

BANCO DE PORTUGAL
Research and Statistics Department

**Portuguese Prices Before 1947:
Inconsistency Between the Observed Cost
of Living Index and the GDP Price Estimation
of Nunes, Mata and Valério (1989)**

PAULO SOARES ESTEVES

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The analyses, opinions and findings of these papers represent the views of the authors; they are not necessarily those of the Banco de Portugal.

Please address all correspondence to: Paulo Soares Esteves,
Banco de Portugal, DEE, Av. Almirante Reis, 71 P—1100 LISBOA
Fax (351-1) 52 38 41

**PORTUGUESE PRICES BEFORE 1947:
INCONSISTENCY BETWEEN THE OBSERVED COST OF LIVING INDEX AND
THE GDP PRICE ESTIMATION OF NUNES, MATA AND VALÉRIO (1989).***

**Paulo Soares Esteves
Banco de Portugal**

Introduction

Economic research is in great debt to economic historians. Most of the empirical research, namely on stylized facts on economic growth and business cycle theories, are build up with long-run data beyond published official figures, and therefore would not be possible without the retrospective estimations provided by economic historians. As warned by historians, this data is sometimes questionable and it is an object of frequent revisions. Moreover, these estimations are produced mainly to provide a qualitative picture of the past. However, many nonspecialist authors use this retrospective data to estimate and to construct theoretical models without any critical view, and therefore could achieve misleading results and draw incorrect interpretations.

The portuguese secular series most commonly used are those attributed to Nunes, Mata and Valério (1989). Among other results, Nunes et. al. present estimations of the nominal GDP and their price for 1833-1947 (official national accounts are available since 1947). The purpose of this note is to identify a serious inconsistency between the GDP price estimation and the observed consumer price and to warn researchers working with these secular figures to be extremely cautious. As a direct consequence of the methodology employed, the ratio between the observed consumer price and the estimated GDP price is always increasing over time. Given this deviation, the evaluation of economic variables, like the GDP at constant prices and the real exchange rate for the portuguese escudo, produces very different results depending of the price measure which is used. These differences suggest that economic research should avoid the use of the estimated GDP deflator to measure price behaviour in the portuguese economy before 1947. Moreover, there are reasons to suspect that the nominal GDP is seriously overestimated.

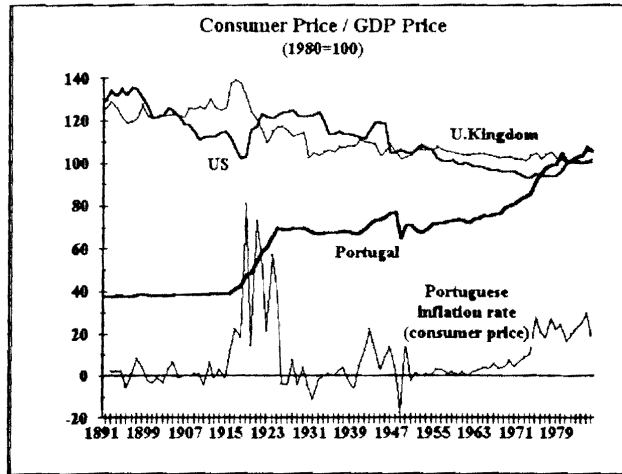
* I would like to thank Paulo Brito for his valuable comments. Remaining errors are my own.

Estimation of the GDP price before 1947

In Nunes et. al., the GDP deflator for the period before 1947 was estimated using the cost of living index as a proxy variable. Until 1899 this index was computed using raw data from Justino (1986); since then, the index is a rough consumer price index published by the social security office and by the national statistics office. The use of the proxy was based on the estimated elasticity between the two variables (δ) for the 1947-1981 period. Defining P_y as the GDP price and P_c as the cost of living price, the GDP price evolution before 1947 was estimated by:

$$d\ln P_y = \delta \cdot d\ln P_c \quad (1)$$

Graphic 1



Hence, the estimated behaviour of the ratio between the cost of living index and the GDP price could be written as:

$$d\ln\left(\frac{P_c}{P_y}\right) = (1-\delta) \cdot d\ln P_c$$

Given that the estimated elasticity for 1947-1981 is lower than one ($\delta=0.816$), and that the index of cost of living is a variable with a positive trend, then this relative price is always increasing, namely in higher inflation periods (graphic 1). The parameter δ could be different than one for limited periods. In fact, differences between the imported and domestic goods' prices or different weights on consumption and production baskets could explain temporary movements of this relative price. However, δ should have an asymptotic mean equal to one,

suggesting that the assumption of $\delta=1$ could be the best choice to estimate secular figures because it minimizes the probability of accumulating errors. Otherwise, the functional form adopted will force one relative price to go towards zero, with a velocity that will be higher during inflationary periods. For instance, the relative price of the GDP estimated by Nunes et. al. decreases to almost one-half between the beginning of the century and 1947. Using Liesner (1991) data for 1891-1985, this relative price has a very different evolution in the United States and in the United Kingdom.

Implications on the evaluation of economic variables.

The use of the estimated GDP price or the cost of living index produces very different results when evaluating economic variables, suggesting the presence of important measurement errors in the GDP price estimation.

As can be seen in table 1, the results of Nunes et. al. for the real per capita GDP are closer to those of Bairoch (1976). Bairoch's measure for per capita GDP in the United Kingdom was employed in both cases. However, if the cost of living index is used as the deflator of the nominal GDP estimated by Nunes et. al., the results seem unrealistic. In fact, according to these results, the portuguese per capita GDP was not very different from that of the United Kingdom in the second half of the XIX century. Furthermore, these results suggest that if we believe in Bairoch's data and in the official figures for the cost of living index, there are reasons to suspect that the nominal GDP of Nunes et. al. is overestimated, although we can not supply an alternative measure for this variable.

Table 1 - Relative per capita income
between Portugal and the United Kingdom (UK=100) (*)

	Bairoch (1976)	Nunes, Mata e Valério (1989)	Using the cost of living index as deflator
1850 ^(a)	56.8	40.1	85.5
1880 ^(a)	39.7	33.8	65.8
1913	29.3	28.5	53.6
1933	40.0	37.4	40.8
1950	28.3	31.7	32.8
1970	50.3	59.6	53.9

(*) in 1960 US dollars and prices.

(a) three-year annual averages.

Graphic 2



Graphic 3



On the other hand, the measure of the real exchange rate for the portuguese escudo is dramatically influenced by distortions between consumer and GDP prices. The graphics 2 and 3 present the bilateral real exchange rate vis-à-vis the British pound and the US dollar for 1895-1985, using both consumer price indexes and GDP prices. The prices for the US and the United Kingdom are those of Liesner (1991). The nominal exchange rates were computed using data from the Bank of Portugal; for the period before 1957, the escudo/dollar exchange rate was based on the cross rate between the escudo/pound rate and the pound/dollar rate published in Mitchell (1988).

Conclusions

For the reasons presented above, the data for the portuguese economy before 1947 should remain a research issue. There are reasons to believe that the nominal GDP and the GDP deflator that were published in Nunes et. al. (1989) could be overestimate. In spite of the fact that the estimation for the GDP at constant prices does not seem unrealistic when comparing with Bairoch's figures, the utilization of one of these two variables (nominal GDP or GDP price) for empirical purposes can be misleading. It should be preferable to use the observed cost of living index to measure price behaviour. Unfortunately, we can not suggest alternative figures for the nominal GDP.

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