Trend inflation estimates for Thailand from disaggregated data

Pym Manopimoke*, Vorada Limjaroenrat

Puey Ungphakorn Institute for Economic Research Bank of Thailand, Address: 273 Samsen Road, Phra Nakhon, Bangkok 10200, Thailand

ARTICLE INFO

JEL classification:
C33
E31.

Keywords:
Disaggregated prices
Inflation
Outlier adjustment
Stochastic volatility
Time-varying parameters
Trend-cycle decomposition
Unobserved components.

ABSTRACT

This paper constructs a new trend inflation measure for Thailand based on the multivariate unobserved components model with stochastic volatility and outlier adjustments (MUCSVO) of Stock and Watson (2016). Similar to core inflation, the MUCSVO produces an estimate of trend inflation utilizing information in disaggregated data, but also allows for time-varying weights that depend on the volatility, persistence and comovement of the underlying sectoral inflation series. Based on the empirical results, the majority of sectoral weights show significant time-variation in contrast to their relatively stable expenditure shares. Volatile food and energy sectors that are typically excluded from core inflation measures also turn out to help explain approximately 10 percent of MUCSVO trend inflation rate movements. Compared against other benchmark trend inflation measures, we show that the MUCSVO delivers trend estimates that are smoother, more precise, and are able to forecast average inflation over the 1–3 year horizon more accurately both in-sample and out-of-sample, especially since the year 2000.

1. Introduction

Since May 2000, the Bank of Thailand (BOT) adopted an explicit inflation targeting framework, making the mandate of price stability an overriding objective for monetary policy. The task of trend inflation measurement, which provides a prediction of the general direction of future inflation, thus became particularly critical towards the BOT’s policy assessment and decision-making process. However, being able to accurately extract underlying inflationary pressures from overall inflation rate movements is no trivial task. Given that aggregate inflation is influenced by multiple sources of ‘noise’, it is a challenge to separate out long-term persistent movements that drive the ‘signal’ or trend, from transitory fluctuations in the data that influence the short-term cycle.

Changing inflation dynamics also complicates the task of trend inflation measurement. For Thailand, many authors report a sizeable decline in the level, volatility, and persistence of CPI inflation since the year 2000, as well as a sustained divergence between actual and core inflation (Chantanahom et al., 2004; Khemangkorn et al., 2008). It has been suggested that these occurrences were a result of structural changes in the Thai economy, whether it be from the adoption of an inflation targeting framework by the Bank of Thailand (BOT), or globalization pressures that intensified during that time (Manopimoke and Direkudomsak, 2015). Furthermore, the underlying driving factors for Thai inflation appears to have evolved over time as well. Since the year 2000, Manopimoke and Direkudomsak (2015) find that a global output gap has replaced its domestic counterpart, while since the global financial crisis, oil price changes have become a more dominant driver of Thai CPI inflation.

In light of such issues, this paper investigates whether existing trend inflation measures for Thailand can be improved upon by utilizing a method that allows the ‘data to speak’ as much as possible. In doing so, we estimate a new trend inflation measure for Thailand based on the multivariate unobserved components model with stochastic volatility and outlier adjustments (MUCSVO) as proposed by Stock and Watson (2016). The key advantage of the model is that it distinguishes between common and sector-specific trend and transitory factors, and allows persistent movements in the disaggregated sectoral series to affect overall trend inflation rate movements through time-varying rather than fixed weights. Since these weights depend on fundamental changes in the volatility and persistence of the sectoral inflation series as well as the degree of co-movement among sectors, trend estimates from the MUCSVO should adapt to changing inflation dynamics more quickly and adequately than existing measures which are more rigid.

* The authors would like to thank Piti Disyatat, Pisut Kulthanavit, Warapong Wongwachara, and seminar participants at the Puey Ungphakorn Institute for Economic Research 2016 Workshop and the Bank for International Settlements 2017 Workshop of the Asian Research Networks for helpful comments and discussion. The views expressed in this paper are those of the authors and do not necessarily reflect the position of the Bank of Thailand.

Corresponding author.
E-mail address: pymm@bot.or.th (P. Manopimoke).
Furthermore, the MUCSVO also incorporates a model-based treatment of outliers which, as mentioned by Stock and Watson (2016), makes the model particularly well-suited for the task of real-time trend estimation. For a small open economy such as Thailand, this feature should be extremely helpful towards identifying the underlying trend amidst volatile price movements that often stem from external price shocks.

Throughout the empirical investigation, we focus on examining the following three questions that are central to the task of trend inflation measurement. First, we evaluate whether the use of disaggregated data in the MUCSVO approach can help improve upon univariate estimates of trend inflation that are computed from headline inflation alone. Second, if there are gains to be had from the use of disaggregated data, are the implied weights on sectoral components time-varying and how do they compare against their static expenditure share weights that are used to construct core inflation? To examine these two questions in further detail, we also conduct in-sample and out-of-sample forecasting exercises to evaluate how the resulting MUCSVO trend compares to other benchmark measures of trend inflation when it comes to forecasting headline inflation at horizons that are relevant to policymakers. Last, given that the estimated coefficients of the MUCSVO can provide information about the underlying characteristics of sectoral inflation series, we hope to gain improved insight about the changing nature of Thai inflation dynamics over past decades.

A preview of our main findings are as follows: (i) the MUCSVO trend estimates are smoother and substantially more precise than univariate measures of trend inflation. In particular, MUCSVO-based estimates of the root mean squared estimation error are roughly half of its univariate counterpart; (ii) the common trend component explains the majority of Thai inflation rate movements well up until the adoption of an inflation targeting regime in the year 2000, but its role became muted relative to particularly since the year 2000.

In-sample and out-of-sample forecasting exercises to evaluate how the resulting MUCSVO trend compares to other benchmark measures of trend inflation when it comes to forecasting headline inflation at horizons that are relevant to policymakers. Last, given that the estimated coefficients of the MUCSVO can provide information about the underlying characteristics of sectoral inflation series, we hope to gain improved insight about the changing nature of Thai inflation dynamics over past decades.

The paper is organized as follows. Section 2 provides a brief overview of Thai inflation dynamics and existing methods used to construct trend inflation estimates for Thailand. Section 3 introduces the MUCSVO model of Stock and Watson (2016). Section 4 presents and discusses the estimation results and Section 5 conducts the forecasting exercise. Section 6 concludes.

2. Thai inflation dynamics and trend inflation measurement

Previous studies often recognize that Thai inflation dynamics underwent a significant change during the year 2000. From 1995 to 1999, the average level of headline CPI inflation was as high as 4.2 percent. The adoption of an inflation targeting framework in May 2000 by the Bank of Thailand (BOT) however has gained unprecedented success in lowering both the levels and volatility of Thai inflation. Since then, the average inflation rate dropped to a low level of 2 percent. Based on various studies, the improved behavior of Thai inflation is in large part due to the BOT’s success in stabilizing or ‘anchoring’ long-term inflation expectations (Buddhari and Chensavasdijii, 2003; Manopimoke and Direkudomsak, 2015).

In a country that adopts an inflation target such as Thailand, the issue of trend inflation measurement is truly central to monetary policymaking. To achieve and maintain low and stable inflation, an accurate measure of the trend is needed to gauge underlying inflationary pressures that will persist into the future. However, aggregate inflation is often affected by a myriad of temporary and volatile shocks, with complicated dynamics that change over time. Therefore, the problem of filtering out the transitory shocks or the ‘noise’ from the data to gain an estimate of the ‘signal’ that represents trend inflation, becomes a particular challenging task.

Overall, there are two main approaches to the signal extraction problem. The first approach involves down-weighting or excluding the most volatile and non-persistent sectors from aggregate inflation, which turn out to be components that are mostly influenced by supply-side shocks. Measures of core inflation that exclude food and energy prices are standard examples. For Thailand, a core inflation measure that excludes rent prices from CPI inflation is also often used as an operational guideline for trend inflation. This is because the Thai housing market can at times be heavily influenced by special government policy measures, divorcing underlying price dynamics from true market forces. Against similar reasonings, underlying inflationary pressures are also often gauged from CPI inflation that excludes administered price items (CPI-xMeasure). Since 1998, administered price items accounted for more than 30 percent of Thailand’s CPI basket - a sizable share that makes Thailand a country that imposes the highest degree of price controls in the world (Peerawatthanachart, 2015).

Core inflation is a widely used measure for trend inflation, particularly because it is straightforward to compute and transparent in the manner in which it can be communicated to the public. However, it has been criticized on the grounds that the chosen set of excluded components are typically fixed, even when their influences can vary across time. In response, Bryan and Cecchetti (1994) introduced a trimmed mean or median measure, which is also based on an exclusion approach but allows the set of removed components to change over time. Based on the distribution of price changes, the sectors excluded can be removed in a symmetrical or asymmetrical fashion. For Thailand, the BOT often employs an asymmetric trimmed mean measure by removing 12 and 6 percent of the items with large relative price changes from the lower and upper end of the price distribution respectively.

The second signal extraction approach is based on times-series smoothing methods. According to various forecasting exercises, these time-series models have been shown to forecast inflation well, implying that they can provide a good representation of the underlying trend. Some examples are the first-order integrated moving average (IMA(1,1)) model of Nelson and Schwert (1977) or the random walk model for four-quarter average inflation as proposed by Atkeson and Ohanian (2001). Building upon these models, Stock and Watson (2007) propose a univariate unobserved components model for inflation with stochastic volatility (UCSV) which treats the trend

---

1 Econometricians typically rely on judgment-based and ex-ante adjustments of outliers prior to trend inflation estimation. However, this approach is not feasible for real-time trend estimation because it requires knowledge of whether a large change will mean-revert. Ignoring outliers altogether though is not recommended as it runs the risk of mistaking a single large outlier as a systematic increase in the short-run volatility of inflation.

2 First, the BOT inflation targeting framework corresponded to maintaining core inflation within a range of 0–3.5 percent. However, this range was later narrowed to 0.5–3.5 percent in 2009. Then, to allow the target to better reflect changes in the cost of living, the BOT altered its inflation target in 2015 to correspond to headline CPI inflation at 2.5 percent with hands of plus and minus 1.5 percent. For example, during the early 2000s, tax incentives were implemented to boost recovery in the real estate market. As a result, consumers moved away from rental accommodation to home ownership, causing significant downward pressure on housing rent that was sustained throughout the 2002–2004 period. Note that the housing sector also corresponds to approximately a fifth of Thailand’s core inflation basket, exerting a sizable influence on inflation. Thus, removing rent prices from headline inflation can be a practical solution towards avoiding significant price distortions.

3 Primarily, price controls are implemented by the Thai government to prevent large swings in inflation, such as by actively using oil fund levies and fuel excise taxes as instruments to stabilize domestic oil prices. In practice however, adjusting government instruments in response to global commodity price cycles has resulted in large fluctuations in retail oil prices, as can be observed in July 2005 when the government suddenly increased its collection of oil funds to reduce diesel price subsidies. Since the global financial crisis, the Thai government has attempted to restructure domestic fuel pricing by reducing price subsidies as well as by allowing energy prices to naturally respond to market forces.
دریافت فوری متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات