

Inflation-adjusted sectoral saving and financial balances

This note⁽¹⁾ presents revised and updated estimates⁽²⁾ of sectoral saving and financial balances adjusted for the effects of price inflation on net monetary assets and liabilities.⁽³⁾ It also presents estimates of the ex ante inflation gains and losses accruing to each sector based on a measure of implicit long-term market expectations. Since actual inflation changed by much more than this ex ante measure over the period, the ex post inflation adjustment is rather more substantial.

Methodology

During inflationary periods, holders of monetary assets will experience capital losses while those with liabilities will experience gains. Such gains and losses constitute part of the adjustment necessary to arrive at a comprehensive income measure, defined as the amount that an individual can consume without changing the real value of his or her wealth. This approach to accounting for the effects of inflation is partial to the extent that only changes in the value of monetary assets and liabilities are considered. Non-monetary items are excluded partly because their prices tend to respond to inflation in due course, but also because consumers may face greater uncertainty about their gains or losses on such items. Also, the accrued gains may be less often realised.

In this article *ex post* measures of sectoral inflation gains and losses are calculated for the period 1979–86, together with the implications for saving and financial balances. Holdings of net monetary assets by sector are also deflated by the price index to yield the real stock in each year. Finally, estimates of implicit market expectations of inflation are used to derive an *ex ante* measure of the inflation erosion of net monetary asset values.

One component of sectoral income identified in the national accounts is interest payments. The Fisher equation relates market rates of interest to the anticipated rate of inflation. In periods when the expected rate of inflation rises, the nominal rate of interest rises—though typically not as much⁽⁴⁾—and consequently interest payments comprise two elements; first an amount representing the ‘true’ or real interest payment, which in principle should be unchanged if basic saving and investment propensities are unaffected; and second, a component that is either a partial or full compensation for inflation. The inflation compensation element of interest may be considered as partial repayment of capital and should therefore be deducted from conventionally

measured income in order to arrive at something nearer a comprehensive income measure.

The *ex post* estimate of inflation erosion was obtained by multiplying the stock of monetary assets/liabilities of each sector by the current rate of inflation, as measured by the fourth quarter on fourth quarter change in the consumers’ expenditure deflator. This deflator was chosen because it is assumed that the ultimate objective of all economic activity is consumption. Sectoral net monetary assets are measured at mid-year, as this gives an approximation to the average of the sectoral position over the year. For the component of net monetary assets denominated in foreign currencies, movements in the consumers’ expenditure deflator were taken net of movements in an exchange rate which values sterling against a basket of currencies weighted according to the composition of the SDR. These weights are thought to be more appropriate than the trade weights used to construct the effective exchange rate, which was used in previous *Bulletin* articles.

In addition to these *ex post* inflation gains and losses it is possible to derive alternative estimates based on the expected erosion of the value of net monetary assets. The proxy used to gauge expected inflation was an implicit market expectation derived from taking the difference between a nominal and a real yield on government securities.⁽⁵⁾ The nominal yield chosen was the gross redemption yield on a medium-coupon conventional stock. The real yield was that on an index-linked stock of approximately the same maturity.⁽⁶⁾ This measure of inflation expectations needs to be treated cautiously for a number of reasons. First, the level of the proxy for inflation expectations depends on the coupon. Second, the assumptions that are made regarding income tax rates will also affect the imputed inflation expectations, and these rates have changed over the period. Stocks are held by different agents facing different tax rates, with, for example, a high proportion of index-linked government securities being held by tax-exempt pension funds.

(1) Written by N O Kennedy of the Bank’s Economics Division.

(2) Figures were last published in the June 1984 *Bulletin*, pages 231–4, and are based on the methodology set out in ‘Real’ national saving and its sectoral composition” by C T Taylor and A R Threadgold, Bank of England *Discussion paper* No 6.

(3) Monetary items are defined as assets or liabilities that are fixed in amount by contract or statute in terms of units of currency regardless of changes in the price level.

(4) See the article on trends in the real rate of interest on page 225.

(5) Previous figures were published, and the methodology outlined in the March 1983 *Bulletin*, page 13.

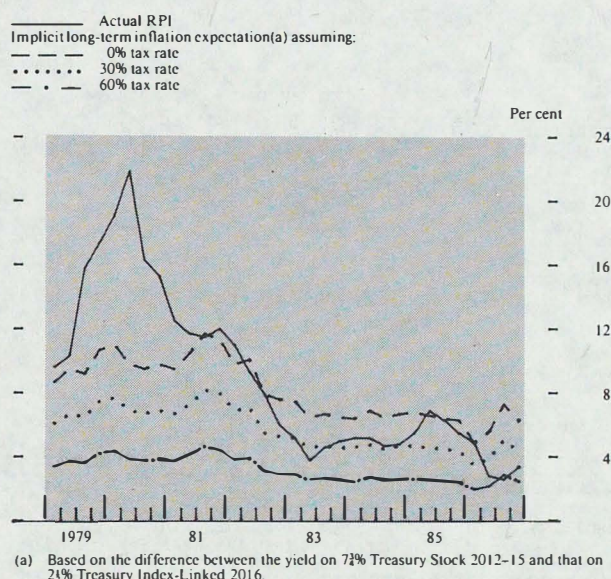
(6) Prior to 1982, the real rate was taken to be 21% in the absence of a market measure. This assumption was used by M Miller, ‘Measuring the stance of fiscal policy’, *Oxford Review of Economic Policy*, volume 1, no. 1.

Different combinations of tax rate and coupon give a range of implicit market expectations, a high coupon stock held by a non-tax-payer taking one to the upper end of the range. Third, since index-linked gilts are indexed to the RPI, inflation expectations derived from this methodology relate to the RPI rather than the consumers' expenditure deflator. Finally, changes in the yield may be caused not only by changes in inflation expectations, but also by movements along the yield curve. To minimise confusion between these factors, a sequence of conventional and index-linked stocks could be used that would keep the position on the yield curve constant. But this would be an extensive exercise, and it is not clear that the necessary data is available for each year. The simple solution chosen was to use conventional and index-linked stocks which had a maturity of around 35 years at the beginning of the period. At a long-term maturity the yield curve may be considered to be relatively flat. In this case the proxy for inflation expectations, some weighted average of expectations out to the redemption date, is clearly a long-term expectation.

Chart 1 shows the implications for these estimated long-term price expectations of assuming different marginal rates of income tax at 0%, 30% and 60% using a medium-coupon stock, and the actual RPI. Changes in the measure of these expectations were naturally much smoother over the period than changes in the actual rate of increase of the RPI. From the chart it can be seen that this proxy for long-term inflation expectations did not respond greatly to the rapid inflation at the beginning of the period, but towards the end of the period, *ex ante* (assuming a tax rate of 30%) and *ex post* RPI measures had converged.

Whether inflation adjustments derived from *ex ante* or *ex post* measures of inflation are more useful for economic analysis remains an open question. Much economic theory emphasises the importance of forward-looking measures of variables such as income and

Chart 1
Implicit long-term market inflation expectations and actual RPI



prices in explaining economic behaviour, particularly where agents are well informed and rational. However, agents may be equally concerned about actual values of variables where there are major market imperfections and/or uncertainties, and the unanticipated changes are large. The issue is partly an empirical one, but both measures appear to be of interest.

Table A shows the net monetary position of the main sectors of the economy (personal, company, public and overseas), together with the inflation erosion of the value of their net monetary assets. In this table the relevant assets of life assurance and pension funds (LAPFs) are assumed to be assets of the personal sector rather than of other financial institutions (OFIs).⁽¹⁾ Since not all of persons' holdings of equity in LAPFs are monetary assets, they are multiplied by the ratio of monetary to total assets of LAPFs. The company sector in the table is made up of

Table A
Inflation losses/gains on real value of net monetary assets/liabilities by sector: 1979-86

£ billions; percentages in italics

	1979	1980	1981	1982	1983	1984	1985	1986
Sectoral net monetary assets (+)/ liabilities (-)								
(mid-year estimates)								
Personal sector	91.6	100.6	112.4	121.6	151.2	152.4	164.2	163.6
Company sector	-13.7	-13.1	-11.1	-22.6	-42.1	-30.1	-25.8	-11.8
Public sector	-87.2	-98.9	-107.7	-109.7	-115.4	-123.9	-133.4	-139.1
Total domestic sector	-9.3	-11.4	-6.4	-10.7	-6.3	-1.6	5.0	12.7
Overseas sector	9.3	11.5	6.4	10.7	6.3	1.6	-5.0	-12.7
<i>Change in consumers' expenditure deflator Q4 on Q4 (per cent)</i>	15.9	13.1	10.6	6.8	4.4	4.7	5.1	2.9
<i>Ex post erosion of net monetary liabilities (+)/ assets (-)(a)</i>								
Personal sector	-14.7	-13.1	-12.0	-8.5	-6.8	-7.6	-8.5	-4.6
Company sector	2.2	1.8	1.6	1.7	2.0	2.7	—	2.6
Public sector	13.9	12.6	12.1	7.6	5.5	6.5	6.5	4.4
Total domestic sector	1.4	1.3	1.7	0.8	0.7	1.6	-2.0	2.4
Overseas sector	-1.4	-1.2	-1.8	-0.9	-0.8	-1.6	2.1	-2.5
<i>Change in deflator for foreign currency assets Q4 on Q4 (per cent)(b)</i>	23.4	24.1	-3.4	1.1	-5.3	-8.8	12.9	-8.4

(a) Notional losses and gains between the sectors may not sum to zero because of rounding.

(b) The deflator for foreign currency assets and liabilities is the rate of change of the consumers' expenditure deflator taken net of the percentage change in the SDR-weighted exchange rate.

(1) Balance sheet data in the national accounts treat LAPFs as part of OFIs.

Table B
'Real' saving and financial balances: 1979-86

£ billions	1979	1980	1981	1982	1983	1984	1985	1986
Personal sector								
Saving:(a)								
Nominal	12.1	16.3	15.5	16.1	14.0	15.3	11.9	7.7
'Real'	- 2.6	3.2	3.5	7.6	7.2	7.7	3.4	3.1
Financial balance:								
Nominal	8.5	13.3	12.8	11.4	7.8	9.4	6.0	0.5
'Real'	- 6.2	0.3	0.8	3.0	1.0	1.8	- 2.5	- 4.1
Company sector								
Saving:(a)								
Nominal	9.4	4.7	5.1	7.3	11.8	16.5	18.3	19.6
'Real'	11.7	6.5	6.7	9.0	13.8	19.2	18.2	22.1
Financial Balance:								
Nominal	—	—	2.0	3.3	8.0	7.9	8.0	10.2
'Real'	2.2	1.8	3.6	5.0	10.0	10.5	7.9	12.8
Public sector								
Saving:(a)								
Nominal	- 5.3	- 7.1	- 6.4	- 6.2	- 7.2	- 11.1	- 7.6	- 7.0
'Real'	8.7	5.5	5.7	1.4	- 1.7	- 4.6	- 1.1	- 2.6
Financial balance:								
Nominal	- 8.5	- 10.4	- 7.6	- 7.4	- 10.3	- 12.9	- 10.1	- 8.8
'Real'	5.4	2.2	4.5	0.2	- 4.8	- 6.4	- 3.6	- 4.4
Total domestic sector								
Saving:(a)(b)								
Nominal	16.2	13.9	14.2	17.2	18.6	20.7	22.6	20.3
'Real'	17.8	15.2	15.9	18.0	19.3	22.3	20.5	22.6
Financial balance:(c)								
Nominal	—	2.9	7.2	7.3	5.5	4.4	3.9	1.9
'Real'	1.4	4.3	8.9	8.2	6.2	5.9	1.8	4.3

(a) After providing for stock appreciation and capital consumption at replacement cost and plus net capital transfers.

(b) Equals dis-saving of overseas sector plus errors and omissions.

(c) Equals financial deficit of overseas sector plus errors and omissions.

industrial and commercial companies (ICCs), banks and OFIs. The public sector comprises central government, local authorities and public corporations. Measurement of the income and saving of the nation as a whole is relatively little affected by inflation gains and losses because of the small balance of net monetary assets/liabilities held by the domestic sector. The main effect of inflation is on the individual sectors of the economy.⁽¹⁾

Table B sets out the *ex post* inflation-adjusted, denoted 'real',⁽²⁾ saving and financial balances for the domestic sectors valued at current prices, together with their unadjusted equivalent, taken from the national accounts. Financial balances are defined as saving (income less consumption) after deducting actual net capital spending (including stockbuilding).

Table C shows the sectoral net monetary assets drawn from Table A deflated by the price index in the fourth

Table C
Sectoral net monetary assets(+)/liabilities(-) deflated by prices^(a)

£ billions at 1980 consumer prices	1979	1980	1981	1982	1983	1984	1985	1986
Personal sector	99.9	96.5	97.1	98.2	116.9	112.5	115.5	109.6
Company sector	- 15.0	- 12.6	- 9.6	- 18.3	- 32.6	- 21.7	- 18.7	- 5.9
Public sector	- 95.1	- 94.9	- 93.1	- 88.6	- 89.2	- 91.4	- 93.6	- 94.7
Total domestic sector	- 10.2	- 11.0	- 5.6	- 8.7	- 4.9	- 0.6	3.2	9.0
Overseas sector	10.2	11.0	5.6	8.7	4.9	0.5	3.3	9.0

(a) Notional losses and gains between the sectors may not sum to zero because of rounding.

(1) Even more important may be gains and losses within a sector (for example between net creditors and net debtors within the personal sector), but those effects are not dealt with here.

(2) 'Real' is used throughout the note to mean inflation-adjusted rather than deflated by the price level.

quarter of each year, where 1980 is the base year. The *ex post* inflation-adjusted change in the stock of net monetary assets divided by the price level approximates the change in the real value of the stock of net monetary assets. This demonstrates the symmetry of the method of calculating inflation erosion (ie the sum of 'real' savings over a period, divided by a suitable price deflator, is identical to the change in net real assets).

Table D shows the *ex ante* inflation erosion on the net monetary assets of each of the major sectors.

Table D
***Ex ante* inflation losses/gains on real value of net monetary assets/liabilities by sector 1979-86^(a)**

£ billions, percentages in italics.

	1979	1980	1981	1982	1983	1984	1985	1986
<i>Ex ante</i> erosion of net monetary assets (+)/liabilities (-)(b)								
Personal sector	- 6.2	- 7.0	- 8.6	- 7.7	- 7.3	- 7.4	- 7.7	- 6.5
Company sector	1.0	1.0	1.2	1.6	2.2	2.6	- 0.1	2.4
Public sector	5.7	6.6	8.8	6.9	5.9	6.4	5.8	6.3
Total domestic sector	0.5	0.6	1.5	0.8	0.8	1.6	- 2.0	2.2
Overseas	- 0.6	- 0.6	- 1.6	- 0.8	- 0.8	- 1.6	2.0	- 2.2
<i>Implicit market inflation expectations (per cent)</i>								
	6.7	7.0	7.5	6.2	4.8	4.6	4.5	4.2
<i>Actual RPI (per cent)</i>								
	13.3	18.0	11.9	8.5	4.7	5.0	6.1	3.4

(a) Based on the difference between the yield on 7.75% Treasury Stock 2012-15, and 2.5% Treasury index-linked 2016, assuming a constant income tax rate of 30%.

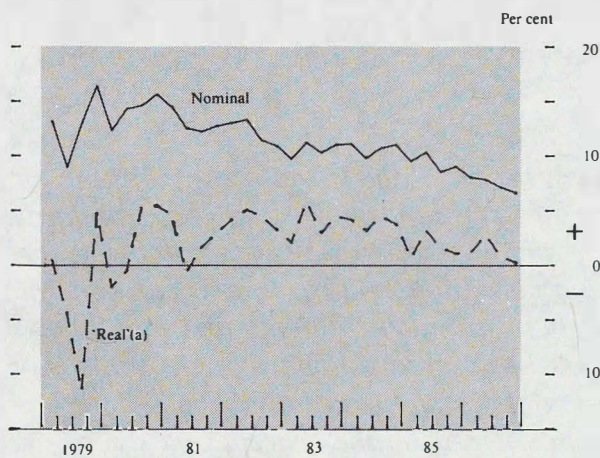
(b) Notional losses and gains between the sectors may not sum to zero because of rounding.

Recent developments

Over the period, the annual rate of growth of the consumers' expenditure deflator fell from a peak of 15.9% in 1979 to 2.6% in 1986. The price index for foreign currency assets was much more variable because of exchange rate movements. With the exception of 1985, the combined domestic sectors had small inflation gains in each year, with the largest in 1986. In 1985-86 the domestic economy became a net monetary creditor rather than a net monetary debtor for the first time since 1967, the year for which these adjustments were first calculated.

Personal sector net monetary assets grew considerably between 1979 and 1986 in nominal terms, largely because of a sharp rise in 1983. A rise remained after deflating by prices. The personal sector, as a large holder of net monetary assets, saw a large erosion of their real value between 1979 and 1986, though the rate of erosion declined as inflation fell. Inflation-adjusted personal disposable income grew faster as a consequence between 1979 and 1983 than did the conventional real personal disposable income measure, which remained broadly flat. From 1983 onwards both grew at broadly the same rate. Chart 2 shows that compared with the nominal saving ratio, the 'real' saving ratio was relatively stable between 1980 and 1986. In fact, between 1980 and 1984 it rose as a proportion of the nominal saving ratio, as savers were rebuilding some of the previous loss in their real wealth. The nominal saving ratio in 1986 amounted to 7.5% while

Chart 2
Nominal and 'real' personal saving ratios



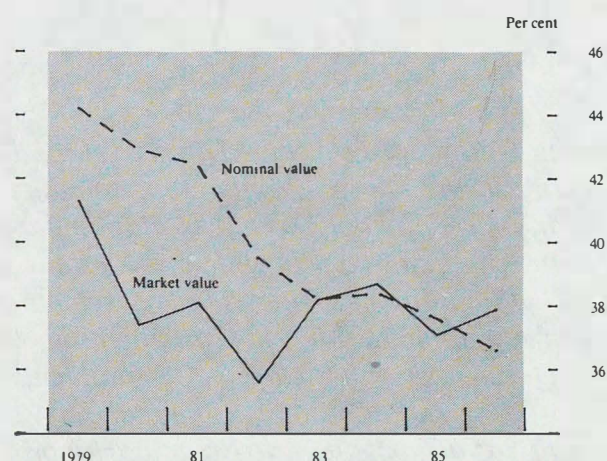
(a) The 'real' personal saving ratio is calculated using the *ex post* inflation adjustment.

the 'real' saving ratio was around 1½%. Smaller inflation losses in recent years meant that individuals needed to devote a smaller proportion of their income to maintaining the real value of their monetary assets. In contrast, for much of the 1970s, the 'real' saving ratio was actually negative.

Company sector net liabilities grew considerably during 1982 and 1983, before declining again. This meant that inflation erosion, which represents a gain to the company sector since it is a small net monetary debtor, actually rose over these years despite a rapid decline in inflation. Thus inflation effects tended to strengthen an already positive nominal financial balance.

The rate at which inflation eroded the outstanding net monetary liabilities of the public sector was substantially lower after 1982 than in the years 1979–81, although inflation losses were still large. This is reflected in the steady decline in the ratio of public sector net monetary debt to national income (Chart 3). Moreover, a fall in interest rates in 1983 brought about a small rise in the market value of the public sector's monetary debt, bringing the nominal and market value closely in line with one another. Before 1983 the effect of taking inflation erosion into account was to turn a positive nominal

Chart 3
Public sector net monetary liabilities as a percentage of GDP



deficit into a 'real' surplus. From 1983 the 'inflation tax' was lower than the public sector financial deficit, leaving a negative 'real' financial balance. The nominal PSBR declined from £12.2 billion in 1979 to £4.0 billion in 1986 and also fell as a percentage of national income (Table E). A significant increase in the 'real' PSBR in 1983 occurred as a result of higher nominal borrowing and lower inflation. Prior to this, inflation gains brought about a surplus on the 'real' PSBR. As inflation fell, the adjusted and nominal PSBR tended to converge.

Table E
Public sector borrowing requirement: 1979–86

£ billions, percentages in italics

	1979	1980	1981	1982	1983	1984	1985	1986
Nominal PSBR (borrowing -)	-12.2	-11.1	-10.7	-4.6	-11.7	-10.1	-7.6	-4.0
<i>As a percentage of national income at market prices(a)</i>	<i>-7.0</i>	<i>-5.4</i>	<i>-4.9</i>	<i>-1.9</i>	<i>-4.4</i>	<i>-3.5</i>	<i>-2.4</i>	<i>-1.2</i>
Public sector notional gains on net monetary liabilities(b)	13.9	12.6	12.1	7.6	5.5	6.5	6.5	4.4
'Real' PSBR (borrowing -)	1.7	1.5	1.4	3.1	-6.3	-3.6	-1.1	0.4
<i>As a percentage of 'real' national income at market prices(a)</i>	<i>0.8</i>	<i>0.9</i>	<i>0.6</i>	<i>1.3</i>	<i>-2.3</i>	<i>-1.3</i>	<i>-0.4</i>	<i>0.1</i>

(a) National income plus general government income from net indirect taxes. The 'real' estimate also includes the notional gain on net external liabilities.

(b) From Table A.