IV. MEASURING AND ASSESSING UNDERLYING INFLATION

Introduction

Core inflation measures can help gauge underlying inflation…

Headline inflation rates can be volatile, often because of substantial movements in commodity or food prices. Such volatility in a key price index can make it difficult for policymakers to accurately judge the underlying state of, and prospects for, inflation. Therefore, core inflation rates – excluding or downplaying the more volatile price changes so as to reveal the underlying, more persistent components – can be helpful. This chapter discusses ways in which core consumer price inflation can be measured, as well as its potential usefulness for policymakers, based on evidence in the United States, the euro area, Japan, the United Kingdom and Canada. It then uses these measures to assess current inflation conditions in these economies. The chapter proceeds as follows:

… as they are less volatile than headline inflation

– In the next section, three broad types of core inflation measures are examined. The first exclude from the headline consumer price index (CPI) certain components based on the notion that their high volatility tends to reflect supply disruptions (*e.g.* oil and food prices). The second exclude each month the largest price changes, whatever the source, based on a predetermined statistical criterion. The third adjust the weights of individual CPI components so as to reduce the impact of historically volatile components. All these measures vary considerably less than headline inflation, consistent with the notion that they reflect underlying inflation developments.[1]

Headline inflation tends to move towards core rates

– To explore further what core rates can say about future inflation trends, two separate sets of tests employing these measures were performed, which are discussed in the third section. The first set looked only at the predictive power of the difference between current headline and core inflation rates, while the second used a more flexible format. Both suggest that a subset of core measures can be identified that contain potentially useful information about future headline inflation. In particular, there is a tendency for headline inflation to move back to core rates. That said, the specific higher-frequency measures of core inflation that provide the most information about future headline inflation differ across economies.

Policy inferences are best made in a broader context

– Based on what are considered to be the best performing core measures from the two types of tests (in terms of their information content), the final section notes that, looking at recent changes in these core rates, there appears to be a pick-up in underlying inflation pressures in the United States. No such pressures could be identified in Canada, while in the United Kingdom, underlying inflation rates have settled into a range around 2%. In the euro area, a modest downward trend can be seen. In Japan, deflation looks likely to continue for a

1. Other more model-based ways of computing indicators of core inflation, not covered here, include the structural vector autoregression approach proposed by Quah and Vahey (1995) and the dynamic factor index proposed by Bryan and Cecchetti (1993).

while yet, albeit mildly. That said, these indicators are of most value for policymakers when their implications are judged not in isolation but rather in the context of other information.

Typology of core inflation measures

Three types of core rates are examined

Three broad classes of core inflation measures, and the rationale underlying their use, will be discussed here: measures that permanently exclude pre-identified components of the CPI; those that exclude certain components on a period-by-period basis (according to specific statistical criteria); and those that downplay the more volatile components.

Permanently excluding particular components

The first excludes items like energy and food prices…

A standard core measure excludes food and energy from the overall CPI. This is often the one that receives the most public attention. There are, however, other variants that are readily available or in use: for example, there are versions for the euro area and the United Kingdom that exclude energy and unprocessed food; in Japan, fresh food is removed; and in Canada, the eight most volatile components, as well as indirect taxes, are taken out of the index. In the United States, in addition to the CPI-based measure excluding food and energy, the measure based on the private consumption expenditure (PCE) deflator, which is preferred by the monetary authorities, also has a core counterpart. What all these measures have in common is that the exclusions are permanent.[2]

… for which there is an economic rationale

The economic argument for excluding these components from the calculation of headline inflation rates is that they are the ones most likely to be subject to disruptions in supply, as opposed to reflecting aggregate demand. In this case, and provided that the stance of monetary policy has not changed, the influence of such large, one-off price changes (either positive or negative) will fade over time. Hence, excluding them provides a better picture of existing underlying inflation pressures.

Excluding various components on a period-by-period basis

The second excludes volatile items as they occur

A second method of calculating underlying inflation is to exclude what are regarded as excessively volatile changes as they occur. Here, the economic rationale that such "outsized" price changes are more likely to be relative price changes, rather than generalised inflation developments, may not always hold. There are, however, valid statistical arguments for excluding (or downplaying) volatile components.[3]

Trimmed means are one way to adjust the inflation rates

Trimmed means are one way of dealing with these statistical problems. These are constructed by first ranking in descending or ascending order the price changes recorded by all the individual CPI components in a given period and excluding the top and bottom x per cent – that is, the components corresponding to x per cent of total CPI weights on each side. The inflation rate is then calculated as the mean of the remaining price changes. The median inflation rate, which is equivalent to a trimming of 50%, is a limiting case of the trimmed mean.

2. In some countries, such as Canada, statistical agencies also compute measures of inflation that exclude the impact of changes in indirect taxes, which are not regarded as related to inflation.
3. If the distribution of price changes is not normal (and even if it is symmetric, which may not be the case), then the calculated mean is a less efficient measure of actual inflation, which matters when large price changes (both positive and negative) are located at either end of the distribution ("fat tails"). See Bakhshi and Yates (1999), and Bryan *et al.* (1997).

Downplaying the influence of volatile items

The third type assigns smaller weights to more volatile items

The third way of dealing with components that are felt to be too volatile is to replace the expenditure-based CPI weights with ones that are inversely proportional to each item's price volatility over a reference period. The core inflation rate is then calculated as the mean from this volatility-weighted distribution. While more volatile items are not permanently excluded, their influence on average headline inflation is muted.

The core measures are…

From examining various measures of core inflation (see Box IV.1 and Figure IV.A1-IV.A5 in the Appendix), a few stylised facts are evident:

… generally less volatile than headline inflation rates…

– Most indicators are less volatile than the headline rate, consistent with the presumption that they should reflect the more persistent, or underlying, component of inflation. A comparison of standard deviations shows that the

Box IV.1. The various measures of core inflation under consideration

Standard core measures

In the figures appearing in this chapter, the measures of core inflation excluding food and energy are referred to as Core 1. The alternative core measures exclude other items, discussed in the text, on a permanent basis and are referred to as Core 2 with the items, which tend to be specific to each economy, identified in brackets.

Trimmed means

The trimmed means used here are calculated on a month-on-month basis.[1] Year-on-year or three-month inflation rates are then obtained by compounding monthly trimmed mean inflation rates. Five thresholds are used: 2, 5, 10, 15 and 25%.A special case of the trimmed mean is the weighted median, corresponding to a trimming percentage of 50%; in this case, only the component leaving 50% of the weights on each side of the distribution is retained.An additional indicator in this category – the one step Huber-type skipped mean – is constructed by eliminating in each period the price changes determined to be "outliers" on the basis of a standardisation procedure that is robust to non-normality.[2]

Volatility weighting

Two alternative measures of volatility weights are considered: 1) the standard deviation of the monthly price change relative to the overall index; 2) the standard deviation of the price's second difference. The first measure focuses on the volatility of relative price changes, while the second one focuses on high-frequency volatility. They are referred to in the tables as Definition 1 and Definition 2, respectively. An alternative are double-weighted indicators, where the original CPI expenditure-based weights are not discarded but re-weighted by being divided by one of these two volatility measures and then re-scaled.[3]

Data

For all five economies, the officially published core inflation measures used are those based on the CPI (the HICP for the euro area), except for the Core 2 indicator for the United States. The consumer price components used to calculate the various indicators are also based on the CPI/HICP. For the United Kingdom, where the definition of the inflation target shifted from the RPIX to the CPI (formerly known as HICP), CPI data are used. The component breakdown used consists of 42 items for the United States (36 before 1998); 94 for the euro area (but varying between 81 and 93 before 2001); 40 for Japan; 84 for the United Kingdom (between 78 and 83 in 1996-2000) and 54 for Canada.[4] The indicators are constructed from seasonally-adjusted component data for the United States, Japan and Canada. Only for the United States are seasonally-adjusted data at the level of disaggregation used here publicly available; for Japan and Canada, data were seasonally adjusted using X12. For the euro area and the United Kingdom, where the data series available are too short to allow reliable seasonal adjustment, the constructed indicators are based on raw data, the resulting indicator series being seasonally adjusted using X12.

1. For this chapter, the one-month changes were chosen in order to study the information content of core indicators at high frequencies.
2. See Aucremanne (2000) for details.
3. A measure of core inflation published by the Bank of Canada (CPIW) approximately corresponds to the double-weighted mean based on Definition 1 of volatility. However, it is calculated from 12-month rather than one-month price changes.
4. The results can vary depending on the level of disaggregation of the CPI (Bryan *et al.*, 1997; Aucremanne, 2000). For the euro area, the most disaggregated publicly available data were used. The same level of disaggregation was used for the United Kingdom. For the United States, Japan and Canada, intermediate levels of disaggregation were preferred for data availability and computational reasons.

reduction in volatility is greater if indicators are considered at higher frequencies (three or six-month annualised rates of change), where headline inflation itself is more volatile than when measured at year-on-year rates.[4]

… but there are several cross-country differences in how they behave

– For some economies, core inflation indicators generally lag the headline rate, while for others, the opposite holds. In addition, in a number of cases, the means of various indicators are different from those of headline inflation (Table IV.1). If the bias is stable over time, it can be offset by mean-adjusting the series when making comparison with actual inflation. However, there is evidence that the size and the sign of these biases can vary, for example due to the nature of the price shocks experienced. In other cases, the indicators appear to differ widely in the range of their variation over the period shown. Some of the differences across economies reflect the way CPI sub-components develop relative to each other.[5]

Table IV.1. **Average value of headline and core inflation**

	United States		Euro area	Japan		United Kingdom	Canada	
	1984-1995	1996-2004	1996-2004	1984-1995	1996-2004	1996-2004	1985-1995	1996-2004
CPI all items	3.62	2.42	1.88	1.49	-0.04	1.34	3.36	2.01
Standard core measure[1]	4.10 **	2.23 *	1.67 **	1.94 **	-0.01	1.10 **	3.22	1.62 **
Alternative core measure[2]	3.55	1.61 **	1.73 *	1.49	-0.03	1.25	3.58	1.75
Trimmed means								
2%	3.59	2.26	1.80	1.41	-0.09	1.25	3.61	1.86
5%	3.64	2.21 *	1.75	1.36	-0.03	1.30	3.56	1.72 *
10%	3.72	2.31	1.74 *	1.40	0.05	1.49 **	3.45	1.68 **
15%	3.77	2.41	1.71 *	1.43	0.10	1.61 **	3.42	1.66 **
25%	3.83	2.60 *	1.65 **	1.47	0.20 *	1.73 **	3.42	1.72 **
Weighted median	3.85 *	2.88 **	1.65 **	1.44	0.25 **	1.82 **	3.34	1.73 **
One-step Huber-type skipped mean	3.69	2.36	1.68 **	1.42	0.17	1.83 **	3.01	1.46 **
Volatility weighted means								
Definition 1	3.76	2.39	1.42 **	1.39	-0.27	2.06 **	3.60	1.76 *
Definition 2	3.63	2.11 *	1.47 **	1.36	-0.30 *	1.54 **	3.63	1.86
Double weighted means								
Definition 1	3.92 **	2.75 **	1.75	1.83 **	0.16	2.50 **	3.33	1.41 **
Definition 2	3.88 *	2.51	1.75	1.68	0.06	1.96 **	3.46	1.62 **

Note: The * and ** denote that the mean of the core measure is significantly different (using the ANOVA F-statistic) from the mean of headline inflation at the 95 and 99% level, respectively.

1. CPI excluding food and energy for the United States, Japan and Canada; HICP excluding energy, food, alcohol and tobacco for the euro area and the United Kingdom.
2. PCE deflator excluding food and energy for the United States; HICP excluding energy and unprocessed food for the euro area and the United Kingdom; CPI excluding fresh food for Japan; CPI excluding the 8 most volatile components for Canada.

Source: OECD calculations

4. See Catte and Sløk (2005).
5. Individual CPI components tend to have different patterns of variation, causing them to affect the individual indicators differently. In particular, while the aggregate inflation rate of the service component is everywhere very persistent, the behaviour of core goods prices (*i.e.* excluding food and energy) displays greater responsiveness to cyclical conditions in the United States than in the euro area.

Assessing the potential usefulness of various indicators

Two tests were used to assess the usefulness of core rates

Because of the different behaviour of various measures of core inflation, it is useful to establish which of them are most helpful for policy purposes. A standard method used is to see which provides the most information about future inflation prospects, additional to what would be obtained from looking just at current changes in the headline rate. Here, two separate tests, described in Box IV.2, were conducted over time horizons relevant to monetary policy. The general results of each test for the five economies are summarised in Table IV.A1 in the Appendix.[6]

The first looked at the gap between headline and core inflation…

The first test focused on the information content of the difference, or gap, between the current levels of headline and core inflation (proxied by the various indicators) in predicting future movements in headline inflation. The idea is to test

Box IV.2. Tests to distinguish between various measures of core inflation[1]

Testing for the convergence of headline inflation towards measures of core inflation

The first set of regressions were aimed at examining the information content of the core inflation indicators by testing whether or not the current *gap between headline and core inflation* is significantly related to the gap between current and future inflation. This helps assess whether there is a tendency for headline inflation to revert to some measure of core inflation in the short to medium run and the regression was carried out for predicted changes over 12, 18 and 24 months.[2] In this case, the regression equation took the following form:

$$H_{t+j}^{12} - H_t^{12} = \alpha + \beta\left(H_t^{12} - C_t^{12}\right) + \varepsilon_t \quad \text{for j = 12, 18 and 24 months.}$$

Here the explanatory power of the alternative indicators was assessed by examining whether or not the coefficient was both negative and significant.

Testing for additional informational content of core indicators at higher frequencies

The second set of tests focused on whether the information conveyed by core inflation indicators regarding future headline inflation is not already contained in the recent headline inflation rate itself. Regressions were run using a more general functional form where the dependent variable is the 12-month-ahead headline inflation rate, and the explanatory variables were present and lagged values of both headline and core inflation (proxied by each indicator in turn), considered at alternative frequencies.[3] Thus, the estimated equation had the following form:

$$H_{t+12}^{12} = \alpha + \sum_{\substack{i=0 \\ step k}}^{12-k} \beta_i H_{t-i}^{k} + \sum_{\substack{i=0 \\ step k}}^{12-k} \gamma_i C_{t-i}^{k} + \varepsilon_t \quad \text{for k = 1, 3, 6 and 12 months.}$$

In this case, statistical tests were conducted to see if the γ parameters were significant as a group in order to differentiate among competing measures.

For each approach, it is possible to differentiate among those measures that were found to be significant according to their ability to explain variations in the left-hand side of the equation.

1. For more details, see Catte and Sløk (2005).
2. Similar exercises have been performed in a number of studies for individual economies. See Clark (2001) and Cogley (2002) for the United States, and Johnson (1999) and Macklem (2001) for Canada.
3. That is, when the 1-month rates are used, all lagged values from time t to time t-11 are included; for 3-month rates, the values included are those at times t, t-3, t-6 and t-9; for six-month rates, those at time t and t-6; and for the 12-month rates, only the current (time t) value is included. The inclusion of only lagged values referring to non-overlapping periods is intended to ensure that the results are comparable across frequencies, as they can be seen as alternative ways of "packaging" the same information by aggregating it through time.

6. See Catte and Sløk (2005) for more details.

whether or not headline inflation returns to core inflation once a gap is opened. An examination of Table IV.A1 in the Appendix, under the column marked Test 1, suggests the following:

… and found that headline inflation tends to converge to core rates

– Across economies and time horizons, the coefficients obtained on the gap between headline and core inflation were negative, indicating that headline inflation tends to converge back towards the underlying rate. On the particulars, the weighted median and the 25% trimmed mean were always found to be significant in predicting future headline inflation.

For most economies, several measures performed well…

– For the United States and Canada, all measures of core inflation have statistically significant coefficients on the gap at the 12-month horizon.[7] Using the ability of a particular core measure to explain the variation in actual headline inflation (the adjusted R^2s) to differentiate among competing definitions that were found to be significant, one or the other of the standard core measures (the CPI excluding energy and food, and the analogous measure based on the PCE deflator) appears to perform best at all horizons for the United States. In the case of Canada, the same criterion suggests that measures that downplay the more volatile components in the price index do better. Japan has a large number of measures that were found to be statistically significant at the 12-month and other horizons and, like Canada, those that rely on volatility-type weighting schemes perform well.[8]

… but the euro area had the fewest

– The euro area has the fewest core measures that are statistically significant at the 12-month horizon and even these explain only a very small proportion of the overall variation of headline inflation. This may be due to the low variation in headline inflation. The United Kingdom is an intermediate case, based on the number of core measures that were found to be statistically significant.

Using a more flexible approach…

The second test assesses whether the information contained in core indicators has any additional ability to provide information on inflation over the coming 12 months, beyond what is suggested in the past history of headline inflation itself.

… there are always indicators that provide relevant information

Referring again to Table IV.A1 under the heading Test 2 in the Appendix, for all economies, there are always one or more core indicators that provide statistically significant additional information relative to that contained in the headline rate. In the case of the United States, Canada and the United Kingdom, a sizeable number of the core indicators were found to be statistically significant. For the euro area and Japan, on the other hand, only a handful of indicators seem to provide statistically significant additional information. Among various indicators that were found to be significant, those that have the greatest explanatory power differ across countries. No single indicator came out significantly across all economies.

7. Although not shown in Table IV.A1, this remains the case for the United States at the 18 and 24-month horizons, while for Canada the 2% trimmed mean drops out at the 18-month horizon and one of the volatility-weighted means at the 24-month horizon.
8. The preferred measure is the double-weighted mean based on the first definition of volatility (standard deviation of changes in the relative price) for Japan, while for Canada it varies with the time horizon of the forecast: it is the double-weighted mean (also based on the first definition of volatility) at the 12-month horizon, the volatility-weighted mean (based on the same definition) at longer horizons.

Some implications for current inflation pressures

Assessing current pressures with the best-performing indicators

As noted above, core measures are less volatile than headline rates at higher frequencies (three or six-month annualised changes). Indeed, one of the useful features of core inflation indicators is that these higher frequency changes can be used to discuss changes in low-frequency inflation trends (changes over a 12-month period) on a more timely basis. In other words, they can potentially provide some advance information on possible trends that are developing in underlying demand conditions in the economy that have not as yet become evident in the 12-month inflation rate, the one typically examined by central banks as well as the public. In this section, the indicators that were found to be the best predictors of future headline inflation[9] are analysed as to their implications for current inflation pressures. They are shown in Figure IV.1 for each of the five economies.[10] The patterns in the figures suggest the following:

Several US core measures have recently been rising

– In the United States, the sharp pick-up in headline inflation in the spring of 2004 is partly reflected in high-frequency core inflation rates. More recently, several of these core measures have been rising.

Euro area inflation appears to be moving down, but slowly

– In contrast with the United States, the lower volatility of all of the euro area inflation rates is striking. A key issue has been whether inflation would move back below the 2% threshold after the 1999-2000 energy price shock. The core measures indicate that the decline in inflation from the near-term peak reached in early 2002 has been a relatively continuous, if slow, process, even at the three-month frequency, a feature that is consistent with other studies of euro area inflation (see Box IV.3).

At best indicators point to a slow exit from deflation in Japan

– In Japan, it has been particularly difficult over the past two years to discern underlying price trends. In late 2004, increases in energy and food prices pushed up inflation (at all frequencies) but their effects have since begun to fade. Since the beginning of the year, the preferred high-frequency indicators have all slipped back into negative territory, although some are edging up.

Recent developments in core rates point to stable and low UK inflation

– In the United Kingdom, inflation (both actual and core) has been very stable in the face of high levels of economic activity. This stability has been ascribed to a combination of mostly declining import prices, heightened competition and strong productivity gains, including in the distribution sector, as well as moderate wage increases in spite of a relatively tight labour market.[11] After edging up somewhat, core inflation measures more recently appear to be clustered around the 2% mark.

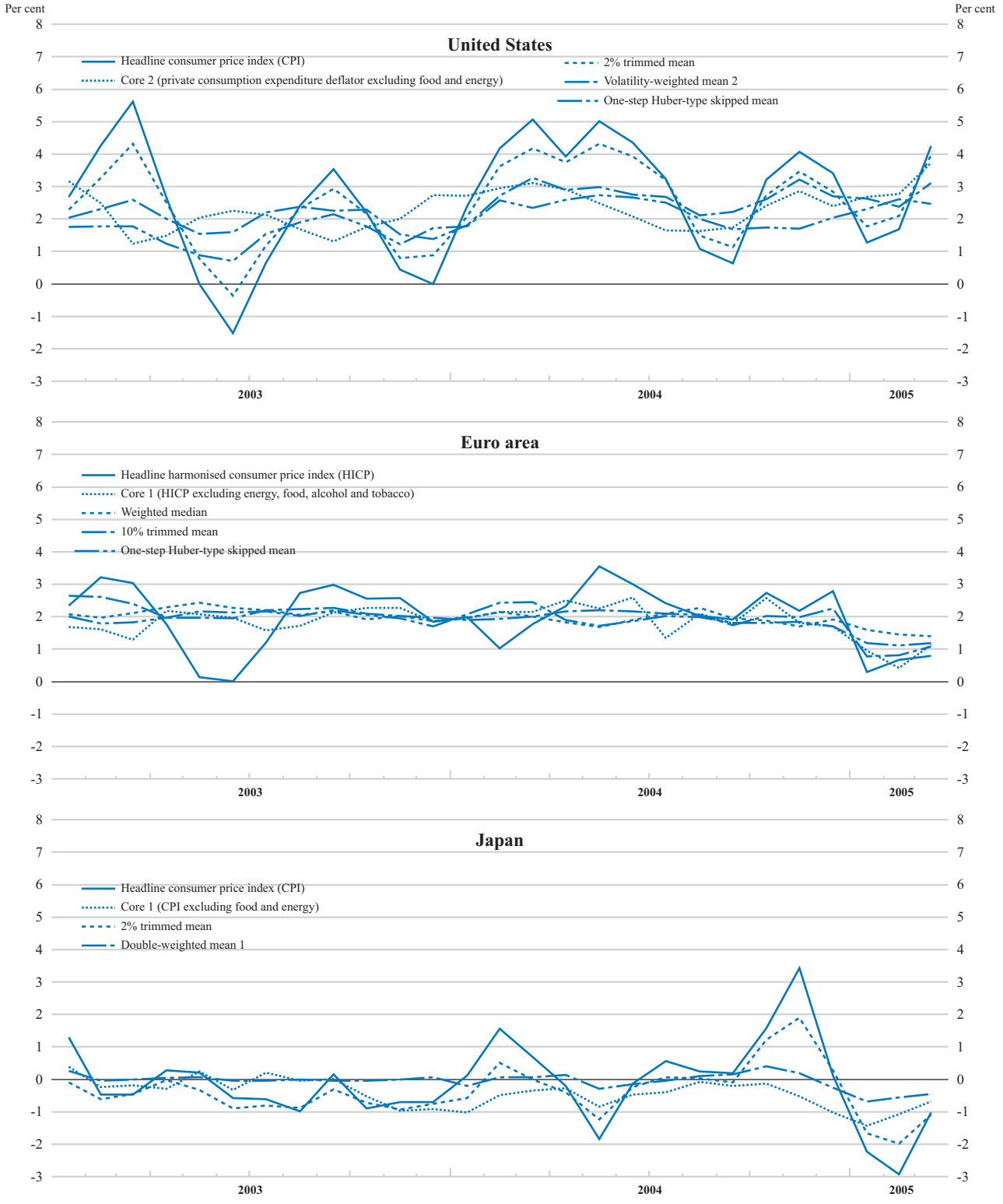
Canadian inflation appears to be well anchored around 2%

– The recent experience of headline inflation in Canada has been characterised by marked oscillations, but no clear trend. Measures of core inflation at the three-month frequency are significantly less volatile and they generally point to inflation remaining well-anchored around the 2% level.

9. For the gap model (Test 1), those core measures "within a certain class" were chosen that had the highest adjusted R^2s. For the distributed lag model (Test 2), the criteria aimed at identifying the core measure at the three-month frequency that can provide useful information about inflation 12 months hence, again based on adjusted R^2s.
10. In all cases, the data for the core measures shown have been adjusted so that they have the same average level over the 1996 to 2004 period as the headline inflation rate.
11. See Bank of England (2004).

Figure IV.1. **Headline inflation and selected indicators of core inflation**

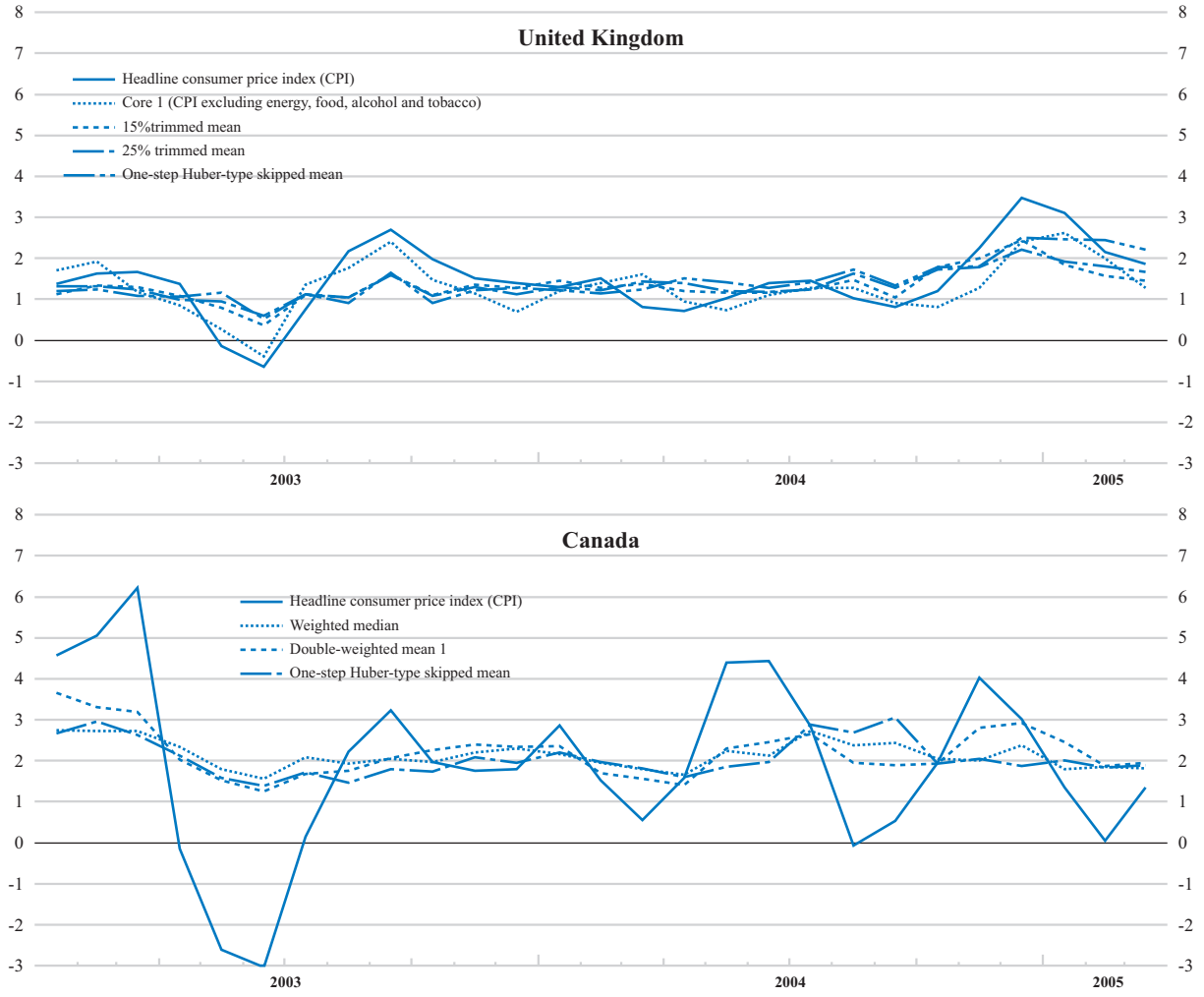
3-month annualised percentage change



Note: The level of all indicators of core inflation has been normalised at the average of the headline inflation rate over the period 1996-2004.
Source: OECD, *Main Economic Indicators* and OECD calculations.

Figure IV.1. **Headline inflation and selected indicators of core inflation** *(cont.)*

3-month annualised percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

While useful, some caution is required in using core inflation

In conclusion, while core inflation measures do appear to provide relevant information for policy makers, a degree of caution is in order when interpreting them. To begin with, exercises that are based on purely time-series types of analysis (like those presented in this chapter) neglect other important information such as the output and labour market gaps. In this regard, it is perhaps not surprising that the out-of-sample predictions based solely on the test models reported above do not perform that well.[12] Furthermore, some of the price changes that are being excluded in these exercises on purely statistical criteria may have important information on the current state of

12. See Catte and Sløk (2005) for details. One possible reason is that the relationship between core and headline inflation is not invariant to policy. The behaviour of both variables will depend importantly on the success that the central bank achieves in controlling inflation.

Box IV.3. Why is euro area inflation so sticky?

Since the inception of the single currency on 1 January 1999, euro area headline inflation has remained at or just above 2%, with remarkably little variation around that level. This has been the case even as growth slowed and a sizeable negative output gap emerged in 2003 and persisted into 2004. To quite some extent, the inertia displayed by inflation can be ascribed to structural rigidities.

Inflation responds only weakly to cyclical slack

The failure of economic slack to exert significant downward pressure on inflation and wages contrasts with experience over the same period in the English-speaking OECD economies, which are generally more flexible.[1] Indeed, looking at a longer time horizon, there is evidence that the response of inflation to a negative output gap is comparatively weak in the euro area. This means that when inflation overshoots the ECB's price stability threshold, a larger and/or a longer-lasting output gap is required than elsewhere to bring it back to that level.

This inertia relative to other economies partly stems from a lack of flexibility in price adjustments.[2] Indeed, prices are changed only about half as frequently in the euro area as in the United States. In addition, implicit pricing contracts and strategic interactions among competing firms contribute to producer price stickiness. This is also borne out more recently by the failure of prices to decelerate when the euro appreciated, even for goods that have high import content. As well, sectors which show the most inertia (those related to services) tend to be responsible for persistence that is evident in nation-wide indices. These stylised facts suggest that the problem could be related to a lack of integration and competition in parts of the internal EU market.

Structural rigidities play an important role

Starting from this diagnosis, a recent OECD study has examined how rigidities in labour and product markets affect euro area inflation.[3] It confirmed that inflation responded more weakly to cyclical slack in the euro area than in English-speaking OECD economies and showed that it was associated with a lack of progress with the implementation of structural reforms. Specifically, cyclical slack has a singificantly smaller negative impact on inflation in countries with strict employment protection legislation or tight product market regulations than in countries with more flexible policy settings in these areas.

By implication, implementing structural reforms should improve the resilience of the euro area economy, not least because it would provide the ECB with more scope to respond to weak demand conditions without jeopardizing price stability.

1. See OECD (2005).
2. Documented by Angeloni *et al*. (2004).
3. See Cournède *et al.* (2005).

inflation pressures. A case in point was the large oil-price shock in the 1970s, which, in retrospect, did contain information about inflation and, along with commodity price developments at the time, about the stance of monetary policy. As well, in some cases, the analysis of the data is complicated by the fact that statistical agencies change their methods in constructing price indices, leading to breaks in the underlying series. Finally, because many of the measures are based on somewhat complicated statistical criteria, using them for communication purposes is difficult. In this regard, while central banks do use these measures internally, they are also at pains to emphasise that the objective of policy is to stabilise headline inflation rates over the medium term.

Appendix

Table IV.A1. Summary of the test results to access the usefulness of core inflation measures, 1996-2004[1]

12 months ahead

Core inflation measure	United States		Euro area		Japan		United Kingdom		Canada	
	Test 1[1]	Test 2[2]	Test 1[1]	Test 2[2]	Test 1[1]	Test 2[2]	Test 1[1]	Test 2[2]	Test 1[1]	Test 2[2]
Standard core measure[3]	**	*		**	**	*		**	**	
Alternative core measure[4]	**				**			**	**	
Trimmed mean										
2%	*	**			**	*	**	**	**	
5%	**	**			**		**	**	**	
10%	**	**		**	**		**	**	**	*
15%	**	**			**		**	**	**	*
25%	**	**	**		**		**	**	**	*
Weighted median	**	*	**		**		**	**	**	**
One-step Huber-type skipped mean	**	**	**		**		**	**	**	**
Volatility weighted mean										
Definition 1	**				**	**	**	**	**	**
Definition 2	**	*				*	**	**	**	**
Double weighted mean										
Definition 1	**	*			**		**	**	**	**
Definition 2	**	**			**		*	**	**	**

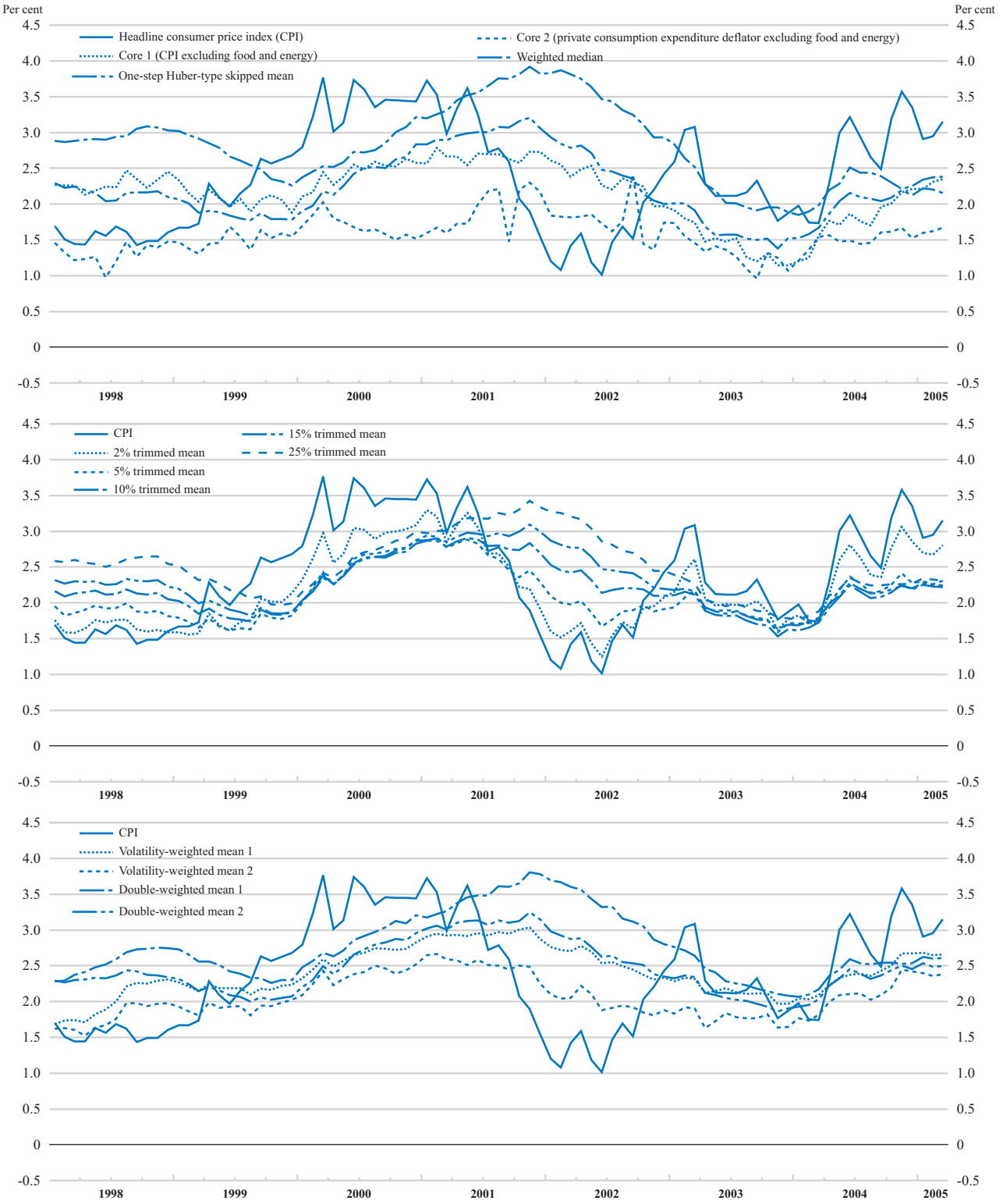
Note : For each measure of core inflation, * and ** indicates significance at the 95 and 99% levels, respectively. In the case of Test 1, the significance refers to the coefficient β in Box IV.2, while in the case of Test 2, it refers to the significance to the coefficients γ as a group, also described in Box IV.2. Results not significant at the 95% level are not shown.

1. In all cases, the coefficients were negative, indicating that headline inflation tends to converge to core. For Test 1, horizons of 18 and 24 months were also tested. Those results, not reported here, generally confirm the findings at the 12-month horizon.
2. Only the results for lags at three months are shown.
3. CPI excluding food and energy for the United States, Japan and Canada; HICP excluding energy, food alcohol and tobacco for the euro area and the United Kingdom.
4. PCE deflator excluding food and energy for the United States; HICP excluding energy and unprocessed food for the euro area and the United Kingdom CPI excluding fresh food for Japan; CPI excluding the eight most volatile components for Canada.

Source: OECD calculations

Figure IV.A1. **United States: indicators of core inflation**

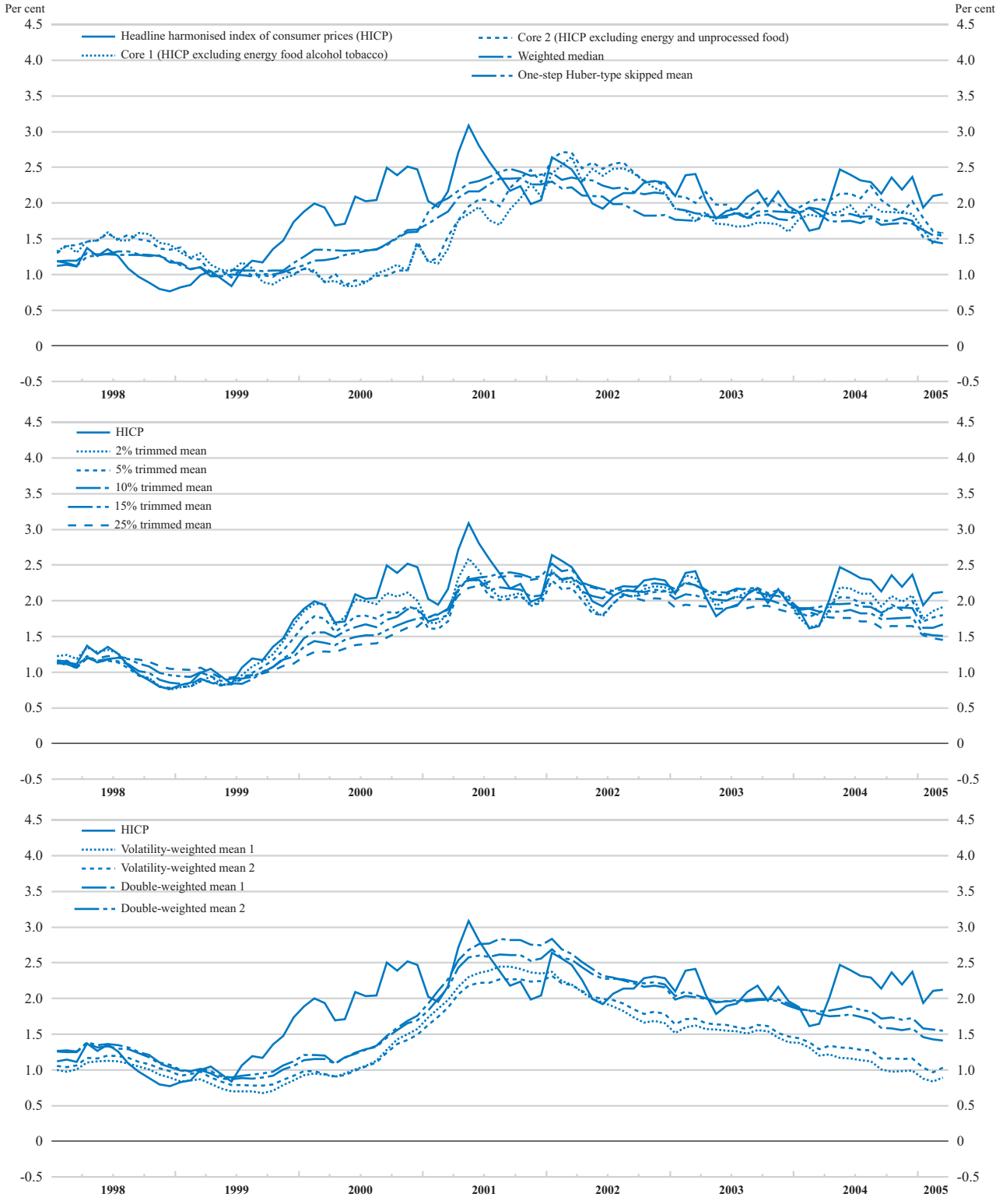
Year-on-year percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

Figure IV.A2. **Euro area: indicators of core inflation**

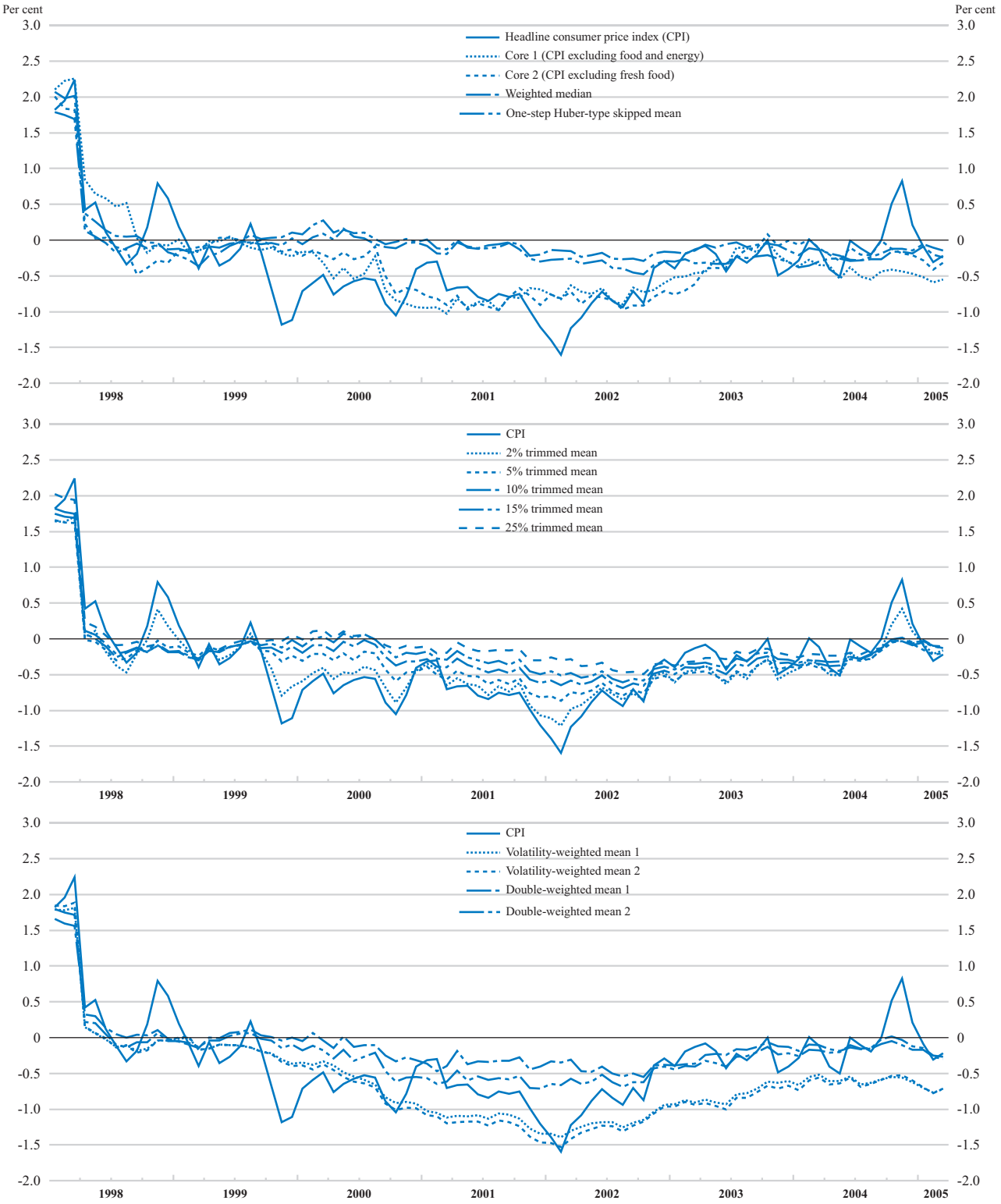
Year-on-year percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

Figure IV.A3. **Japan: indicators of core inflation**

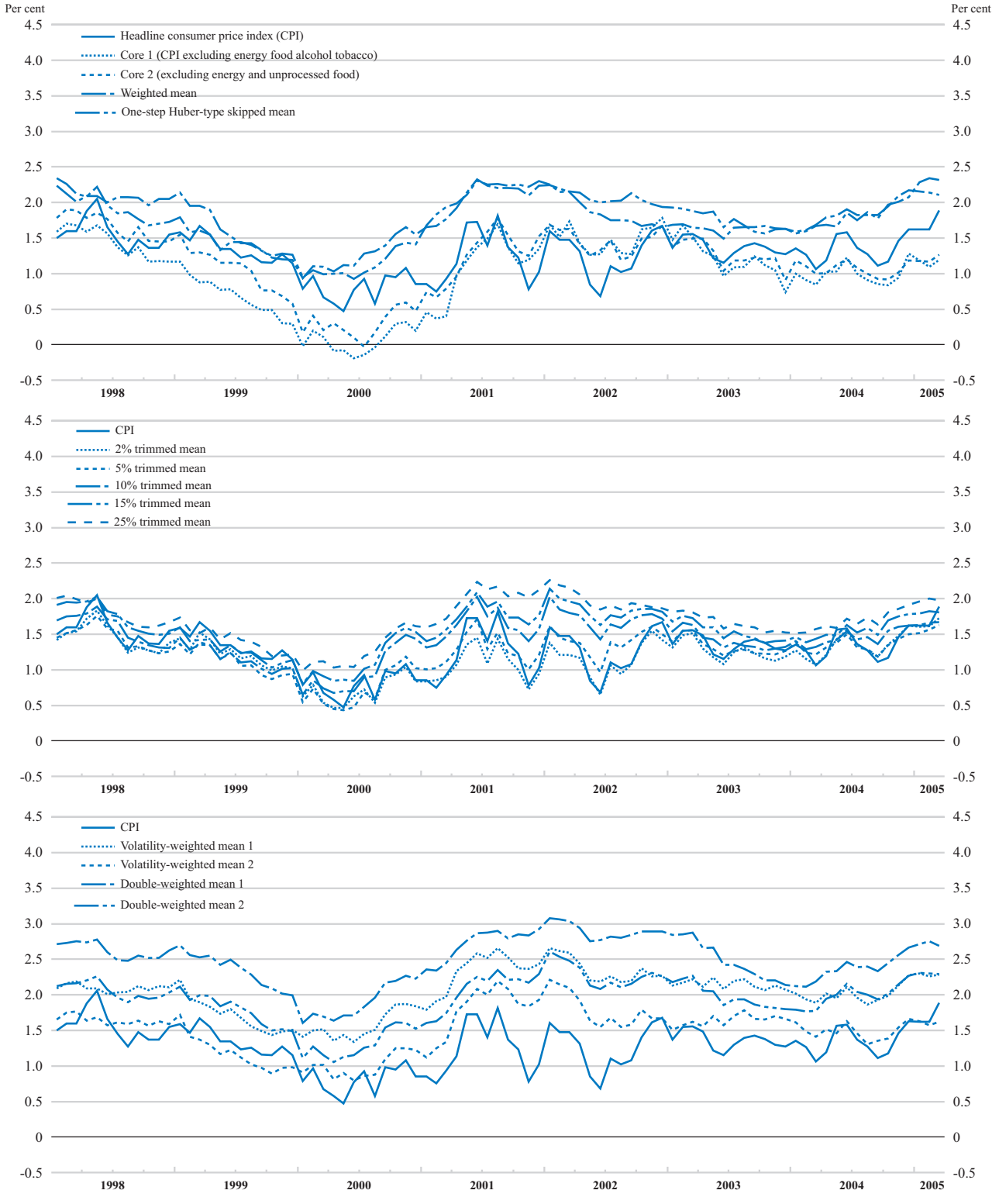
Year-on-year percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

Figure IV.A4. **United Kingdom: indicators of core inflation**

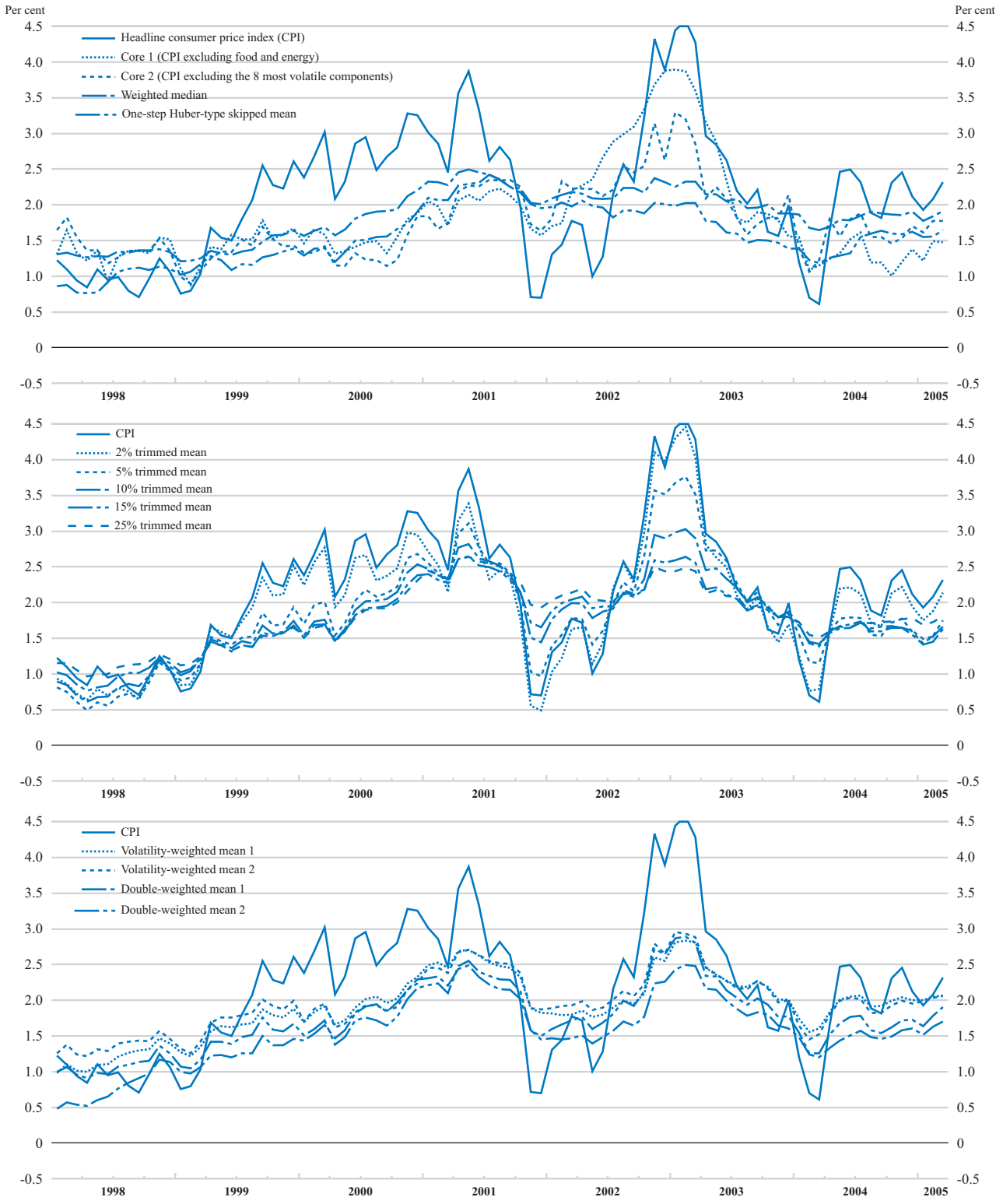
Year-on-year percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

Figure IV.A5. **Canada: indicators of core inflation**

Year-on-year percentage change



Source: OECD, *Main Economic Indicators* and OECD calculations.

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Conventional signs

$	US dollar	.	Decimal point
¥	Japanese yen	I, II	Calendar half-years
£	Pound sterling	Q1, Q4	Calendar quarters
€	Euro	Billion	Thousand million
mbd	Million barrels per day	Trillion	Thousand billion
. .	Data not available	s.a.a.r.	Seasonally adjusted at annual rates
0	Nil or negligible	n.s.a.	Not seasonally adjusted
–	Irrelevant