Let us start with Triplett’s (2001) definition of a cost-of-living index: “The cost-of-living index is a price index that measures the change in consumption costs required to maintain a constant standard of living.” A basic question for a statistical agency is whether this is the objective of the CPI. If not, then what is the objective?

Early attempt to measure a price index such as the “tabular standard” in Massachusetts around the mid-eighteen century was an attempt to achieve the above objective (Fisher, 1913). This tabular standard, often called a Lowe index, is the what is now known as a fixed basket index, or cost-of-goods (COG) index. The use of this index is probably due to its simplicity and the difficulty of collecting quantity data periodically. Nevertheless, we should not forget that the objective is to use it as a proxy to the cost-of-living (COL) index defined above.

Is the fixed-basket index a good approximation to a true COL index? Here economic theory may give us some guidelines. The fixed-basket index effectively assumes that the consumers have perfect-complement preference structures. In other words, consumers do not respond to relative price changes among the goods in the basket. Of course this leads to the well-known substitution bias. If there is anything useful in the study of economics, the most important result should be the so-called law of demand: when the price of a consumption good goes up, consumers will buy less. The so-called pure price index advocates simply take the “consumer” out of the price index.

Standard of living depends also on environmental factors such as personal security, custom and social convention, climate change, pollutions, etc. Therefore the CPI is at best a COL subindex (Triplett, 2001) or what the Schultze Panel Report (2002) calls a conditional COL index.

Critics of the COL index are a bit like a political party working on a negative election campaign. They often criticize their opponents without stating what they will do for the electorates. For example, the Schultze panel (2002) suggests that a satisfaction-based COL index may show inflation as well as deflation in the absence of any changes in the price product, . . . ”

(p. 56). I think the criticism is unjustified. The writer of that passage is using the idea of hedonic treadmill hypothesis, which, in terms of conventional consumer theory, means a changing utility function. The theory of COL index, however, assumes that taste is constant. Therefore the writer criticizes the COL index based on a situation that it is not designed to handle. Moreover, I do not see a COG index can perform better in the same situation either. The study of happiness and subjective well-being is an important subject in economics. But it is too much to ask for when we want a COL index such as the CPI to measure or even to account for these effects. In my opinion, the CPI reflects the cost of maintaining the materialistic well-being of the citizens, not their subjective well-being.

Many properties of the COL index are derived from the neoclassical theory of economics. The neoclassical theory has been criticized by the behavioural economists that empirical observations do not support the theory in many occasions. Challenges for behavioural and experimental economists include non-transitivity of preference structure, framing effects, herding effects, preference reversals, problems in subjective probabilities, and influence by fairness and altruism (Thaler, 1991). Indeed, some important decisions in our life time are unique and non-repetitive choices with incomplete information (North, 1990). These short-comings of the neoclassical model are pervasive when we want to model the long-run institutional changes and their co-evolution with preference structures (Bowles, 2004). Nevertheless, for the purpose of a monthly CPI, those drawbacks of the neoclassical model are of secondary importance. If there is any area in which the neoclassical model is good at, it must be the short-run demand of marketed goods and services. Criticism of the COL index using the results in behaviour economics is like what Elster (1989) calls second decimal decision: when trying to find the larger of two numbers, people compare the second decimals and ignore the first one. The first decimals here are the flexibility of the fixed-basket index and a COL index to accommodate the substitution effects.

Let us turn our attention to the COG index. The Schultze panel (2002) argues that “a fixed-basket index is biased as a measure of the cost of living but not necessarily as a measure of the price level itself.”
This begs the question of what the exact meaning of a price level is. In its purist sense, we have to resort to the Divisia index, which is the decomposition of the rate of change in nominal value into a price component and a quantity component. A discrete version of this idea is the so-called product test, which states that the product of a price index and the corresponding quantity index must be equal to the ratio of total values in the two periods. The next logical question to ask is this: if we divide the value ratio by a COG index, will the resulting quantity index represent a reasonable change in aggregate consumption? It is well-known that this implicit quantity index for the Laspeyres price index is a Paasche quantity index, and for the Paasche price index a Laspeyres quantity index. What about a fixed-basket index which uses the expenditure weights of another year? Here we simply do not know what the resulting quantity index really represent. Incidentally, the implicit quantity index of the Fisher price index is the Fisher quantity index. Therefore by using the Fisher index it is easy to explain to the users and the public what we are measuring.

The product test is not merely an academic curiosity for students of index number theory. One of the basic tools that central banks use for monetary policy analysis and macroeconomic forecasting is the dynamic stochastic general equilibrium model (Sbordone et al, 2010). In this model, the households are assumed to optimize consumption and work while balancing their financial plans regarding spending, saving, and income. For example, a simple formulation can be expressed as

$$\max_{c_t, n_t} \sum_{t=0}^{\infty} \beta^t U(c_t, n_t)$$

subject to the intertemporal budget constraint

$$p_t c_t + b_{t+1} = (1 + R_t) b_t + w_t n_t,$$

where $p_t$ is the CPI in period $t$. If $p_t$ does not satisfy the product test, the meaning of aggregate consumption $c_t$ in the utility function $U$ will be unclear. Moreover, $p_t$ is understood to be a COL index. Monetary policy is carried out by fine tuning the nominal interest rate $R_t$. This in turn affects the expected inflation rate, real output, and employment through the dynamics of general equilibrium of aggregate demand and aggregate supply. The official Bank of Canada monetary policy since 1991 has been inflation-control targeting. The target, $\pi_t = \log p_t - \log p_{t-1}$, is set at 2 percent per year. The Bank emphasizes that “use of the CPI as the basis for the target reflects its role as the most commonly used indicator of inflation in the Canadian economy and the most relevant estimate of the cost of living for most Canadians.” (BOC, 2006, p. 7) In particular, Rossiter (2005) has estimated that the total measurement bias of the Canadian CPI is 0.6 percent per year.

There are conceptual and practical issues to be resolved in measuring a true COL index. But at the end we should ask whether we want to measure something approximately correct or something that is precisely incorrect.

References


