

Measures of core inflation in Switzerland:

An evaluation of alternative calculation methods for monetary policy

(English summary)

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In this study, four widely employed methods for calculating core (or underlying) inflation are discussed and implemented based on disaggregated data of the Swiss consumer price index (CPI). Attention focuses on the question as to how useful the calculated measures of core inflation are as indicator variables for monetary policy. The study covers the time period from 1978 to 2005. The methods of calculation under consideration are (a) the exclusion method, which completely removes highly volatile components such as food and energy from headline CPI inflation, (b) robust estimators of core inflation, such as trimmed means and the weighted median, (c) approaches with volatility-dependent weights, which comprise the method developed by the Bank of Canada on the one hand and the so-called Edgeworth index on the other, and (d) the dynamic factor index. What all of these methods have in common is that they rely on statistical criteria to filter out erratic and idiosyncratic price movements from headline CPI inflation in order to provide the central bank with an indication of the evolution of the general trend in inflation. Although a number of specification possibilities exist within each of the four methods, in general they excel by their relatively simple implementation and a high degree of transparency.

The study shows that, by and large, the methods for calculating core inflation under examination can be viewed as useful tools for price analysis. They serve as a systematic framework that enables the central bank to detect – albeit from different perspectives – transitory price disturbances and price movements specific to particular goods or sectors and, thereby, to identify the driving forces behind developments in the CPI. In addition, robust estimators of core inflation give an in-depth insight into the cross-sectional distribution of price changes of CPI items. Scrutinising the causes of short-run volatility in Swiss headline CPI inflation shows that, at least in the recent past, price disturbances can be attributed to a large extent to oil products and unprocessed food, such as fruit and vegetables. Moreover, a substantial amount of short-run volatility also came from apparel and footwear, due to base effects connected with methodological changes in the treatment of sale prices. In contrast, there are barely any price disturbances stemming from services in housing, healthcare, education and culture.

However, the study also makes it clear that, in four particular cases, some of the methods for calculating core inflation are not able to properly discern between short-run fluctuations and price movements with a permanent effect on the general trend in inflation. First, none of the statistical methods under consideration are capable of sufficiently removing the effects of so-called generalised price shocks from headline CPI inflation. A typical example is the introduction of the value-added tax in 1995, which more or less affected all consumer goods in the CPI to a similar degree. Second, the exclusion method and the robust estimators prove to be problematic, as they remove certain price movements completely from headline CPI inflation. As a consequence, not only their volatile components are excluded, but also relevant information on the trend in inflation inevitably is lost. Third, the robust estimators manifest grave difficulties in dealing appropriately with goods prices that are not highly volatile, but, over a longer period of time, follow a path which substantially diverges from the general trend in inflation. Examples of this are entertainment electronics, telecommunication services and electricity, the costs of which have been retreating due to ongoing technological progress and market liberalisation. Normally, these price movements are removed from headline CPI inflation when robust estimators are calculated, in spite of their medium to long-run nature.

Fourth, it turns out that the exclusion method used is unable to cope with a world economy characterised by large shifts in relative prices for several years. More specifically, strong growth in China, India and other Asian economies is accompanied by soaring demand for raw materials, contributing to a boom in prices of oil and metals. At the same time, many manufactured goods, such as apparel and electronic devices, undergo an ongoing decline in prices, because these countries appreciably increase exports and, thus, intensify competition in the world markets. The exclusion method, as it is usually applied, does not sufficiently take account of these shifts in relative prices, since the effects of rising energy prices are removed from headline CPI inflation, but not the dampening effects of manufactured goods on inflation. By treating the two sorts of effects in an asymmetrical manner, although they ultimately reflect the same economic circumstances, the resulting measures of core inflation convey a not particularly well-balanced picture of the general trend in inflation. Moreover, recent experience has suggested that the information content of these measures of core inflation is also impaired by the exclusion of food prices. Due to the fact that agricultural products, such as grain and sugar cane, have been used more and more to produce fuel (ethanol), relative prices of numerous foodstuffs have increased globally. At the same time, world market prices of dairy products and meat are on the rise in the wake of changing eating habits in emerging market economies, notably in China and India. These developments are inherently medium and long term so that the calculation of core inflation based on the exclusion of the involved food prices appears questionable.

In order to evaluate the different measures of core inflation, I analyse their correlation structure and conduct a set of statistical tests to formally assess their information content for

monetary policy. In particular, the assessment looks at whether the measures of core inflation under examination are unbiased with respect to headline CPI inflation and whether they exhibit a significantly lower short-run volatility. In addition, the question is considered as to whether they behave as attractors of headline CPI inflation and whether they contain relevant information for forecasting future inflation. Given a structural break in the Swiss inflation process, dated in May 1993, the evaluation is based on two separate sub-samples, the first ranging from September 1978 to May 1993 and the second from June 1993 to December 2005. The results derived from the statistical tests conclude that none of the measures of core inflation satisfy all the empirical criteria desirable from a monetary policy perspective. However, attention should be paid to the fact that the results of the evaluation essentially depend on the choice of the sub-sample. In other words, some measures of core inflation possessed diverging empirical properties before and after the transition to a low-inflation environment in 1993.

As the evaluation shows, the criterion of unbiasedness is not met by all of the measures of core inflation. Noticeably, the exclusion method measures and the Edgeworth indices suffer from a significant bias with respect to headline CPI inflation. However, the bias has different causes: in the case of the exclusion-based measures, the bias arises from eliminating certain goods completely and permanently from headline CPI inflation, thereby losing relevant information on the trend in inflation, as well. The bias of the Edgeworth indices, meanwhile, is rooted in the fact that the calculation method totally disregards the expenditure weights of the underlying CPI basket. As far as reduction in short-run volatility is concerned, it turns out that almost every measure of core inflation is substantially smoother than headline CPI inflation. Exceptions are the exclusion-based measures in the sub-sample from 1993 to 2005. Mainly because they are impaired by the above-mentioned base effects of apparel and footwear, no reduction in short-run volatility is detectable. Concerning the behaviour as an attractor of headline CPI inflation, in the sub-sample from 1978 to 1993, this property can be found solely with the dynamic factor index, whereas in the sub-sample from 1993 to 2005, the criterion is satisfied by most of the measures of core inflation. Again, some measures of core inflation perform poorly, in particular the exclusion-based measures, the weighted median and the Edgeworth indices. Eventually, the evaluation makes it clear that the measures of core inflation under examination hardly embody any relevant information on the future path of headline CPI inflation. As the results of a forecasting experiment indicate, a random-walk model or a simple mean-reversion model yield forecasts that are normally more accurate than a forecast equation based on measures of core inflation. Accordingly, these measures cannot be considered appropriate tools for assessing future risks to price stability.

Ultimately, three recommendations can be derived from the results of the present study. First, it appears advisable to monitor a whole range of measures of core inflation and to treat them as complementary pieces of information. In so doing, it would be taken into account that

none of the measures of core inflation emerge as a dominant performer and, therefore, could be viewed as the “best” indicator of the trend in inflation. However, a thorough interpretation of observed price developments always requires that – besides measures of core inflation – the entire economic environment should be incorporated into the analysis. Second, one should refrain from using measures of core inflation in order to assess future risks to price stability. Since measures of core inflation are deduced from headline CPI inflation, they generally do not embody any relevant information on price developments in the medium and long-run. Again, to assess future risks to price stability in an adequate manner, a broadly based macroeconomic analysis is indispensable. This analysis should necessarily encompass the entire spectrum of indicators drawn from labour, goods and financial markets, as well as forecasts derived from economic models. Third, it is recommendable to re-examine the measures of core inflation calculated by various methods with respect to their empirical properties in regular intervals. In so doing, it is taken into consideration that the information content of measures of core inflation for monetary policy might change over time. Furthermore, the results of the evaluation also give clear evidence that the measures of core inflation under examination do not satisfy all the desiderata. However, there is no alternative to measures of core inflation when an assessment of the general trend in inflation is needed in real time. Consequently, a great deal of importance is attached to the periodical evaluation of the different calculation methods, as it makes sure that the specific pros and cons of the resulting measures of core inflation are well-known and that monetary policymakers have the most reliable indicators at their disposal when assessing the general trend in inflation.