

5 Tax and National Insurance

5.1 Income Tax

Here we concentrate on Income Tax, just one of many important taxes which include, for example,

- Value Added Tax
- Company Tax
- Capital Gains Tax
- Council Tax

For most people, income tax is one of the most relevant of these.

Our aim is to show you how income tax is calculated. It is based on earnings and normally deducted by your employer before you receive your pay.

A certain amount of income is NOT taxed - this is known as your *personal allowance (PA)*. HMRC (Her Majesty's Revenue and Customs), through your allocated tax office, will inform your employer of your tax allowance so that the appropriate amount of tax is deducted from your gross pay. Taxable income tables and online tax calculators are available to help with these calculations. The website

https://www.gov.uk/income_tax

is a good starting point for information.

The object of this CMSP resource is to help you understand the process behind the calculations. We are using the figures from the 2014 - 2015 tax year in this Unit.

The British personal tax year runs from 6th April to 5th April in the following year. For the income tax year 2014 -15, tax was payable at the following rates on the *amount above your personal allowance* (£10 000 in this particular tax year) according to the formula:

<i>Rate</i>		<i>Taxable Annual Income</i>
BASIC	20%	£0 to £31 865
HIGHER	40%	£31 866 to £150 000
ADDITIONAL	45%	over £150 000

where

taxable annual income = gross income – personal allowance

and

tax = tax at basic rate + tax at higher rate + tax at additional rate.

In the next example we see how this is calculated.

For simplicity we will not include National Insurance or pension contributions at this stage.



Worked Example 1

Mrs Hill earns £12.50 per hour and works for 24 hours per week. Her annual personal allowance is £10 000.

- How much tax will she pay in the year?
- What is her average monthly pay this year?



Solution

Mrs Hill earns in a year

$$£12.50 \times 24 \times 52 = £15\,600$$

Her personal allowance is £10 000, so her annual taxable income is

$$£15\,600 - £10\,000 = £5\,600$$

This is taxed at the basic rate, i.e.

$$\begin{aligned} 20\% \text{ of } £5\,600 &= £5\,600 \times \frac{20}{100} \\ &= £5\,600 \times \frac{1}{5} \\ &= £1\,120 \end{aligned}$$

So she has to pay £1120 in tax for the year, meaning that in the year she actually receives

$$£15\,600 - £1\,120 = £14\,480$$

and her average monthly 'take-home' pay is

$$\begin{aligned} &= £14\,480 \div 12 \\ &\approx £1\,206.67 \end{aligned}$$



Worked Example 2

Professor Wittard, who works full-time, is paid a salary of £60 000 per annum.

His annual personal allowance is £10 000.

- How much tax does he pay in year?
- What percentage of his annual salary is paid in tax?



Solution

$$\begin{aligned} \text{His yearly taxable income} &= £60\,000 - £10\,000 \\ &= £50\,000 \end{aligned}$$

He is taxed at the rate of 20% on the first £31 865 of his salary above £10 000, and 40% on the remainder.

So the amount he pays in tax

$$\begin{aligned} &= 20\% \times £31\,865 + 40\% (£50\,000 - £31\,865) \\ &= \frac{1}{5} \times £31\,865 + \frac{2}{5} \times £18\,135 \end{aligned}$$

$$= £6373 + £7254$$

$$= £13\,627$$

(b) His final % rate of tax

$$= \frac{13\,627}{60\,000} \times 100\%$$

$$\approx 22.7\%$$



Worked Example 3

You are paid £8.50 per hour for working in a local shop. This is your only employment. For how many hours can you work if you want to be below the income tax threshold?



Solution

If you work for an average of x hours per week, then your yearly income is

$$£8.50 \times 52x = £442x$$

For your income to be below the tax threshold, you need

$$442x \leq 10\,000 \quad (\text{personal tax allowance})$$

or

$$x \leq \frac{10\,000}{442}$$

$$\leq 22.624 \dots$$

So working in whole hours, you must not work more than 22 hours per week, on average.

(Check: working an average of 22 hours per week, your income

$$= £8.50 \times 52 \times 22$$

$$= £9724$$

while working for 23 hours per week, your income

$$= £8.50 \times 52 \times 23$$

$$= £10\,166, \text{ which is just over the personal allowance.})$$



Exercises

- Robert works full-time as an IT technician and is paid a salary of £36 000 per year. His personal allowance is £10 000.
How much is his average monthly take-home pay?
- Angela is a secondary school Headteacher with a salary of £85 000 per year. Her personal allowance is £10 000.
 - How much tax will she pay in one year?
 - What percentage of her salary is deducted in tax?

3. Chris works an average of 20 hours per week. He is paid £10 per hour.
- (i) How much tax does he pay in a year?
 - (ii) What is his average weekly take-home pay?
- Chris agrees to work one night per week for 8 hours at the rate of time-and-a-half. His remaining 12 hours are paid at the standard rate.
- (i) How much tax does he now pay in a year?
 - (ii) What is his average weekly take-home pay?
4. Andrea is a hedge fund manager and earns £215 000 per year, excluding bonuses. Her personal allowance this year is £10 000.
- (i) How much tax will she pay this year?
 - (ii) What percentage of her salary is this?
- (b) Andrea has a good year and is given a £50 000 bonus at Christmas!
- (i) How much of this will be deducted as tax?
 - (ii) What now is her tax as a percentage of her salary?

5.2 National Insurance

Benjamin Franklin (1706 - 1790), a founding father of the United States, wrote *,

"In this world, nothing can be said to be certain except death and taxes."

but we have seen in the previous section that, for low income earners, there is no tax!

There is a similar situation with **National Insurance** (NI):

NI is a system of contributions paid by employees (you) and employers towards the cost of certain state benefits such as the National Health Service, Statutory Sick Pay, pensions and unemployment benefit. The self-employed contribute partly by a fixed weekly or monthly payment and partly on a percentage of net profits. NI contributions are collected by HMRC through the PAYE (pay as you earn) system, along with Income tax and repayment of Student loans.

NI provides a significant part of the government's revenue (21% of the total collected by HMRC).

The amount of NI you pay depends on your gross pay and whether or not you are 'contracted out' of the National Insurance scheme. If you are contracted out, you pay a lower rate of NI but on retirement you receive only the basic state pension.

The NI contribution details for contributions paid by employees for the tax year 2014-15 are given in the following table.

* Another quote from Benjamin Franklin is,

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

- particularly appropriate when teaching Core Maths!

Employee National Insurance contributions for the tax year 2014 - 2015

Employees who are **not contracted out** pay:

0% on income up to **£153 per week** or **£663 per month** or **£7956 per year.**

12% on income between **£153 and £805 per week**

or between **£663 and £3488 per month**

or between **£7956 and £41 860 per year.**

2% on income above **£805 a week** or **£3488 per month** or **£41 860 per year.**

Employees who are **contracted out** pay:

0% on income up to **£153 per week** or **£663 per month** or **£7956 per year.**

10.6% on income between **£153 and £770 per week**

or between **£663 and £3337 per month.**

or between **£7956 and £40 040 per year.**

12% on income between **£770 and £805 per week**

or between **£3337 and £3488 per month**

or between **£40 040 and £41 860 per year.**

2% on income above **£805 a week** or **£3488 per month** or **£41 860 per year.**

Note that details are given per week, per month or per year.

We now see how this works in practice.

**Worked Example 1**

Sally earns £375 per week and is contracted out of the National Insurance scheme. How much does she pay in NI each week?

**Solution**

As she is contracted out, with earnings per week between £153 and £770, she will pay 10.6% of her earnings in NI, that is,

$$\begin{aligned} 10.6\% \text{ of } £375 - £153 &= £222 \times 0.106 \\ &\approx £23.53 \text{ per week} \end{aligned}$$

**Worked Example 2**

Nick earns a salary of £22 500 in the first year of his teaching post. He is not contracted out of the National Insurance scheme.

- How much is his NI contribution per year?
- What percentage of his annual salary is this?

**Solution**

- He has to pay 12% of income between £7956 and £41 869 per year. Hence Nick pays

$$12\% \text{ of } (£22\,500 - £7956)$$

$$= 12\% \text{ of } £14\,544$$

$$= £1745.28$$

- (b) The percentage of his salary paid in NI contributions is

$$\frac{£1745.28}{£22\,500} \times \frac{100}{1} \approx 7.76\%$$



Worked Example 3

Vicky earns £95 000 a year as Head of a FE College. She is contracted out of the National Insurance scheme.

- (a) How much does she pay per year in NI contributions?
 (b) What percentage is this of her salary?



Solution

- (a) Vicky pays 10.6% on her income between £7956 and £40 040,
 12% on her income between £40 040 and £41 860,
 and 2% on her income between £41 860 and £95 000

This gives

$$\begin{aligned} & 10.6\% \text{ of } (£40\,040 - £7956) + 12\% \text{ of } (£41\,860 - £40\,040) \\ & \quad + 2\% \text{ of } (£95\,000 - £41\,860) \\ & = 10.6\% \text{ of } £32\,084 + 12\% \text{ of } £1820 + 2\% \text{ of } £53\,140 \\ & \approx £3400.90 + £218.40 + £1062.80 \\ & = £4682.10 \end{aligned}$$

$$\begin{aligned} \text{This is } & \frac{4682.10}{95\,000} \times \frac{100}{1} \\ & \approx 4.93\% \end{aligned}$$

of her salary.



Exercises

1. Calculate the NI contributions for:
 - (a) Lisa, who is paid £380 per week and is not contracted out of the National Insurance scheme.
 - (b) Eva, who is paid a salary of £28 000 per year and is opted out of the National Insurance scheme. How much does she save on her NI contributions by opting out?
 - (c) Joshua, who is paid £2500 per month and is not contracted out.
 - (d) Rachel, who is paid £7.50 per hour and works 25 hours per week and is contracted out.

2. Use a spreadsheet or table to calculate the NI contributions for salaries in the range £5800 to £80 000 and illustrate this on a graph. Assume all workers are not contracted out of the National Insurance scheme, and consider increments of £2500 in the salary payments.

Describe the main features of this graph and discuss its implications.

5.3 Combining Income Tax and National Insurance

In the two previous sections we have treated income tax and NI as two separate entities. In reality, most of us have to pay both of these taxes - the following examples illustrate this. Of course, in reality, we have other deductions, allowances, etc. not covered here, that might affect what we pay in tax. These include

- tax on income earned from properties let
- tax on share dividends and/or bank/building society interest
- Capital Gains Tax on profits made when selling items
- pension contributions.

We will, though, ignore these complexities and take the simplest case, that of paying income tax and NI on earned income. You will need to use the details given in the previous two sections: these are repeated below.

Income Tax payable on amounts earned above personal tax allowance (2014 - 2015)

Rate		Taxable Annual Income
BASIC	20%	£0 to £31 865
HIGHER	40%	£31 866 to £150 000
ADDITIONAL	45%	over £150 000

Employee National Insurance contributions for the tax year 2014 - 2015

Employees who are **not contracted out** pay:

0% on income up to **£153 per week** or **£663 per month** or **£7956 per year.**
12% on income between **£153 and £805 per week**
or between **£663 and £3488 per month**
or between **£7956 and £41 860 per year.**
2% on income above **£805 a week** or **£3488 per month** or **£41 860 per year.**

Employees who are **contracted out** pay:

0% on income up to **£153 per week** or **£663 per month** or **£7956 per year.**
10.6% on income between **£153 and £770 per week**
or between **£663 and £3337 per month.**
or between **£7956 and £40 040 per year.**
12% on income between **£770 and £805 per week**
or between **£3337 and £3488 per month**
or between **£40 040 and £41 860 per year.**
2% on income above **£805 a week** or **£3488 per month** or **£41 860 per year.**



Worked Example 1

Harry works part-time (24 hours per week) at the local pub and earns £8.50 per hour. He is not contracted out of the National Insurance scheme and has a personal allowance of £10 000

- How much will Harry pay in income tax and NI contributions each week?
- What is his take-home pay?



Solution

In a year, Harry earns

$$£8.50 \times 24 \times 52 = £10\,608$$

Assuming his personal allowance is £10 000, he will pay tax on

$$£10\,608 - £10\,000 = £608$$

at the rate of 20%, i.e.

$$20\% \text{ of } £608 = £121.60$$

so his weekly income tax deduction is $£121.60 \div 52 = \underline{£2.34}$

For NI contributions, he pays 0% on yearly earnings up to £7956 and 12% on earnings between £7956 and £41 860.

Hence Harry pays, per year,

$$\begin{aligned} &12\% \text{ of } (£10\,608 - £7956) \\ &= 0.12 \times £2652 \\ &= £318.24 \end{aligned}$$

which, per week, is

$$\frac{£318.24}{52} \approx \underline{£6.12}$$

So Harry earns, per week, $£8.50 \times 24 = £204$ and actually takes home

$$\begin{aligned} &£204 - (£2.34 + £6.12) \\ &= £204 - £8.46 \\ &= £195.54 \end{aligned}$$

Note: because of his relatively low pay and limited hours, Harry in fact, pays very little in income tax and NI contributions.



Worked Example 2

Alice is a GP on a salary of £86 000 per year; she is employed on a 0.75 full-time equivalent contract. She has a personal income tax allowance of £10 000 and is contracted out of the National Insurance scheme.

- How much does she earn each year, before deductions?
- How much are her total income tax and NI contributions this year?



Solution

- (a) Alice's pay this year is

$$0.75 \times £86\,000 = £64\,500$$

- (b) She has to pay income tax on

$$£64\,500 - £10\,000 = £54\,500$$

This is

$$\begin{aligned} &20\% \text{ of } £31\,865 + 40\% \text{ of } (£54\,500 - £31\,865) \\ &= £6373 + £9054 \\ &= £15427 \end{aligned}$$

Alice has to pay National Insurance contributions of

$$\begin{aligned} &0\% \text{ on } £7956 + 10.6\% \text{ on } (£40\,040 - £7956) + 12\% \text{ on } (£41\,860 - £40\,040) \\ &\quad + 2\% \text{ on } (£54\,500 - £41\,860) \\ &= 0 + £3400.90 + £218.40 + £252.80 \\ &= £3872.10 \end{aligned}$$

So Alice's total contributions for income tax and NI this year are

$$\begin{aligned} &£15427 + £3872.10 \\ &= £19\,299.10 \end{aligned}$$



Exercises

For all the questions, assume a personal tax allowance of £10 000 unless otherwise stated.

1. (a) Albie is paid a salary of £35 000 p.a. and works full time. He is contracted out of the National Insurance scheme
 - (i) How much does he actually get paid on average, after deductions, each month?
 - (ii) What percentage of his salary is this?
- (b) He is given a pay rise of £7500 p.a.
 - (i) Calculate Albie's new income tax and NI contributions.
 - (ii) What percentage of his salary does he actually take home?
2. Sara works part-time, for 15 hours per week and is not contracted out of the NI scheme. She is paid £12.50 per hour.
 - (a) Does she pay income tax? If 'Yes', how much per year??
 - (b) Does she make NI contributions? If 'Yes', how much are her contributions per year?
3. Steve has accepted a new job with a salary of £64 000. He will be working 0.8 of the full-time equivalent.
 - (a) Assuming he is not contracted out of the National Insurance scheme, how much is his take-home pay on average each month?
 - (b) What percentage of his salary does he pay in total in tax and NI contributions?

4. Ben is a student working part-time at the local convenience store. He is paid £6.00 per hour.
- What are the maximum number of hours he can work before having to make income tax or NI contributions?