The anchoring of inflation expectations in Singapore

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Introduction

The credibility of a central bank is probably one of the most important factors determining whether the pursuit of an anti-inflation policy is associated with significant output and employment losses. When a central bank lacks credibility, the public will not believe that the central bank will do what it says it is going to do. As a result, inflation expectations in the private sector will exceed the central bank's inflation target. These expectations will feed into the wage and price decisions of households and firms, causing businesses and workers to demand higher prices for their goods and services. The resulting increase in general prices complicates the environment for monetary policy, making the central bank's job more difficult.

The central bank therefore needs to take the public's expectation of inflation into account when determining the stance of monetary policy, in order to achieve its objective. Moreover, central banks need to assess the credibility of their monetary policy on an ongoing basis. A key to this ongoing assessment is knowing the inflation expectations of the general public and their consistency with the price stability objective of the central bank. In this respect, measures of expected inflation play an important role in any such exercise, given that the inflation expectations of firms and households over various horizons influence their wage and price decisions, thereby affecting the inflation process.

While low inflation is an objective of monetary policy, it is equally important that the low inflation is not achieved artificially through administrative means at the cost of relative price distortions.

Hence this short note has two parts. The first part analyses the behaviour of inflation expectations of the Singapore economy by market analysts as derived from qualitative survey data and the extent to which they are well anchored. The second part reviews the detailed data underlying the consumer price index to examine the degree of flexibility of relative prices in Singapore.

Inflationary expectations from qualitative responses

One way to gauge inflation expectations would be to use survey data. We use the monthly Asia Pacific Consensus Economics survey, which interviews over 180 prominent Asia-Pacific financial and economic forecasters for their estimates of a range of variables. The monthly Asia-Pacific Consensus survey provides us with one-year-ahead expected inflation numbers. The survey also provides, on an annual basis, five-year-ahead forecasts of CPI inflation. These CPI forecasts will provide a basis for our analysis.

Understanding the process underlying the formation of inflation expectations could greatly enhance the design and conduct of monetary policy. For example, it could enable us to understand what types of institutional arrangements and communication policies help the

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central bank retain credibility for meeting its price stability objective, especially when large and persistent relative price changes ripple through the inflation data.

To that end, unlocking some of the mysteries about inflation expectations may help central banks decide whether and how to incorporate a numerical inflation objective into the monetary policy process. Some central banks have used these numerical objectives as a tool to help anchor inflation expectations. Economists refer to a numerical inflation objective as a "commitment device". But whether or not there is an explicit numerical objective, anchoring inflation expectations requires a central bank to keep inflation low and stable, to reinforce its commitment to price stability, and to clearly communicate its policies in pursuit of that commitment.

Figure 1 below provides a schematic diagram of the interaction between inflation expectations and the conduct of monetary policy. The loop on the right shows that inflation expectations are affected by the credibility of the central bank, which is in turn dependent on the commitment and track record of the central bank and the effectiveness of its monetary policy. The loop on the left reflects initiatives by MAS in recent years to enhance its communication and increase its transparency and accountability. It shows how the credibility of the central bank is enhanced through greater accountability while improved communication helps to anchor inflation expectations.

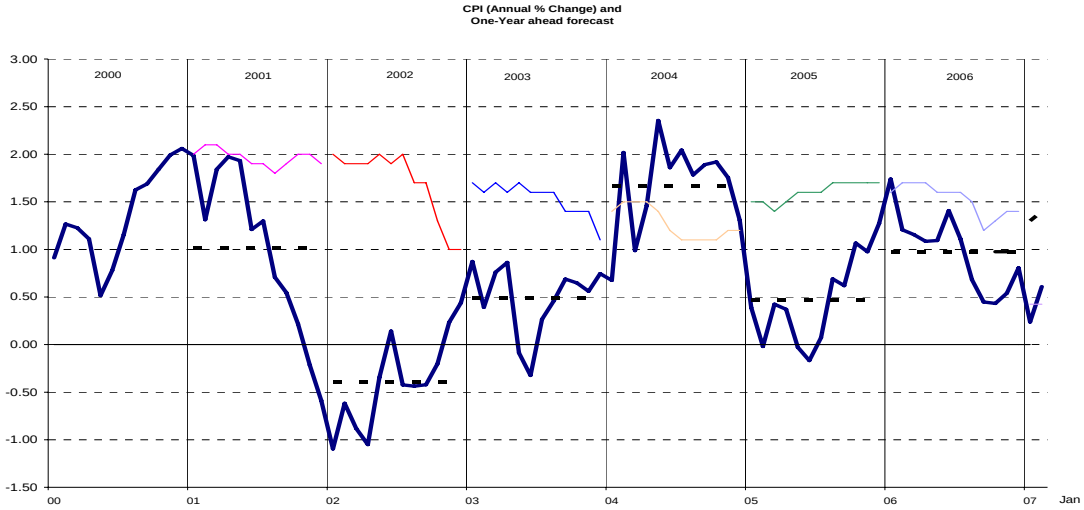
Figure 1

Anchoring expectations and effective monetary policy

Indeed, if we plot the one-year and long-term inflation forecasts extracted from the survey data (see Charts 1 and 2), there is a strong indication that inflation expectations tend to hover between 1% and 2%. Chart 2 plots the five-year CPI inflation forecasts from 1999 to 2006. It shows that the profile of inflation forecasts has flattened in recent years to around 1.5%, providing some evidence that inflation expectations have become better anchored as a result of the recent initiatives to enhance communication, transparency and accountability.

Chart 1

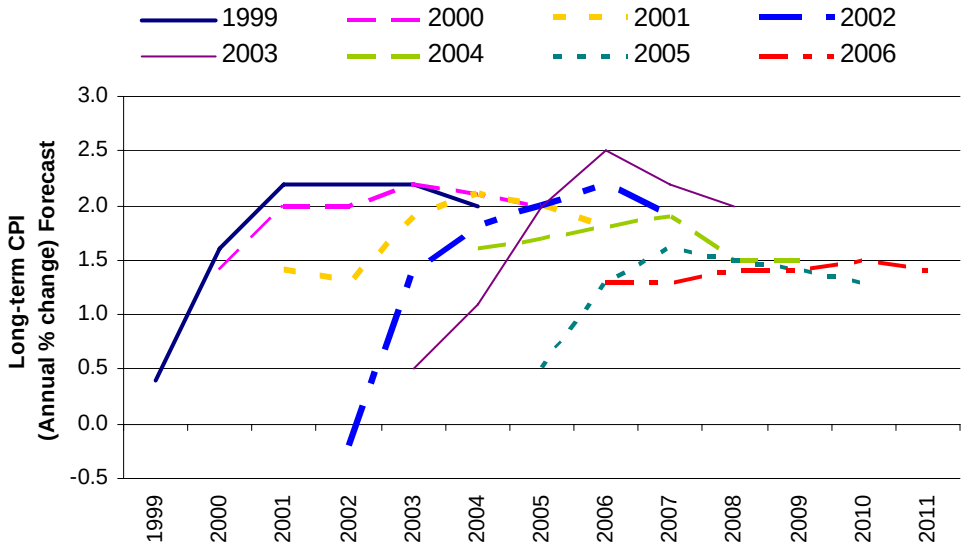
One year ahead CPI inflation forecast



Thin lines show the one year ahead forecasts of CPI Inflation from the year before. Dotted lines represent the average CPI inflation rate for the whole year. The thick solid line is the actual CPI inflation.

Chart 2

Long term (five-year) CPI inflation forecasts



Flexibility in relative prices

We next assess the degree of flexibility in Singapore's relative prices. In particular, we show that relative prices are highly flexible, implying that there have been few distortions behind the low inflation expectations in Singapore.

It is important to distinguish between inflation and a relative price increase. People often see price increases in some of the items they buy and associate that with higher inflation. However, inflation is a condition that affects all prices, not just a subset of prices of particular

goods and services. Changes in relative prices – that is, the prices of individual items relative to the average of all prices – are quite different from inflation. Changes in relative prices reflect changes in the supply and demand conditions in specific markets. Sometimes a particular item experiences such a large and persistent relative price change that it temporarily ripples through the inflation data. The obvious example is the increase in oil prices. The sharp increase in energy prices in the last few years has greatly increased the costs faced by businesses and households in many countries. It is important to allow individual prices to move up and down relative to one another so as to ensure that inflation is not unduly biased in one direction. Such changes in relative prices are essential to ensure that economic resources are allocated efficiently within the economy.

We assess the pattern of price changes in Singapore by drawing on micro-level CPI data. The data set used is the monthly CPI data at the five-digit level provided by the Department of Statistics. The coverage is from January 1998 to August 2006. Excluding accommodation-related items and new items introduced during the CPI rebasing in 2004, a total of 136 price series or about 86% of the CPI basket are analysed. From this rich data set, several stylized facts support the view that relative price changes are quite flexible in Singapore.

The first set of results relates to the frequency of consumer price changes in Singapore. The "frequency approach" employed by Aucremanne and Dhyne (2004) was adapted for this exercise. This methodology proxies flexibility in prices by the frequency of price changes (F), which is defined as the number of observations of price changes divided by the total number of observations. The formulae to determine the frequency of price changes for product i and the aggregated frequency of price changes for a product group j are as follows:

$$F_i = \frac{\sum_{t=2}^{T} DUM_{i,t}}{T-1} \text{ and}$$

where: *DUMi is a dummy variable which takes the value of "1" if the price of product i has changed in time period t and "0" otherwise*

T is the time span of the sample

nj is the number of products observed in product group j

Following Bils and Klenow (2004), the implied average price duration (D) for each product, defined as an uninterrupted period during which the price index remains unchanged, is inversely related to the frequency of price changes, ie D = 1/F. This assumes that price changes occur at discrete time intervals.

Chart 3 shows the distribution of price duration of the 136 price series in the CPI basket. A significant portion of the CPI basket is characterised by fairly frequent price changes, with almost 60% of the basket exhibiting a short price duration of one to two months, and close to 80% experiencing price adjustments at least once in six months. Overall, the average price duration for all items is 1.7 months, while the weighted average price duration is 3.6 months.

Next, we also found that price decreases are just as common as price increases, and the average magnitude of price decreases is only slightly smaller than that of price increases. Table 1 shows that there are varying frequencies of price changes across different product groups during the period from January 1998 to August 2006.

Chart 3

Distribution of price duration

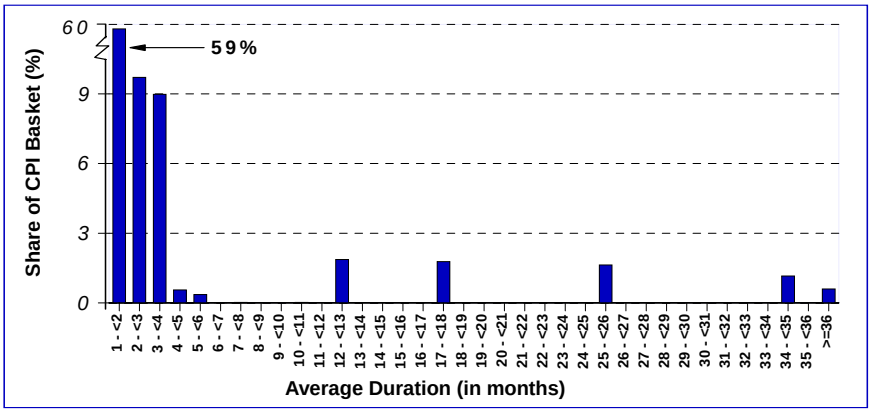


Table 1

Frequency of price changes and price duration

CPI Groups/subgroups	Weights in CPI basket	Frequency (%)	Duration (months)	Weighted duration (months)
Non-cooked food	1029	94.9	1.1	1.1
Cooked food	1300	81.2	1.2	1.1
Recreation & others	1659	69.7	1.4	2.3
Clothing & footwear	357	66.3	1.5	2.3
Health care	469	61.0	1.6	2.1
Transport	1671	51.0	2.0	6.9
Communications	504	37.9	2.6	2.6
Education & stationery	819	36.8	2.7	9.0
Housing (excluding accommodation)	766	22.5	4.4	4.7
All items	8574	58.0	1.7	3.6
Goods vs services				
Goods	4833	84.1	1.2	1.3
Services	3741	38.9	2.6	5.7

Note: CPI groups are ranked in descending order of frequency of price changes.

There appears to be little downward rigidity in prices in Singapore, as the frequency of price increases is only slightly greater than the frequency of price decreases, as indicated by the ratio of 1.1 (Table 2). In an inflationary environment, the magnitude of price increases can be expected to exceed price decreases on average. This asymmetry is observed in Singapore, with the average monthly price increases and price decreases at 1.2% and –1.1% respectively.

Table 2

Average and median size of monthly price changes (%)

CPI Group	Median size of price increases	Median size of price decreases	Average size of price increases	Average size of price decreases	Ratio of magnitude of price increases to decreases	Ratio of frequency of price increases to decreases
Non-cooked food	0.5	–0.4	1.1	–1.0	1.1	1.1
Cooked food	0.1	0.0	0.2	–0.2	1.2	3.2
Clothing & footwear	1.5	–1.8	2.6	–2.4	1.1	1.0
Housing (excluding accommodation)	0.4	–0.3	1.7	–1.0	1.6	0.9
Transport	0.7	–0.5	1.1	–1.2	0.9	1.0
Communications	1.1	–1.2	2.1	–2.1	1.0	0.5
Education	0.4	–0.6	0.8	–0.9	0.9	1.7
Health care	0.3	–0.2	0.5	–0.4	1.3	2.0
Recreation & others	0.4	–0.4	0.9	–0.8	1.2	1.1
All items	0.5	–0.5	1.2	–1.1	1.1	1.1
Goods vs services						
Goods	0.8	–0.7	1.3	–1.2	1.1	1.0
Services	0.8	–0.4	1.4	–0.8	1.7	1.7

Across product groups, the degree of asymmetry between the frequency of price changes and the magnitude of price changes differs markedly, as shown in Table 2. Clothing and footwear experienced the largest magnitude of price changes, due to the effects of seasonal sales. In comparison, price changes for cooked food are often minor, despite the higher occurrence of price increases. The ratio of the magnitude of price increases to price decreases is the highest for the housing category, due to the recent surge in global oil prices which pushed up prices of oil-related items, such as electricity and gas tariffs. As expected, in categories with a larger component of consumer services, such as health care and recreation, prices tend to be biased upwards. Prices in the education category are, however, dragged down by declining prices of computers.

With regard to the ratio of the frequency of price increases to price decreases, it is highest for cooked food at 3.2 and lowest for communications at 0.5. The former probably reflects the effects of rising wages on total operating costs while the latter reflects the effects of liberalisation of the telecommunications industry and technological progress, which has lowered prices of telecommunications services and equipment over the sample period.

These results provide strong evidence that relative prices in Singapore are flexible, implying that there are likely to be few distortions in relative prices within the economy.

Conclusion

In this note, we show that inflation expectations in Singapore have become quite well anchored at around 1.5%, reflecting the strong credibility of MAS in maintaining price stability

and the effects of enhanced transparency and accountability in recent years. We also provide evidence that relative prices in the economy are highly flexible, implying that the low inflation expectations were achieved with few distortions in resource allocation.

References

Aucremanne, L and E Dhyne (2004): "How frequently do prices change? Evidence based on the micro data underlying the Belgian CPI", European Central Bank Working Paper, no 331.

Bils, M and P J Klenow (2004): "Some evidence on the importance of sticky prices", *Journal of Political Economy*, 112(5), pp 947-985.