

What is the Mexican Central Bank aiming at?

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If the CPI is not sufficiently flexible to allow inflation rates to vary across the income distribution, we have a flaw in our statistical system that will one day become a serious issue.

Angus Deaton, 1998

There is of course no absolute reason for having a price index in the first place. It is an institution, even if a well established, traditional, and perhaps even today still needed institution, affecting many aspects of economic life.

Afrait and Milana, 2009

Abstract

The Consumer Price Index (CPI) is a Laspeyres index with a plutocratic method. This paper has three purposes. The first one is to assemble a democratic CPI. The second purpose is to construct an alternative index using the median of the expenditure distribution. The third one is to compile price indexes for each one of the ten expenditure deciles. The concern about the use of a single price measurement has policy implications. Also, the empirical results are analyzed in terms of the political economy of price measurement and in terms of the history of the monetary policy.

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Introduction

The CPI is a Laspeyres index that uses a plutocratic aggregate method. The Mexican CPI is not an exception. Although this internationally common practice has, in terms of its feasibility, a historical sense, it also constitutes a policy choice that we should rethink in the present day.

The heart of the matter is the following. According to Deaton (1998: 43), the household for which the USA's CPI weights are correct lies at the 75th percentile of the expenditure distribution. In the case of Spain, the applicable percentile is the 61st (Izquierdo, Ley and Ruiz-Castillo, 2003: 149), and for the Mexican CPI the percentile in question is the 86th. Two remarks are warranted about these facts. First, taking into account that income inequality in Latin America –and especially in Mexico– is very large, the gap between percentiles is not surprising; second, income distribution patterns between continents are dissimilar.

The “priority objective” of the Mexican monetary authority is “to protect the purchasing power of money” (*Diario Oficial de la Nación*, 1993). To some extent its goal resembles the mission followed by other central banks.¹ However, long ago, Prais (1959: 126) posed the question, “In constructing an index number to measure changes in the cost of living, and assuming only a single index number is to be prepared, whose cost of living should one have in mind?” This paper has three purposes. The first one is to assemble a democratic CPI for Mexico. Drawing on Pollak (1998: 70), the second purpose is to construct an alternative one using the median of the expenditure distribution. Following the suggestion made by Arrow (1958: 79), the third purpose is to compile price indexes for each one of the ten expenditure deciles.

The paper is organized as follows. The first section briefly discusses some theoretical aspects of price indexes. The second part records the empirical results. The concern about the use of a single plutocratic price measurement has tremendous policy implications. The last section analyzes, in terms of the political economy of price measurement and in terms of the history of the monetary policy, what has been done in this paper.

¹ The U.S. Fed “shall maintain long run growth of the monetary and credit aggregates commensurate with the economy’s long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates” (Senate and House of Representatives of the United States of America, 2000). The Bank of Canada has as a goal “to contribute to solid economic performance and rising living standards for Canadians by keeping inflation low, stable, and predictable” (Department of Justice, 1934).

1. Some theoretical aspects of price indexes

The Mexican CPI is a Laspeyres index with a plutocratic aggregate method. Formally:

$$L = \sum_{h=1}^H w_h \sum_{n=1}^N S_n^h P_n \quad (1)$$

Where:

w_h = the weight given to the individual index for household h in computing the average;

S_n^h = the share of household h 's total expenditure dedicated to good n ; and

P_n = the market price relative for good n .

A plutocratic formula is:

$$w_h = \frac{E_h}{\sum_h E_h} \quad (2)$$

Where:

E_h = the total expenditure of household h ; and

Equal weight to each household implies a democratic formula:

$$w_h = \frac{1}{H} \quad (3)$$

On one hand, equation (2) means “one peso, one vote”. In this sense, it treats all pesos of expenditure equally. On the other hand, equation (3) states “one household, one vote”.

It is worth emphasizing that the plutocratic approach uses a shortcut based on aggregated expenditure shares; by contrast, compilation of a democratic index requires calculating weights for each household. In the past, without information technology tools and detailed survey data, the ordinary index was the unique index that statistical agencies were possible to calculate. Certainly, at present, deciding which one will be used as a monetary policy goal, but also, in a sense, as a basic input in an economic policy package (or framework), constitutes a practical policy issue.

In the theoretical ground, the problem is that aggregate index numbers are not neutral statistical indicators (Muellbauer, 1974: 32). As an empirical matter, the rationalization in using a single price index is the existence of a high degree of homogeneity in the expenditure patterns. This is not the case for the Mexican society, among others. That is, a “Mexican representative household” does not really exist.

In fact, it has never existed. Thus, if only a single index number is to be prepared, there are, at the least, two other options: the democratic one and the one based on the use of the median of the expenditure distribution.

2. Alternative CPI for Mexico

The Mexican Central Bank (BANXICO, acronym for Banco de México), in contrast to other monetary authorities, is the agency in charge of compiling the CPI. Currently, its weighting base is 2000, updated to June of 2002. Unfortunately it is not replicable, for the following reasons:²

- 1) It seems that the BANXICO made use of two national income and expenditure household surveys, one open to the public, known as ENIGH (acronym for *Encuesta Nacional de Ingreso-Gasto de los Hogares*), and another carried out for internal purposes, that is, as a pilot exercise. Both surveys were collected by the National Institute for Statistics, Geography and Informatics (INEGI, acronym for Instituto Nacional de Estadística, Geografía e Informática).
- 2) In the *ENIGH 2000* there are 520 goods and services measured. However, the current Mexican CPI is composed of only 315 goods and services. This aggregation represented the application of formulas that have yet to be made clear.
- 3) Areas covered by ENIGH are classified as populations less than 2,500, from 2,500 to 14,999, from 15,000 to 99,999 and more than 100,000. Only the first one is labelled as rural by the INEGI. In contrast, the Mexican CPI refers to urban areas as populations with more than 20,000 inhabitants.³ In other words, the Mexican CPI classification is not at all consistent, in statistical terms, with those of the ENIGH.
- 4) In setting weights related to several items –among others, cigarettes, beer, food away from home, gasoline, medicine, new vehicles, owners' equivalent rent of primary residence, and wines–, the BANXICO (2002: 12) consulted “the National Accounts System and other surveys” and applied “special statistical techniques”. As a sum these items in question represent one third of the total CPI weights.

Our alternative weights are based on expenditure figures reported by the *ENIGH 2000*. To reduce 520 goods and services into 315, we draw on the formulas applied by the BANXICO. Using all four areas, that is, the whole ENIGH, these figures

² According to Ruiz-Castillo, Ley and Izquierdo (2000: 18): “in an open society, the dissemination of relevant –albeit controversial– information should be encouraged for the sake of transparency”.

³ For the North America region, the Canadian CPI is the only one that includes families living in urban and rural private households.

represent 89.3% of the personal consumer expenditures, according to the *National Accounts System*.⁴

We have two different sets of weights, ours based on *ENIGH 2000* and the ones worked out by the BANXICO. Table 1 contains the 16 goods and services which weights shown major differences.

Table 1
Goods and services that show major weights differences
(percentages)

<i>Goods and services</i>	<i>ENIGH 2000</i>	<i>BANXICO</i>	<i>Difference</i>
Urban bus	0.3074	1.3166	1.01
New cars	0.5160	3.3030	2.79
Whitewash	1.1114	0.1561	-0.96
Beer	0.1524	1.4633	1.31
Intracity transportation	0.5544	1.8180	1.26
Gasoline, unleaded premium	1.1155	3.1900	2.07
Toilet soap	1.3263	0.3885	-0.94
Milk	3.4515	1.8649	-1.59
Other food away from home	1.6024	3.5757	1.97
Carbonated drinks	2.4550	1.4519	-1.00
Rent of primary residence	0.3667	2.5207	2.15
Full service meals and snacks	1.2642	2.3318	1.07
Fabric conditioner	1.9950	0.3758	-1.62
Tortilla	4.1776	1.2265	-2.95
Tuition and fees, College	0.3681	1.6632	1.30
Owners' equivalent rent of primary residence	0.2081	11.9700	11.76
<i>Sum</i>	<i>20.972</i>	<i>38.617</i>	<i>17.645</i>

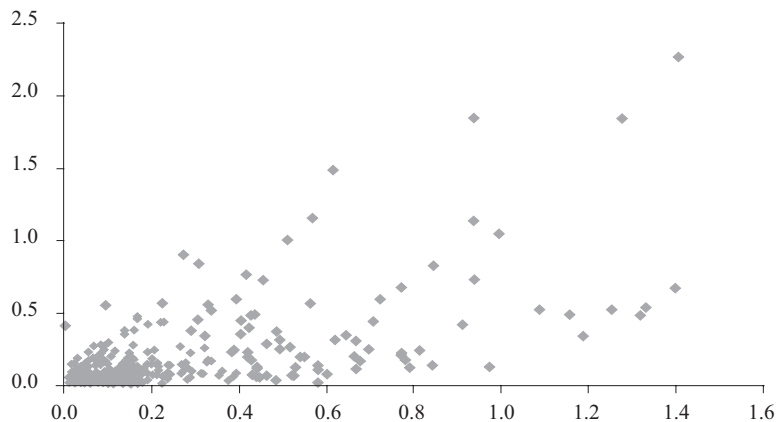
Source: Own calculations based on *ENIGH 2000*.

If we exclude the 16 goods and services registered in the previous table, 299 items still remain which, on average, show an absolute difference of 0.161%. Figure 1 contains its scatter plot. The correlation coefficient between these subsets of weights is 0.62.

In order to illustrate various expenditure patterns, information about the weight of a “basic basket” defined by the BANXICO, which includes 80 components of the 315 goods and services that make up the Mexican CPI, is contained in Table 2.

⁴ For the American case, according to Attanasio, Battistin and Ichimura (2007: 517), “[...] the amount by which the CEX underestimates national aggregates is massive (around 35 percent)[...]”.

Figure 1
Weights of 299 goods and services according to ENIGH 2000 and BANXICO
(percentages)



Source: Own calculations based on *ENIGH 2000* and (www.banxico.org.mx).

Table 2
“Basic basket” weights, for alternative consumer price indexes

<i>Index, median and decil</i>	<i>Percentage</i>
Plutocratic	44.9
Democratic	51.5
Median	55.7
1 st decil	55.2
2 nd decil	54.6
3 rd decil	54.0
4 th decil	53.2
5 th decil	52.6
6 th decil	51.3
7 th decil	50.9
8 th decil	50.1
9 th decil	49.6
10 th decil	43.7

Source: Own calculations based on *ENIGH 2000*.

Indeed the plutocratic weight reflects quite well the consumption pattern of the richest decil, at least as a whole. That is, for the Mexican aggregate “super

household” the basic basket represents almost 45% of its expenditure. In contrast, the median weight reflects the consumption pattern of the poorest decil. In order to combine our weights and price indexes compiled by the BANXICO it was applied an *ad hoc* program. The average growth rates of alternative consumer price indexes between the second half of June of 2002 and the second half of June of 2009 are reported in Table 3.

Table 3
Alternative consumer price indexes, average growth rates between June of 2000 and June of 2009
(percent per year)

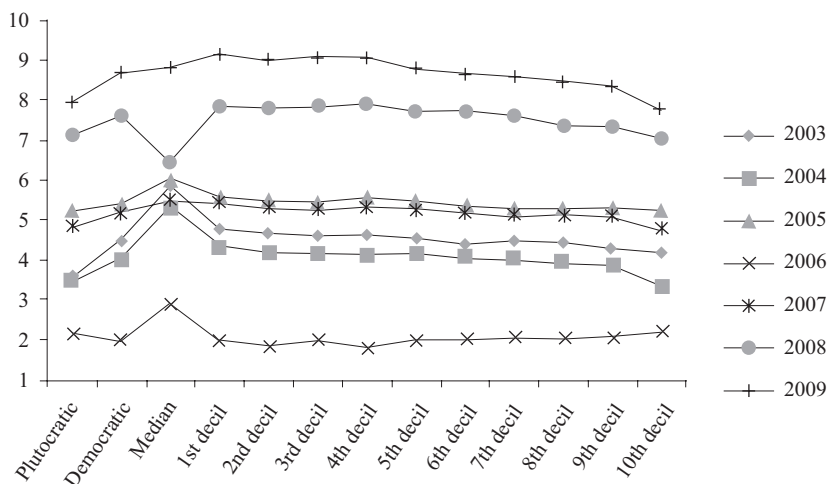
<i>Index, median and decil</i>	<i>Percentage</i>
Plutocratic	5.68
Democratic	6.27
Median	6.93
1 st decil	6.58
2 nd decil	6.44
3 rd decil	6.44
4 th decil	6.45
5 th decil	6.38
6 th decil	6.26
7 th decil	6.21
8 th decil	6.11
9 th decil	6.05
10 th decil	5.72

Source: Own calculations based on *ENIGH 2000* and (www.banxico.org.mx).

Although the same structure of prices was assumed, P_n in terms of equation (1), the average dynamics of consumer price indexes are quite variable. The plutocratic bias, that is, the difference between the democratic and the ordinary consumer price indexes during the analyzed period was, on average, 0.56% per year.⁵ Figure 2 illustrates that, if we compare the year with the highest inflation (2009) with the year with the lowest one (2006), the behaviour of the plutocratic and democratic price measures is not symmetric. Also, in the case of the plutocratic and the median consumer price indexes, it seems that there is an irregularity in 2008.

⁵ According to Ley (2005: 641): “income inequality in Latin America is very large, IDB (1998) reports that countries in the region experience the largest income inequality in the world. It is very likely then that the CPI plutocratic gap be of a larger significance in Latin America, especially in countries with double-digit inflation that may have more differentiated price dynamics”.

Figure 2
Inflation rate, 2003-2009



Source: Own calculations based on *ENIGH 2000* and (www.banxico.org.mx).

Table 4 compares our three basic consumer price indexes, the plutocratic, the democratic and the one based on the median of the expenditure distribution. It should be remembered that the gap among the rates of inflation is simply an empirical matter.

Table 4
Plutocratic, democratic and median consumer price indexes, growth rates, by year (percentages)

Year	Plutocratic (1)	Democratic (2)	Median (3)	Plutocratic bias (2-1)	Median bias (3-1)
2003	3.55	4.49	5.81	0.95	2.26
2004	3.48	4.04	5.33	0.55	1.85
2005	5.24	5.39	6.00	0.15	0.76
2006	2.17	2.01	2.89	-0.16	0.72
2007	4.86	5.21	5.46	0.35	0.60
2008	7.14	7.63	6.45	0.49	-0.69
2009	7.96	8.70	8.83	0.73	0.87

Source: Own calculations based on *ENIGH 2000* and (www.banxico.org.mx).

Conclusions

The concern about the use of a single plutocratic price measurement has, evidently, theoretical implications, but also has tremendous social and policy repercussions. I believe that CPI literature has not explored them sufficiently. Three controversial issues deserve a comment. The first one is about the political economy of the current Mexican CPI. The second one deals with the selection of a CPI between the three alternatives revised: the plutocratic, the democratic and the one based on the median of the expenditure distribution. The third one represents the best option, that is, the use of alternative measurements of prices from the angle of the history of monetary policy.

In terms of the political economy of the CPI we may adopt, at least, two approaches. The first one was recently proposed by Charles R. Hulten (2004), a researcher at the NBER, who emphasizes the political part of the matter we are dealing with. According to this author “like all other aspects of government in a democratic system, a nation’s statistics are ultimately subject to the consent of the governed” (Hulten, 2004: 10). For him, in terms of CPI, this permission depends on many complex factors, such as legitimacy and credibility.

This investigation indicates, in the first place, that Mexican CPI legitimacy is strictly limited because its weights only reflect the expenditure pattern of a small portion of the heterogeneous Mexican society and, in the second place, that in setting the CPI weights, Mexican monetary authority acted wrongly, at least in statistical terms. As a consequence, the credibility of the Mexican CPI is cast into doubt. In this limited sense, its recent independence has been disappointing.

The second approach emphasizes the economy part of the matter we are dealing with. It is known as “the price index problem”. The best way to understand it is to quote at length Sydney N. Afrait, the “guru of the price index” (Deaton, 2005).

Afrait (2005: xx) explains the heart of our problem:

What is a price index? To a mass of persons with any awareness about a price index, it is just a number issued to the public from the Government Statistical Office that should serve for ‘indexation’ purposes, such as may affect wages, salaries, mortgages, loans and other contracts made in any period, to keep amounts at an acceptable level subsequently [...] The ordinary *consumer price index* or CPI represents a practical response to the need. A sense for the equivalence that should give it some legitimacy, and the faithfulness, or *truth*, of a price index to that sense, becomes an issue giving rise to extensive thought and theory about price indexes [...].

Our corollary is that, for the majority of Mexican people this “sense of equivalence” is poor because, let me repeat it, CPI’s weights only reflect the expenditure pattern of a small portion of the heterogeneous Mexican society. As a consequence of this lack of equality, the Mexican society has little confidence regarding the inflation statistics given by the monetary authority.

Dealing with the selection of a CPI, when compiling this index it is difficult to come to a consensus on what the weights should be. My point of view is that the one based on the use of the median of the expenditure distribution is, in a statistical sense, more adequate than the plutocratic one.⁶ This represents a major argument in favor of Pollak suggestion.

There are two good reasons to use the democratic price index. The first one is linked with the fact that, in terms of expenditure patterns, Mexican society, among others, is heterogeneous. This is a reality in the 21st century all around the world. A democratic approach implies a mechanism to recognize this feature. The second reason is linked with the fact that today, in terms of income distribution, societies are uneven. In this sense, if trends in income inequality persist, the plutocratic approach is going to continually be a less accurate reflector of the purchasing power of the majority of people, in both Mexico and in the majority of countries around the world.

Finally, it seems that the use of a single price index based on expenditure averages is also linked with the origins of monetary policy. In practical terms, with the history of the central banks, specifically with their control over the monetary base, and in theoretical terms, with a simplification of the quantity equation of money.⁷ However 21st century societies are more complex in many senses than in the remote past, for example in terms of patterns of consumption. It is time that central banks, including the BANXICO, recognize it. Thus, our preference for a CPI is the seminal one proposed by Arrow, that is, to have a separate CPI for each income level.

⁶ Because of the sample size (10,108 households), in this case there were two households that made up the median. In total, their consumption pattern included 62 goods and services. Therefore, our CPI based on the use of the median of the expenditure distribution contains a “reduced basket” of goods and services.

⁷ According to Fisher (1913: 26), “the equation of exchange may therefore be written: $MV = \sum pQ$ ”. But, in order to simplify it, Fisher (1913: 184) states: “We have found that the general level of prices is determined by the other magnitudes in the equation of exchange. But we have not hitherto defined exactly what a ‘general level’ may mean. There was no need of such a definition so long as we assumed, as we have usually done hitherto, that all prices move in perfect unison. But practically prices never do move in perfect unison. Their dispersion would render impossible the statistical study of general price movements were there no practical method of indicating the general movement. A simple figure indicating the general trend of thousands of prices is a great statistical convenience. It also simplifies our equation of exchange by converting the right side, which now consists of thousands of terms, into a single simple term”.

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