Hedonic indexes and GDP estimate in the USA

Abstract
About one-fifth of the USA GDP is estimated by the Bureau of Economic Analysis through the use of hedonic indexes of prices, built to process the prices of heterogeneous goods - and services -, that is the prices of goods whose characteristics change over time. Prices of characteristics of good are estimated through the use of regression functions and an implicit price is built for the heterogeneous good that substitutes the market price within the GDP deflation procedure. This substitution is not built to take into account the quantitative changes of the technological characteristics of a heterogeneous good; on the contrary, it is built to assign a different price from the market price, to the estimated utility that the final buyer could enjoy. (Seskin, Smith, 2011; BEA, 2011b). The aim of this paper is to highlight a theoretical issue concerning the idea of the value of goods and services implicit in this methodology, since the price of goods would not be properly identified through the market price. On the contrary, in economic theory, either Austrian school or classic, market price has to be explained to understand the mechanism of its determination; but it doesn’t have to be modified so that it can quantify the real value of the good.

Key words: Hedonic price; Quality adjusted index; Market price; Exchange value.

1 Introduction to the hedonic evaluation for the USA GDP

In the United States of America (USA) the Bureau of Economic Analysis (BEA), Department of Commerce, estimates the GDP on the grounds of raw data on the final sales of goods provided by the Bureau of the Census. To establish which has been the change of GDP for a given year, BEA estimates the price changes of some type of goods processing price indexes through a particular methodology that uses so called hedonic functions.

According to the theorists of such a method, “a hedonic function is a relation between prices of varieties or models of heterogeneous goods – or services – and the quantities of characteristics contained in them” (Triplett, 2004). For a heterogeneous good is meant any good which can be on the market with different characteristics from one year to another (or not on the market, in the case of goods whose value has to be estimated, like rents of owner-occupied buildings)¹.

Currently², the hedonic evaluation is applied to determine the price indexes for 10 merchandise categories (BEA, 2011a). Their percent weight over the total GDP of the United States is shown in Table 1.

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¹ For an introduction to this methodology see: BCE (2004).
The categories of goods, which can be considered with high technological content in a broad sense (Computers and peripheral equipment, Software, Telecommunications, Photocopiers, Audio & Video), reach, summed together, only the 13.23% of all the hedonically valued goods (and they weight only the 2.57% of the GDP). The hedonic evaluation, then, is not implemented directly for reasons tied up to the technological development of goods but it is done, instead, when we want to assign a price to a determined good or service which is considered not anymore on the market, so that it might be used as a term of comparison for the currently present good, which is made up by the same features, contained only in different amounts (Shapiro, Aizcorbe, 2010). Then a regression function is used to generate an implicit price for the good currently on the market, that will be not only quantitatively but also theoretically different from the market price.

The economic theory, in fact, maintains that market price is also a relative price and not only an absolute price (Schumpeter, 1990) and its change indirectly modifies the prices of other goods. In addition, in economic theory of value, either in Austrian school (exchange value that quantifies use value; Schumpeter, 1972) or in classic school (exchange value as a cost of production; Schumpeter, 1990; Landreth, Colander, 1996; Agnati, 2001), market price is a quantification whom determination has to be explained and not modified so that value of good can be expressed in a coherent way through the market price. For a practical explanation, we consider two examples. For the material goods, in the Household appliances category, the price recalculation is performed by computing a regression function which includes among the regressors also the “brand” (Liegey, 2003). Then the consumption choices made by buyers are considered to argue the necessity of the price recalculation in alternative to the market price actually paid. The regression function does not consider just technologic features and it concerns, actually, also a feature that can be regarded as already considered in the decision-making process that contributed to determine the market price. As concern the services, on the contrary, for the heading Rent, that taken alone weighs the 10.51% of GDP, the reason of the hedonic treatment is traced back to the different utility implicit in the rents of the buildings enjoyed by tenants (BEA, 2011a), since the rented

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3 For this purpose there are already in use the quality adjusted indexes.

4 For a classic version of the question of market price as absolute price see: Marx (1989, vol. III); instead, for the market prices mathematically determined as relative prices see: Walras (2006); for a modern version related to the determination of the market price as a relative and not absolute price, see: Samuelson (1993).
dwellings are improved over the years. That is, the rent paid on the market is recalculated since it would refer to a dwelling qualitatively different from the previous (same) dwelling (Stewart, Reed, 1999). In this case, then, the measurement of the good characteristics is not modified; the rent, in fact, is the price of the tenancy service and not the price of the dwelling, and the characteristics of the dwelling should be evaluated separately so that the value of good might be measured through a different weighting.

2 Some hints to the underlying theoretical problems

The current implementation of the hedonic evaluation of prices for heterogeneous goods and services, in our opinion, is grounded, therefore, contemporarily on two thesis.

1. There is a need to estimate the change intervened regarding the goods characteristics, regardless what is done in the market through the price.
2. The market evaluation occurs anyway properly through the price, even though its measure needs to be modified.

Clearly, these two issues are strictly twisted and both connected to the theory of value of goods. However, whereas the first focuses on the hypothesis that the modification of goods and services included in the estimate of final production is not properly evaluated by the market through the price, the second one denies this problem considering it only of quantitative nature. In our opinion, then, the hedonic evaluation poses a problem of a qualitative nature to which, however, it provides a quantitative solution. If through the first thesis, then, it is introduced an indirect critique to the economic theory, denying the adequacy of the market price as measurement of the exchange value or of the utility of a good, through the second thesis, instead, there is the implicit acceptance of the form of price as a means to express the value of a good, implementing just a quantitative modification of the market price, ascribed to those particular goods and to the others for comparison.

The more direct consequence of this implementation, widespread in the USA, concerns the international comparisons which are not homogeneous and should be considered not only as a quantitative and theoretical problem, but also as an issue that might affect directly the economic policies of different countries.

3 References

5 In the work of Irving Fisher (1930-2006, p. 768) the value of capital is the capitalized or discounted income. For the heading Rent, then, the increase of the capital value of the dwelling is already included in the market price of the rent, that should constitute the income to be capitalized or discounted and not the income capitalized or discounted.

6 The theoretical critique is indirect since it is not the aim of the hedonic evaluation; the remarks traced down, in fact, tend to support a technical approach regarding the opportunity to estimate the prices of heterogeneous goods through a regression function that takes properly into account the changes into the characteristics, to be expressed through index numbers.