Alternative Consumer Price Indexes for Mexico

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Carlos Guerrero de Lizardi

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Alternative Consumer Price Indexes for Mexico

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Abstract

The Consumer Price Index is a Laspeyres index which uses a plutocratic aggregate method. The Mexican CPI is not an exception. This paper has three purposes. The first purpose is to assemble a democratic CPI. The second purpose is to construct an alternative one using the median of the expenditure distribution. The third purpose is to compile price indexes for each one of the ten expenditure deciles. The concern about the use of a single price measurement has tremendous policy implications. In the last part the empirical results are analyzed in terms of the political economy of price measurement and in terms of the history of the monetary policy.

Keywords: Mexican CPI, political economy of price measurement, monetary policy

JEL: C43, E31, E52

2 Tecnológico de Monterrey. This work was carried out while I was a visiting scholar at the Center for International Development, John F. Kennedy School of Government, Harvard University. I particularly thank Mary Hilderbrand. Thanks are due to Andrew Stiling for his helpful research assistance.
Alternative Consumer Price Indexes for Mexico

“The equation of exchange may therefore be written: MV=∑pQ.” Irving Fisher, (1913, p. 26).

“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, p. 43).

“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.” S.N. Afrait and Carlo Milana (2009, p. 4).

Introduction

The Consumer Price Index (CPI) is a Laspeyres index which 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, p. 43), the household for which the American 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, p. 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.” To some extent its goal resemblance the mission followed by other Central Banks. However, long ago, Prais (1959, p. 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

3 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.” 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”.

3
mind?” This paper has three purposes. The first purpose is to assemble a democratic CPI for Mexico. Drawing on Pollak (1998, p. 70), the second purpose is to construct an alternative one using the median of the expenditure distribution. Following the suggestion made by Arrow (1958, p. 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 section 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 we have done in this paper.
1. Some theoretical aspects of price indexes

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

\[ L = \sum_{h=1}^{H} w_h \sum_{n=1}^{N} S^h_n P_n \]  \hspace{1cm} (1)

where \( w_h \) represents the weight given to the individual index for household \( h \) in computing the average, \( S^h_n \) is the share of household \( h \)’s total expenditure dedicated to good \( n \), and \( P_n \) is the market price relative for good \( n \). A plutocratic formula is:

\[ w_h = \frac{E_h}{\sum_h E_h} \]  \hspace{1cm} (2)

where \( E_h \) is the total expenditure of household \( h \). Equal weight to each household implies a democratic formula:

\[ w_h = \frac{1}{H} \]  \hspace{1cm} (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 reference for an economic policy package, constitutes a practical policy issue.

In the theoretical ground, the problem is that aggregate index numbers are not neutral statistical indicators (Muellbauer, 1974, p. 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.
3. Alternative CPIs for Mexico

The Mexican Central Bank, in contrast to other monetary authorities, is the agency in charge of compiling the CPI. Currently, its weighting base is 2000, updated to June 2002. Unfortunately it is not replicable, for the following reasons:\(^4\)

1) It seems that the Mexican Central Bank made use of two National Income and Expenditure Household Surveys, one open to the public, known as ENIGH, and another carried out for internal purposes, that is, as a pilot exercise. Both surveys were collected by the Mexican Statistical Institute (INEGI).

2) In the 2000 ENIGH 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 labeled as rural by the Mexican Statistical Institute. In contrast, the Mexican CPI refers to urban areas as populations with more than 20,000 inhabitants.\(^5\) In other words, the Mexican CPI classification is not at all consistent, in statistical terms, with those of 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 Mexican Central Bank (2002, p. 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 ENIGH’s expenditure figures for the year 2000. Using all four areas, that is, the whole National Income and Expenditure Survey, these figures represent 89.3% of the personal consumer expenditures, according to the

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\(^4\) According to Ruiz-Castillo, Ley and Izquierdo (2000, p. 18) “in an open society, the dissemination of relevant –albeit controversial– information should be encouraged for the sake of transparency”.

\(^5\) For the North America region, the Canadian CPI is the only one that includes families living in urban and rural private households.
In order to illustrate various expenditure patterns, information about the weight of a “basic basket” defined by the Mexican Central Bank, which includes 80 components of the 315 goods and services that make up the Mexican CPI, is contained in Table 1.

### Table 1

<table>
<thead>
<tr>
<th>“Basic basket” weights, for alternative consumer price indexes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plutocratic weight</strong></td>
</tr>
<tr>
<td><strong>Democratic weight</strong></td>
</tr>
<tr>
<td><strong>Median weight</strong></td>
</tr>
<tr>
<td><strong>1st decil weight</strong></td>
</tr>
<tr>
<td><strong>2nd decil weight</strong></td>
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<tr>
<td><strong>3rd decil weight</strong></td>
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<tr>
<td><strong>4th decil weight</strong></td>
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<tr>
<td><strong>5th decil weight</strong></td>
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<td><strong>6th decil weight</strong></td>
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<tr>
<td><strong>7th decil weight</strong></td>
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<tr>
<td><strong>8th decil weight</strong></td>
</tr>
<tr>
<td><strong>9th decil weight</strong></td>
</tr>
<tr>
<td><strong>10th decil weight</strong></td>
</tr>
</tbody>
</table>

Source: own calculations using data from the National Income and Expenditure Household Survey (ENIGH) for the year 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 Bank of Mexico it was applied an ad hoc program created in the STATA software. The average growth rates of alternative consumer price indexes between the second half of June 2002 and the second half of June 2009 are reported in Table 2.

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6 For the American case, according to Attanasio, Battistin and Ichimura (2007, p. 517), “…the amount by which the CEX underestimates national aggregates is massive (around 35 percent)…”
Table 2
Alternative consumer price indexes, average growth rates between June, 2H, 2002-2009
(Percent per year)

<table>
<thead>
<tr>
<th>Decile</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plutocratic</td>
<td>5.68%</td>
</tr>
<tr>
<td>Democratic</td>
<td>6.27%</td>
</tr>
<tr>
<td>Median</td>
<td>6.93%</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; decil</td>
<td>6.58%</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; decil</td>
<td>6.44%</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; decil</td>
<td>6.44%</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.45%</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.38%</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.26%</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.21%</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.11%</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>6.05%</td>
</tr>
<tr>
<td>10&lt;sup&gt;th&lt;/sup&gt; decil</td>
<td>5.72%</td>
</tr>
</tbody>
</table>

Source: own calculations using data from the National Income and Expenditure Household Survey (ENIGH) for the year 2000, and consumer price index by items, Mexican Central Bank.

Although the same structure of prices was assumed, in terms of equation (1) \( P_n \), the average dynamic of consumer price indexes is 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.\(^7\) Figure 1 illustrates that, if we compare the year with the highest inflation (2009) with the year with the lowest one (2006), the behavior 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. Table 3 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.

\(^7\) According to Ley (2005, p. 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 1
Inflation rates by year
(Percents)

Table 3
Plutocratic, democratic and median consumer price indexes, growth rates, by year
(Percents)

<table>
<thead>
<tr>
<th></th>
<th>Plutocratic</th>
<th>Democratic</th>
<th>Median</th>
<th>Plutocratic bias</th>
<th>Median bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3.55%</td>
<td>4.49%</td>
<td>5.81%</td>
<td>0.95%</td>
<td>2.26%</td>
</tr>
<tr>
<td>2004</td>
<td>3.48%</td>
<td>4.04%</td>
<td>5.33%</td>
<td>0.55%</td>
<td>1.85%</td>
</tr>
<tr>
<td>2005</td>
<td>5.24%</td>
<td>5.39%</td>
<td>6.00%</td>
<td>0.15%</td>
<td>0.76%</td>
</tr>
<tr>
<td>2006</td>
<td>2.17%</td>
<td>2.01%</td>
<td>2.89%</td>
<td>-0.16%</td>
<td>0.72%</td>
</tr>
<tr>
<td>2007</td>
<td>4.86%</td>
<td>5.21%</td>
<td>5.46%</td>
<td>0.35%</td>
<td>0.60%</td>
</tr>
<tr>
<td>2008</td>
<td>7.14%</td>
<td>7.63%</td>
<td>6.45%</td>
<td>0.49%</td>
<td>-0.69%</td>
</tr>
<tr>
<td>2009</td>
<td>7.96%</td>
<td>8.70%</td>
<td>8.83%</td>
<td>0.73%</td>
<td>0.87%</td>
</tr>
</tbody>
</table>

Source: own calculations using data from the National Income and Expenditure Household Survey (ENIGH) for the year 2000, and consumer price index by items, Mexican Central Bank.
4. Concluding comments

The concern about the use of a single plutocratic price measurement has, evidently, theoretical implications, but also has tremendous social and policy repercussions. We 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 consumer price index between the three alternatives we revised: the plutocratic, the democratic, and the one based on the median of the expenditure distribution. The third one presents, in my opinion, the best option, that is, the use of alternative measurements of prices from the angle of the history of monetary policy.

1. 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, a researcher at the U.S. National Bureau of Economic Research. His approach emphasizes the political part of the matter we are dealing with. According to Hulten (2004, p. 10), “like all other aspects of government in a democratic system, a nation’s statistics are ultimately subject to the consent of the governed.” For him, in terms of CPI, this permission depends on many complex factors, such as legitimacy and credibility.

Our 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, Foreword).

Afrait (2005, p. 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 indices…” Our corollary is that, for the majority of Mexican people this “sense of equivalence” is poor because 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.

2. In compiling a CPI, it is difficult to come to a consensus on what the weights should be. Our 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. There are two good reasons to use the democratic price index. The first reason 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 word. A democratic approach means 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.

3. The origins of monetary policy are linked, 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. In this sense, the use of a single plutocratic index is just an expression of the historical evolution of our economies. Today, societies are much more complex in many senses, for example in terms of patterns of consumption. It is time that Central Banks, including the Mexican one, recognize it. Thus, our preference for a CPI is
the seminal one proposed by Arrow (1958, p. 79), that is, to have a separate consumer price index for each income level.
References

Mexican Central Bank (2002), Metodología para el Cambio de Base del INPC.