Comments on

Learning from Potentially-Biased Statistics

by A. Cavallo, G. Cruces, and R. Perez-Truglia
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Stefan Nagel
University of Michigan, NBER & CEPR

This is an interesting paper and it studies a question that has not received much (empirical) attention. For the most part, we take it for granted that individual decision-makers in the economy have access to high-quality data on important macroeconomic variables such as inflation rates or GDP growth rates. While macroeconomists have paid some attention to noise in official statistics, and the effect of data revisions, we know little about the effects of intentional manipulation of official macroeconomic statistics. This paper provides valuable new evidence on this question.

For thinking about the potential consequences of data manipulation, it is useful to first reflect on the benefits associated with government provision of macroeconomic statistics. Since private-sector agents could potentially learn from their own observations and through social learning channels, it is not entirely obvious how important government provision of macroeconomic information really is. While some exceptions have been noted in the literature, better public information is typically thought to be welfare-improving (e.g., Hellwig 2005). Furthermore, existing evidence suggests that private-sector agents rely to a substantial extent on official statistics when forming perceptions about current macroeconomic conditions and expectations about conditions in the future. In an interesting study of a software bug that caused an error in the inflation statistics in Ecuador for several months, Carrillo and Emran (2012) show that the error had a substantial effect on expectations.

The example of Ecuador is one of an accidental error, which is quite different from the intentional manipulation considered in this paper. In the case of Argentina considered here, the government's intentions and its attempts at manipulation were probably quite clear—at least to parts of the population. The paper provides quite convincing evidence that people in Argentina were not naively misled by the government's manipulation. In terms of the posterior mean of the perceived inflation rate, individuals appeared to do quite a good job in de-biasing the information provided in official inflation statistics. The effects on the posterior mean are the focus of the analysis in this paper. As I will discuss in more detail below, manipulation of statistics could potentially also have interesting and important effects on inflation rate uncertainty, not just on the posterior mean.

Asymmetric reaction to inflation rates. In the online survey experiment, the authors present individuals with different official and unofficial inflation rates and they elicit their inflation perceptions. Roughly speaking, subjects react to an official inflation rate of x% in a similar way as to an inflation rate from unofficial

sources of x+10%. Thus, the difference in their reaction is roughly in line with the magnitude that the actual bias in the reported CPI inflation rate seemed to have. On average, individuals' processing of information seems to be quite well aligned with the authors' simple Bayesian model. One interesting pattern—and one that is less straightforward to understand—is the asymmetry in individuals' reaction to inflation rates at different levels. Varying the inflation rate that individuals are treated with from 10% to 20% (official or unofficial) produces a much smaller difference in subjects' perception of the true inflation rate than moving from 20% to 30%. This effect does not quite fit with the authors' normal prior-normal likelihood Bayesian model. To generate such an asymmetric reaction in the model, one probably needs to introduce some non-linearity, e.g., in the form of an upper bound of the bias. For example, I suspect that if the bias was bounded above at zero, such an asymmetric reaction would arise within the model.

Interpretation of treatment. In the experiment, subjects are treated randomly with one of six inflation rates. Each of those represents an inflation rate that was actually reported by a government agency or a private-sector institution. The official inflation rates from the government agencies differ because they refer to different inflation indices (CPI, GDP deflator, nominal wage growth). During the time period in question, the differences between these rates were substantial. Because the official rates used in the treatment are actually reported ones, just for different types of indices, the authors consider their treatment "non-deceptive." This may not be an entirely accurate characterization because subjects are not being told which official inflation index the inflation rate they are treated with refers to. Since the CPI is the index that subjects are presumably most familiar with, most subjects probably think that the rates they are treated with are CPI inflation rates. In this sense, the experiment is effectively deceptive. Moreover, for the experiment to work as intended, this kind of deception is actually necessary. The authors want subjects to think that the official rates they are treated with are CPI inflation rates. The authors' interpretation of the findings is based on the assumption that this deception was successful. However, since one cannot be sure that the deception worked perfectly, the reliance on deception complicates the interpretation of the results. When subjects are presented with, say, a high official inflation rate, do they infer, to some extent, that this could be nominal wage growth rather than CPI inflation? And the perceived inflation rate that they report to the experimenters, is this now their perceived CPI inflation rate or the perceived rate for some other basket/index?

Price controls. The authors' consumer-intercept survey shows little evidence that the government price controls that applied to certain types of products affected people's perceived goods-specific inflation rates. Individuals' recalled price changes are similar for controlled and non-controlled products. The authors' conclusion is that the price controls did not affect people's inflation perceptions. While this is a plausible interpretation of the evidence, other interpretations are possible. In particular, while individuals may not be able to correctly recall product-specific price changes, it is still possible that price controls had an effect on the perception of inflation overall. Individual's recollection of the average price changes they experienced could very well be affected by the price

controls even though they can't quite recall correctly any of the product-specific price changes anymore.

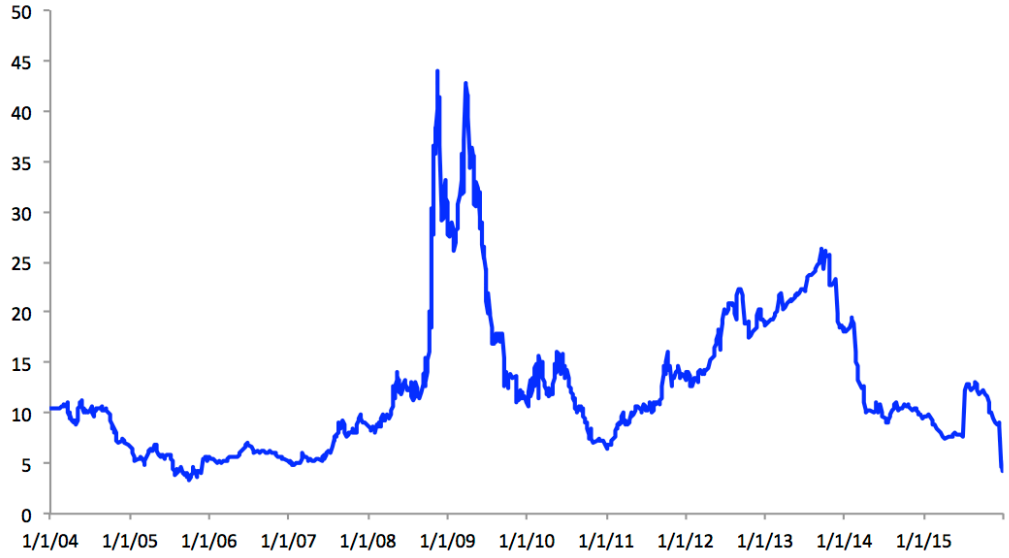
The authors conclude from their evidence that "the government's attempt to manipulate the data, either through the aggregate price index or with targeted price controls, was both ineffective and counterproductive." This claim seems to be largely true, given the evidence in the paper, if one interprets it as meaning that the government's manipulation had no effect on the mean of the perceived inflation distribution. It would be incorrect, however, to conclude from this that the government's manipulation had no effect on the perceived inflation distribution at all. Furthermore, the fact that Argentina had a huge amount of inflation-linked bonds outstanding means that the manipulation may have resulted in a substantial wealth transfer away from inflation-linked bondholders.

Inflation uncertainty. While the government's manipulation had little effect on the mean of consumers' subjective posterior distribution of inflation, the manipulation could have had a substantial effect on consumers' inflation uncertainty. The authors do not focus on uncertainty effects and their experiments are not designed to measure effects on uncertainty, but the uncertainty channel could be an important. As the authors' model shows, even with a fixed bias, the presence of the bias raises the posterior uncertainty about the inflation rate. The level of uncertainty would be further magnified if one extended the model to allow for a random component in the bias. An elevated level of inflation uncertainty could lead to adverse economic consequences. For example, with more noise in the public inflation signal, firms might put more weight on idiosyncratic signals, leading to greater price dispersion and, as a consequence, misallocation. Price dispersion indeed seems to have gone up following the manipulation: Drenik and Perez (2015) find an 18% increase in price dispersion in Argentina following the manipulation of the official inflation rate. It would be interesting to study in more detail to what extent distortion of official inflation rates raises inflation uncertainty.

Inflation-linked bonds. Even without any effect on consumers' perceived inflation distribution, the policy could still be an "effective" one from the viewpoint of a (short-termist) government (and a nasty surprise for inflation-linked bond holders). At the start of the manipulation period, Argentina had about $50bn worth of inflation-linked debt outstanding (Webber 2008). Inflation-linked bonds are supposed to protect investors' real wealth against inflation, but they only do so if the inflation rate used in the calculation of bond payments isn't manipulated.

On each coupon date t, inflation-linked bonds pay a contractually fixed coupon rate times the ratio CPI(t)/CPI(0), where CPI(t) is the CPI level at the time of the coupon payment and CPI(0) is the CPI level at the time the bond was issued. Similarly, the principal paid back to bondholders at maturity T is a contractually fixed face value times CPI(T)/CPI(0). With $50bn of inflation-linked debt outstanding, downward manipulation of the inflation rate by 10% per year saves the government $500m in coupon and $5bn in accrued principal per year. In present value terms, if we take a 10-year zero coupon bond for a back-of-the-envelope calculation, a 10% downward manipulation of the CPI inflation rate over the life of the bond (that is unanticipated at the time of the bond issue) would amount to a 50% loss for bondholders and a gain of similar size for the government.

Figure 1: "Real" yield of Argentina's inflation-linked bonds



Source: Datastream (mnemonic BEMA0Y)

Figure 1 presents the "real" yield of Argentine's inflation-linked bonds (constructed by Datastream as a weighted average across all outstanding maturities). In the case of Argentina the usual calculation of a real yield does not deliver the real yield anymore once the government starts manipulating the inflation statistics. Instead, the "real" yield becomes

True real yield + true inflation rate – manipulated inflation rate

A downward bias in the official inflation rate thus raises the "real" yield that the usual calculation will deliver. In the extreme case where the government manipulates the CPI inflation rate to zero, the "real" yield would equal the nominal yield on a nominal bond. In this case, the inflation protection has become completely ineffective and the bond trades like a nominal bond. As Figure 1 shows, the bond market is moving towards pricing inflation-linked bonds more like nominal bonds as the "real" yield rises from around 5% in 2007 to close to 15% in 2008, consistent with the bias of about 10 percentage points in the official CPI inflation rate.[1]

Thus, from the viewpoint of the government, the manipulation of the CPI may have been highly effective in terms of its fiscal consequences, even if the policy did not succeed in affecting the mean of individuals' perceived inflation distribution.

[1] The big jump in the "real" yield in late 2008 coincides with the announcement of Argentina's government to nationalize private pension plans. This rise in yields thus likely reflects different concerns, not the manipulation of the inflation rate.

Conclusions. Overall, this paper provides useful evidence on how individuals dealt with manipulated official statistics in Argentina. Unofficial statistics are helpful as a substitute for information from official sources and people are quite good in de-biasing the numbers reported in the official statistics. Even so, it is important to keep in mind that the manipulation of the inflation rate in Argentina may have done harm in ways that are not studied in this paper. Manipulation could have substantial effects on inflation uncertainty with possibly detrimental welfare consequences. Furthermore, manipulation may have resulted in a substantial wealth transfer away from inflation-linked bondholders.

References

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