*	0.023	1.488
Durable consumption goods.....	0,98*	0.033	0.909
Non-durable consumption goods	0,93*	0.045	1.519
Intermediate goods.....	1,00*	-0.061	1.101
Investment goods	0,96*	0.005	0.735
Energy.....	0,77*	-0.205	2,528*
Retail trade turnover index			
1990=100 vs. 1995=100			
Overall	0,97*	-0.198	1.529
Foodstuffs, beverages and tobacco	0,92*	-0.200	1.607
Chemicals, medical, cosmetic and hygiene products	0,90*	-0.023	0.921
Textile, clothing, footwear and leather products.....	0,50'	-0.480	1,963*
Furniture, lighting and other housing expenses	0,93*	0.495	0.423

Table 1
CORRELATION COEFFICIENT AND MEAN AND VARIANCE TESTS - to be continued

	Correlation coefficient	Test Statistics	
		Mean	Variance
1995=100 vs. 2000=100			
Overall	0,96*	-0.228	1.552
Foodstuffs, beverages and tobacco	0,89*	-0.117	1.234
Non-foodstuffs, beverages and tobacco	0,95*	-0.236	1.427
Foodstuffs, beverages and tobacco in non-specialized establishments	0,88*	-0.084	1.089
Foodstuffs, beverages and tobacco in specialized establishments	0,82*	-0.246	2,290*
Non-foodstuffs, beverages and tobacco in non-specialized establishments	0,86*	-0.866	3,200*
Chemicals, medical, cosmetic and hygiene products	0,83*	-0.103	1.211
Textile, clothing, footwear and leather products	0,94*	-0.251	1.131
Furniture, lighting and other housing expenses	0,96*	-0.224	1.498
Books, newspapers, stationery and other products	0,79*	-0.004	0.866
Mail trade	0.28	0.227	0.178
Number of nights spent (tourism)			
Portugal	1,00*	-0.055	0.980
Foreign countries	0,99*	-0.029	0.999
Europe	0,99*	-0.024	0.986
European Union	0,99*	-0.025	0.987
Germany	0,99*	-0.012	1.034
Spain	1,00*	-0.027	0.990
France	1,00*	-0.017	0.929
Italy	1,00*	-0.032	1.034
Netherlands	1,00*	-0.016	0.975
United Kingdom	0,99*	-0.029	0.978
America	1,00*	-0.038	1.026
Brazil	1,00*	-0.055	0.945
Canada	1,00*	-0.017	0.978
United States of America	1,00*	-0.030	0.986
Africa	1,00*	-0.111	0.984
Asia and Australia	1,00*	-0.070	0.980
Japan	1,00*	-0.046	1.013
Manufacturing industry survey - monthly series			
Overall			
Production trend	0,85*	-3,511*	1.070
Order books	0,88*	-2,838*	0.387
Export order books	0,90*	-1.397	0.739
Production expectations	0,81*	-2,726*	1.229
Finished products stocks	0,86*	-0.237	0.914
Selling-price expectations	0,94*	1.77	0.747
Consumption goods			
Production trend	0,46'	-5,543*	1.211
Order books	0,42'	-5,603*	0.869
Export order books	0,67'	-4,002*	0.724
Production expectations	0.17	-3,512*	1.263
Finished products stocks	0,73*	3,524*	1.059
Selling-price expectations	0,89*	0.742	1.121
Intermediate goods			
Production trend	0,82*	-1.911	1.121
Order books	0,96*	-1.925	0.730
Export order books	0,87*	-1.808	0.724
Production expectations	0,85*	-2,526*	1.607
Finished products stocks	0,89*	-0.733	1.376
Selling-price expectations	0,92*	1.754	0.664
Manufacturing industry survey - quarterly series			
Rate of capacity utilization in manufacturing			
Overall	0,72'	-4,822*	2.187
Consumption goods	0,59'	-7,332*	0.757
Intermediate goods	0,85*	-0.817	0.422

Table 1
CORRELATION COEFFICIENT AND MEAN AND VARIANCE TESTS

	Correlation coefficient	Test Statistics	
		Média	Variance
Construction and public works survey			
Activity appraisal			
Overall	0.29	-3,116*	2.017
Residential buildings	0,81*	-3,587*	3,931*
Non-residential buildings	0,53'	-5,433*	2.091
Public works	0.08	-0.467	0.436
Order books			
Total	0.44	-6,166*	2.399
Residential buildings	0,65'	-7,469*	0.789
Non-residential buildings	0,66'	-6,068*	1.317
Public works	0,80*	-1.032	2.667
Employment expectations			
Total	0,67'	-7,333*	4,582*
Residential buildings	-0.09	-10,57*	1.273
Non-residential buildings	0.41	-9,076*	1.762
Public works	0,53'	-1.302	0.941
Price expectations			
Total	0.27	4,199*	7,578*
Residential buildings	-0.3	6,009*	3,389*
Non-residential buildings	0,75'	-0.698	1.508
Public works	0,52'	4,085*	2.066
Trade survey - monthly series			
Sales			
Wholesale	0,73*	-2,043*	0.833
Retail	0,76*	-5,044*	0.740
Stocks			
Wholesale	0,45'	-4,95*	1.123
Retail	-0.09	-3,085*	1.197
Placing orders			
Wholesale	0,46'	-2,46*	0.997
Retail	0,44'	-8,869*	1.121
Selling prices			
Wholesale	0,84*	4,168*	0.420
Retail	0,84*	4,212*	0.879
Current business situation			
Wholesale	0.19	-4,791*	0.326
Retail	-0.17	-14,554*	1.969
Expected business situation			
Wholesale	0.22	-2,106*	0.570
Retail	0.25	-8,330*	2,610**
Trade survey - quarterly series			
First and second enquiry			
Sales expectations			
Wholesale	0,94*	-1.021	0.210
Retail	-0.11	-1.226	0.032
Price expectations			
Wholesale	0,89'	0.479	1.092
Retail	0,91*	0.140	1.181
Second and current enquiry			
Sales expectations			
Wholesale	0,86*	-1.681	0.809
Retail	0,57'	-2,914*	0.296
Price expectations			
Wholesale	0,89*	1.380	0.634
Retail	0,88*	3,064*	1.238

Notes:

* - The null hypothesis is rejected for a significance level of 5%. For the correlation coefficient test, the null hypothesis is that the correlation coefficient is equal to 0,5 and the alternative hypothesis is that it is higher than 0,5.

' - The null hypothesis of the correlation coefficient being equal to zero is rejected for a significance level of 5%.

Table 2
FIRST OBSERVATION OF THE HISTORICAL TIME SERIES - to be continued

	First observation
Industrial production index	
Overall	January 1968
Mining and quarrying	January 1968
Production and distribution of electricity, gas and water	January 1968
Manufacturing	January 1968
Consumption goods	January 1990
Durable consumption goods	January 1995
Non-durable consumption goods	January 1995
Intermediate goods	January 1990
Investment goods	January 1990
Energy	January 1995
Industrial turnover index	
Overall	January 1990
Mining and quarrying	January 1990
Manufacturing	January 1990
Consumption goods	January 1990
Durable consumption goods	January 1990
Non-durable consumption goods	January 1990
Intermediate goods	January 1990
Investment goods	January 1990
Energy	January 1995
Retail trade turnover index	
Overall	January 1991
Foodstuffs, beverages and tobacco	January 1991
Non-foodstuffs, beverages and tobacco	January 1995
Foodstuffs, beverages and tobacco in non-specialized establishments	January 1995
Foodstuffs, beverages and tobacco in specialized establishments	January 1995
Non-foodstuffs, beverages and tobacco in non-specialized establishments	January 1995
Chemicals, medical, cosmetic and hygiene products	January 1991
Textile, clothing, footwear and leather products	January 1991
Furniture, lighting and other housing expenses	January 1991
Books, newspapers, stationery and other products	January 1995
Mail trade	January 1995
Number of nights spent (tourism)	
Portugal	January 1964
Foreign countries	January 1964
Europe	January 1993
European Union	January 1975
Germany	January 1964
Spain	January 1964
France	January 1964
Italy	January 1964
Netherlands	January 1964
United Kingdom	January 1964
America	January 1975
Brazil	January 1964
Canada	January 1964
United States of America	January 1964
Africa	January 1975
Asia and Australia	January 1983
Japan	January 1983

Table 2
FIRST OBSERVATION OF THE HISTORICAL TIME SERIES - to be continued

	First observation
Consumer price index	
Overall	January 1977
Food and non-alcoholic beverages	January 1977
Alcoholic beverages and tobacco	January 1993
Clothing and footwear	January 1975
Housing, water, electricity, gas and other fuel	January 1977
Furnishings, household equipment and routine maintenance of the house	January 1977
Health	January 1977
Transport	January 1977
Communications	January 1977
Recreation and culture	January 1977
Education	January 1977
Restaurants and hotels	January 1977
Miscellaneous goods and services	January 1977
Manufacturing industry survey - monthly series	
Total	
Production trend	January 1987
Order books	January 1987
Export order books	January 1987
Production expectations	January 1987
Finished products stocks	January 1987
Selling-price expectations	January 1987
Consumption goods	
Production trend	January 1987
Order books	January 1987
Export order books	January 1987
Production expectations	January 1987
Finished products stocks	January 1987
Selling-price expectations	January 1987
Intermediate goods	
Production trend	January 1987
Order books	January 1987
Export order books	January 1987
Production expectations	January 1987
Finished products stocks	January 1987
Selling-price expectations	January 1987
Manufacturing industry survey - quarterly series	
Rate of capacity utilization in manufacturing	
Total	1986Q1
Consumption goods	1986Q1
Intermediate goods	1986Q1
Construction and public works survey	
Activity appraisal	
Total	February 1991
Residential buildings	February 1991
Non-residential buildings	February 1991
Public works	February 1991
Order books	
Total	February 1991
Residential buildings	February 1991
Non-residential buildings	February 1991
Public works	February 1991
Employment expectations	
Total	February 1991
Residential buildings	February 1991
Non-residential buildings	February 1991
Public works	February 1991

Table 2
FIRST OBSERVATION OF THE HISTORICAL TIME SERIES

	First observation
Price expectations	
Total	February 1991
Residential buildings.....	February 1991
Non-residential buildings	February 1991
Public works.....	February 1991
Trade survey - monthly series	
Sales	
Wholesale	January 1989
Retail	January 1989
Stocks	
Wholesale	January 1989
Retail	January 1989
Placing orders	
Wholesale	January 1989
Retail	January 1989
Selling prices	
Wholesale	January 1989
Retail	January 1989
Current business situation	
Wholesale	January 1989
Retail	January 1989
Expected business situation	
Wholesale	January 1989
Retail	January 1989
Trade survey - quarterly series	
Sales expectations	
Wholesale	1982Q1
Retail	1976Q1
Price expectations	
Wholesale	1976Q1
Retail	1976Q1