

CPPR Briefing Note
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CPPR Briefing Paper

Measuring an independent Scotland's economic performance

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BACKGROUND

How should we measure economic performance?

In the following discussion, economic performance is divided into two separate measures:

- the growth rate of a country
- the standard of living of a country

The paper sets out to try to understand what an independent Scotland's standard of living and growth rate would have been in the recent past, based on available evidence, and treating the historical record as if Scotland was independent. Clearly, in reality, the Scottish economy was operating at this time within a UK framework. Nevertheless, the analysis highlights a number of interesting issues in relation to how the Scottish economy performed.

It finds that the traditional international measures of economic performance are often not best suited to judging how well or badly an 'independent' Scotland's economy has performed.

The most typically cited international measures for judging the standard of living and the growth rate are - \$ denominated current price GDP per capita for the former and real terms GDP growth for the latter.

The paper starts by looking at GDP growth and how this has compared with the UK in particular. The principal reason that GDP growth is of interest is because it is a consistent and readily available measure of how a country's economy is performing. It is not perfect and it is not the only possible measure that could be used¹. However, it remains the most widely used measure of economic success around the world.

The paper then goes on to consider the actual standard of living of Scotland². As we will see it is not a simple task to calculate this for Scotland, nevertheless it is important as a variety of claims have been made over this in the current referendum debate.

A growing economy will, in general, improve the living standards of its citizens and signifies a country whose economic capacity is growing and which is continuing to improve in terms of innovations that raise productivity levels. Hence both a high standard of living and a high growth rate are signs of a good economic performance and a prosperous nation.

¹ See, for example, 'Society at a Glance, OECD Social Indicators, 2006 edition', Chapter 2, for further discussion of its faults and possible alternatives.

² Discussion of the 'standard of living' here concentrates on GDP per capita type measures. It does not take into account the distribution of income across a country's citizens. This distribution impact is important in terms of how wealth is shared but is out-with the scope of this paper.

SECTION 1 – Economic growth rates for Scotland and the UK

There has long been interest in, and controversy over, Scotland's economic growth rate and how it compares to that of the UK as a whole. Typically Scotland's growth rate has been seen as being below that of the UK.

This paper extends the normal Scotland vs UK comparative analysis beyond the usual measure of indexed GDP data to look at a variety of measures of GDP and how these affect the results when comparing relative growth rates. (See Annex 1 for a description of different measures of output.)

In particular, this analysis introduces a full analysis of the impact of including a geographic share of North Sea output on Scotland's economic performance.

The period 2001 to 2011 has been chosen as the recent publication of Census 2011 population figures allows for a more accurate calculation to be made of the growth in living standards (as measured by GDP per capita) in Scotland and the UK over the decade up to 2011.

Different measures of growth

Using the population Census figures from 2001 and 2011, alongside a variety of Scottish and UK GDP measures allows for a number of comparisons to be made.

- Growth in Scottish and UK **mainland** GDP, which therefore excludes direct (ie offshore) contributions from the North Sea region
- Growth in GDP **including oil and gas extraction from the North Sea**, where Scotland is assumed to incorporate its geographic share of oil and gas activity (the most recent data from 2011 has this at around 84%)
- Each of the above in per capita terms (ie population adjusted)
- All of the above in both cash terms and in constant (ie inflation adjusted) price terms

Each measure is of interest in its own way, but some should be paid particular attention to. For example:

- The per capita measures helps remove growth that is driven purely by a rising population, which does not necessarily involve any growth in living standards;
- The exclusion of oil and gas allows for the comparison of economic growth in mainland Scotland and the UK, ie excluding any North Sea activity. In officially published figures the North Sea is currently assumed to be a separate UK region whose output is only attributed to the UK as a whole. This assumption can seriously distort the Scotland vs UK relative growth picture;
- Showing growth in both cash and real terms is important as the impact of oil and gas activity can have contrasting effects. For example, over the decade to 2011 adding in oil and gas activity reduces the UK growth rate in real terms, as production has fallen considerably. However, in cash terms, including oil and gas raises the UK growth

rate, as oil and gas prices have risen to an even greater degree than production has fallen;

- Normally, real terms GDP growth would be the most appropriate measure to consider. However, when a natural resource like oil and gas is involved then the cash measure becomes important too. This is because, unlike with normal economy-wide inflation, high oil and gas inflation results in benefits to the producer country, as the inflation element is largely exported and the higher profits and taxes are retained in the producer country (excepting any profits that are ultimately remitted to asset owners based overseas, an important point to which we return later). Equally, if the price of oil and gas falls then the negative impact will compound the effect of any falling production levels on reducing cash terms growth;
- In Scotland's case, as many of the companies operating in the North Sea have their headquarters based outside of Scotland, it is more the tax revenue to the Scottish Government that would be important to try and gauge from studying this cash based measure of economic activity;
- Such oil and gas impacts are magnified when looking at Scotland as they account for a much larger share of the economy (assuming a geographic share of North Sea activity is apportioned to Scotland). In 2009 these weights were 2% for the UK and 16% for Scotland;
- In a real world example, this cash vs real terms oil & gas effect can be seen in the GDP data for Norway. For example, in 2000, when oil prices rose by over 50%, nominal (cash terms) GDP rose by over 20%, while real (inflation adjusted) growth was only around 3%³.

Table 1 shows the resulting breadth of growth rates for Scotland and the UK over the decade between the Census years of 2001 and 2011. It highlights the following;

Growth - Excluding North Sea activity

- **In real (ie inflation adjusted) terms, Scotland grows more slowly than the UK over the period 2001-2011.**
- However, **in cash terms Scotland grows faster than the UK over the same period.**
- The reason for these contrasting results is that inflation is higher in Scotland compared to the UK as a whole over this period.
- Adjusting for Scotland's slower population growth, in order to get GDP growth per capita, eradicates the real terms UK advantage and increases the cash terms annual growth advantage for Scotland to over ½ of a percentage point.

Growth - Including North Sea activity

- **In real (inflation adjusted) terms, Scotland exhibits negative growth over the period 2001-2011**, which is almost 2 percentage points a year lower than the UK

³ Note that, unlike the UK, Norwegian North Sea production levels have remained high in recent years due to substantial growth in gas production.

growth rate. (*Note: if an independent Scotland retained the official measure of growth currently used by both the Scottish and UK government's these would be the published headline growth figures.*)

- In contrast, **in cash terms, Scotland grows significantly faster than the UK**, by over ½ of a percentage point a year.
- **The reason for these contrasting results is the effect that North Sea oil & gas has on the figures.** Falling oil production reduces real terms GDP output, but as oil prices have been rising by even more, the cash value of overall GDP output has been rising faster than is seen for mainland GDP. This effect applies to both Scotland and the UK. However, since the North Sea makes, proportionally, a much bigger contribution to Scottish than UK GDP, the impact on Scotland is magnified, improving its cash based performance but worsening its real terms performance⁴.
- Adjusting for population growth, in order to get GDP growth per capita, further improves Scotland's relative position.

Table 1: Scottish and UK GDP growth rates, at basic prices, per annum, 2001 to 2011

	Scotland	UK	Scotland minus UK % points
CASH TERMS			
1 GDP inc oil and gas	4.64%	4.00%	0.64%
2 GDP exc oil and gas	4.31%	3.98%	0.33%
Population growth	0.45%	0.69%	-0.24%
3 GDP per capita, inc oil and gas	4.17%	3.31%	0.86%
4 GDP per capita, exc oil and gas	3.84%	3.29%	0.55%
REAL TERMS*			
5 GDP (official)	1.54%	1.58%	-0.04%
<i>Comparable:</i>			
6 GDP (inc oil & gas)	-0.32%**	1.58%	-1.90%
7 GDP (exc oil & gas)	1.54%	1.83%	-0.29%
8 GDP per capita (official)	1.08%	0.90%	0.18%
<i>Comparable:</i>			
9 GDP per capita, (inc oil & gas)	-0.77%**	0.90%	-1.66%
10 GDP per capita, (exc oil & gas)	1.08%	1.15%	-0.07%

**Under real terms, row 5 (and implicitly row 8) shows the growth rates as published by the Scottish Government for Scotland and the UK and where all North Sea activity is allocated to the UK but none to Scotland. By contrast, all other rows which include North Sea output apportion a geographic share of North Sea output to Scotland.*

***These rates have been calculated using approximations for North Sea output based on UK GDP data. See Annex 1 for more detail.*

Sources: Scottish Government: 'Gross Domestic Product 3rd Quarter 2012', Tables 2a and 2b; National Records of Scotland – '2011 Census: First Results on Population estimates for Scotland; ONS, '2011 Census: Population Estimates for the UK'; UK Blue Book 2012; SNAP Quarterly National Accounts tables – 2012 Quarter 3; ONS Regional GVA annual publication.

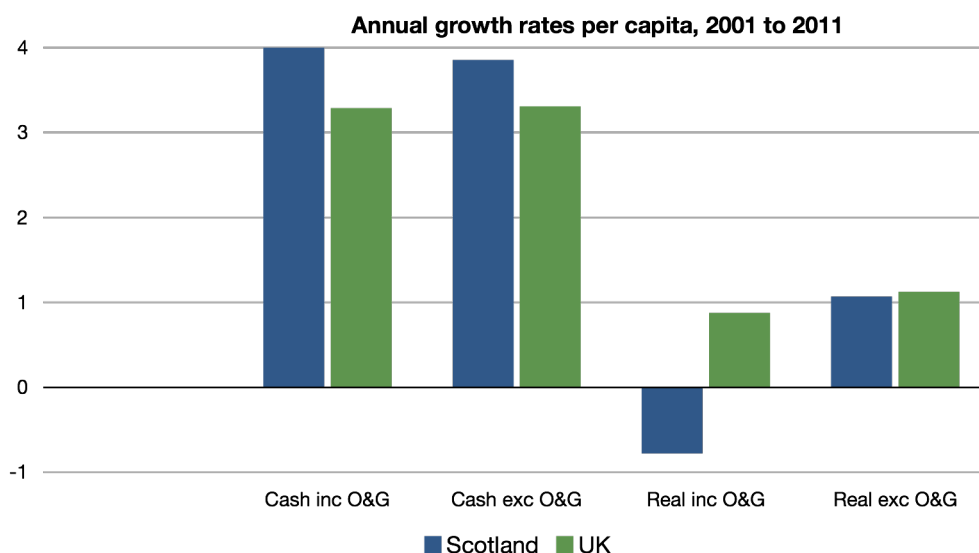
⁴ Note that in the 80s and 90s the reverse effect was probably taking place as production from the North Sea was rising (peaking around 2000), while the price fell from its early 80's peak to its late 90s nadir.

Based on the above analysis, at present, the best measures to use in order to understand Scotland’s economic and financial performance are:

- (i) real terms GDP excluding North Sea, which better measures the performance of **mainland** Scotland
- (ii) cash terms GDP including North Sea, which better measures the growth in Scotland’s **tax revenue potential**, from which government spending can be planned.

Using these two measures it can be seen that, over the decade to 2011, in per capita terms, Scotland has performed in line with the UK by the first measure and well above the UK by the second measure (see Figure 1).

Figure 1



However, the role of oil and gas in determining these results highlights the importance of understanding just where the economic value of the North Sea finally resides.

As such, what we would ideally want to measure is cash terms Gross National Income⁵ (GNI) including oil and gas, as this would take into account how much of the North Sea’s profits were retained within Scotland (See Section 3 and Annex 1 for more on the difference between GDP and GNI).

Unfortunately this figure is not currently available for Scotland as there is insufficient information available on Scottish Interest, Profits and Dividends (IPD) to, or from, overseas (including the rest of the UK). This omission is most important for oil & gas but could also affects financial services and the whisky industry, much of which are ultimately RoUK and/or overseas owned.

⁵ GNI per capita is the OECD, and others, preferred indicator when comparing income levels across countries. GNI measures the income generated by the residents of a country, whether earned on the domestic territory or abroad. Conversely it also excludes income by overseas residents earned in that country.

Until such data is available the actual growth comparison of Scotland vs the UK position will be open to some conjecture.

Finally, it is worth emphasising that the notion that Scotland has been, and continues to be, on a slower growth path than the UK is an extreme simplification of the true, more nuanced, position.

SECTION 2 – Scotland’s Standard of Living

While growth is important it is the resultant standard of living that most concerns citizens, and in particular how this compares with the standard of living in other regions and countries.

Within the UK

Scotland’s relative position, in terms of GDP per capita, within the UK was highlighted in the Fiscal Commission Working Group’s First Report, as shown in Table 3.

Table 3: Relative living standard measures for Scotland and the UK

	GDP per capita (£)	GDP per capita (Indexed)	Earnings (£ per week)	Earnings (Indexed)	Disposable Income (£ per year)	Disposable Income (Indexed)
UK	20,873	100	506	100	15,727	100
Scotland	20,571	98.6	498	97.3	15,342	97.6

Source: ONS. GDP per head -2011, Earnings – 2012, Disposable Income – 2010.

These figures exclude North Sea income. If this were to be apportioned geographically then GDP per capita in Scotland would be considerably higher than for the UK as a whole. However, we do not know where North Sea income finally resides, with much probably ending up overseas, in the country of residence of the owners of the companies currently operating in the North Sea.

Alternative measure to consider are:

(i) median gross earnings of full time employees: regional UK figures show that by this measure Scottish earnings stood at 97% of the UK average, with UK and Scottish employment rates are also being similar;

(ii) gross disposable household income per head: again the data suggests that the average Scottish income lay just below the UK average.

In both cases, the figures suggest that, unless North Sea related non-earnings income is unduly concentrated in Scottish households, which seems unlikely, then Scotland’s average income per person or per household would be similar post-independence to pre-independence and also in line with UK income and standard of living.

Internationally

In order to compare standards of living across countries, economists need to convert from local currencies into a standard format, usually based on the US dollar equivalent.

The Organisation for Economic Co-operation and Development (OECD) undertake this calculation for thirty of the world's richest economies. As Scotland is not an independent country it is not included but the Scottish Government has calculated its own measure, in order for a comparison to be made.

There are two different standard of living measures published by the OECD: GDP per capita and GNI per capita (see Section 1 and Annex 1 for further discussion of the differences between these two measures). The OECD note that the countries where GNI per capita is significantly below GDP per capita are: Luxembourg, Iceland and Ireland, while for Switzerland the reverse is true, significantly boosting income per head⁶.

Table 4 shows the rankings for selected countries according to the GDP per capita measure as well as for GNI per capita. Table 4 includes a measure for Scotland for GDP per capita but only a guesstimate for GNI per capita as full information is not available.

Table 4: Approximations of international standard of living, 2010

Country	GDP per capita		GNI per capita		Change	
	\$,000	Ranking	\$,000	Ranking	\$,000	Ranking
Luxembourg	86.3	1st	61.3	1st	-25.0	-
Norway	57.3	2nd	57.9	2nd	+0.6	-
Switzerland	48.7	3rd	51.5	3rd	+2.8	-
USA	46.6	4th	47.2	4th	+0.6	-
Netherlands	42.2	5th	41.8	5th	-0.4	-
Scotland	41.1	6th	35.8*	13th	-5.3	Down 7
Ireland	40.5	7th	33.6	16th	-6.9	Down 9
UK	35.7	15th	35.8	13th	+0.1	Up 2
Iceland	36.6	16th	29.4	20th	-7.2	Down 4
EU27	31.8		31.8		-	N/A

**Based on the assumption that Scotland and the UK have the same GNI.*

Source: OECD, Scottish Government (Scottish GDP per capita), own calculations (Scottish GNI per capita)

The principal finding to note from Table 4 is the difference that using GNI, a measure of the income earned by the citizens of a country rather than what is produced in a country, can make to a nation's standard of living and its international ranking. For example, Ireland is ranked 7th by GDP per capita but 16th by GNI per capita, which is almost \$7,000 lower.

In Scotland's case a similar downgrading of its ranking is likely to occur due to the considerable degree of overseas ownership with regards to North Sea activity, the drinks industry and financial services. The exact degree of adjustment is unknown. However, given the comparable income and earnings levels seen in Table 3 it seems reasonable to assume that Scotland and the UK have similar GNI levels and so would be similarly ranked.

The important point to take from this analysis is that allocating North Sea activity to Scotland is unlikely to result in any immediate change, post independence, to the standard of living of Scottish households.

⁶ The reason why GDP and GNI differ will vary for each country. For Ireland GDP is above GNI due to the significant overseas ownership of the manufacturing base, particularly with respect to USA ownership. For Switzerland there is both an overstatement, due to the existence of substantial inward day migration by workers from Italy etc, and an even greater understatement of income. due to extensive net investments by Swiss nationals in other countries.

SECTION 3 - What does this mean for the on-going referendum debate?

There are a number of pertinent findings from this analysis that are of importance with regards to the on-going referendum debate.

- First, the data currently used for measuring Scotland's standard of living and growth rate give a distorted view of its performance.
- Second, and as a result, most faster/slower Scottish versus UK growth rate comparisons are inappropriate.
- Third, judging Scotland's economic growth performance is actually quite tricky, as no single measure tells the full story. This point is further complicated by the fact that the ideal measure(s) to use would be GNI⁷ rather than GDP. This is because much of the commercial profit gained from North Sea activity is owned by non-Scottish domiciled companies and so ends up being remitted abroad.
- Fourth, Scotland's tax revenue raising capacity is better measured using nominal growth GDP including North Sea activity, as this takes into account price rises or falls in relation to oil and gas which will feed through directly to the Scottish Government. Normally high or low inflation effects are removed from output figures in order to better identify underlying economic growth, but in the case of a natural commodity like oil, any inflation or deflation outside that experienced by the economy as a whole will result in a gain/loss to the countries public finances.
- Fifth, claims that Scots would be better or worse off under independence cannot be confirmed with the information that we currently have available. In practical terms household income is unlikely to change much, at least in the short term, as economic activity, wages, profits etc will not have changed either.

In general terms what this analysis tells us is that understanding Scotland's economic performance requires a wider consideration of different measures than is currently undertaken. This is due to the complex nature of Scotland's economy.

As an independent country, Scotland's economy would have some unique features that reinforce the need for more sophisticated analysis of the growth figures. The reasons for this are twofold.

First, and like Norway, its economy benefits from a large contribution from a natural commodity (oil), whose price tends to be highly erratic.

Second, like Ireland, a significant proportion of its domestic economy is overseas owned (particularly in relation to oil, drinks and financial services) and so its wealth as measured by GDP tends to be overstated.

These oddities result in the standard measures of economic success having less relevance when judging Scotland's economic performance. So, for example, in 2010 Scotland would have had around the 6th highest \$ terms GDP per capita amongst the wealthy OECD country

⁷ In previous work CPPR has addressed this same issue but with respect to Gross National Product (GNP). GNP and GNI are conceptually identical but most international bodies, like the OECD and the World Bank now prefer to refer to GNI rather than GNI. As a result this paper also makes use of the term GNI.

members. But at the same time Scotland would also have been the only OECD country to have experienced a negative real terms GDP growth rate over the decade from 2001 to 2011.

At present the Scottish Government could undertake work in order to adjust for the first distortionary aspect, by including a geographic share of North Sea activity when calculating real terms GDP growth. Such an adjustment is already undertaken in the annually published Government Expenditure and Revenues for Scotland (GERS) document and in the experimental SNAP data for cash terms GDP. However, no such adjustment is presently made to the Scottish real terms GDP data that is published quarterly.

Adjusting for the second distortionary aspect would be more difficult, as Scotland currently lacks sufficient knowledge of international transactions, although, with work, this position could be remedied.

The difficult reality is that Scotland consists of two distinct economies, one onshore and the other offshore. Scottish economic policies would be largely geared to the former, while it would be principally Scottish oil and gas taxation policy that would impact on the latter.

Equally Scotland's standard of living cannot be judged by simply using GDP per capita, instead we need to know how much of what is produced within Scotland's territory ultimately remains here, as opposed to being repatriated overseas, as well as how much Scots earn overseas comes back to ultimately reside in Scotland.

It is worth emphasising that none of what is contained in this report is an argument for or against independence, but rather a call for far greater clarity over the necessary measurement of the Scottish economy if it were to become an economically independent state.

However, in order to understand our economy and its performance better we need to introduce the new measures of performance described above and incorporate them into the on-going economic and referendum debates.

In terms of moving the debate forward, with regards to these economic performance issues, it would be beneficial if:

- New work is undertaken to develop a Scottish GNI measure, which would provide the clearest picture of the level of Scotland's prosperity and how it is changing over time;
- Ultimately the Scottish Government worked towards publishing a variety of growth measures, as indicated in Table 1 and outline what it interprets from each in terms of its various policy options.

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Annex 1

A. Definitions of output measures

1. Gross Domestic Product (GDP), in basic prices, or Gross Value Added (GVA) – the value of all final goods and services produced within a country's borders. In the case of GVA this excludes taxes and subsidies, however the terms GDP are often used interchangeably, as for example in the Scottish Government's quarterly publication of GDP statistics. For simplicities sake this paper refers to GDP when either measure is being used.

This is the measure (shown in constant, or inflation adjusted, terms and in index form) that is most commonly used in analysing Scotland's and the UK's economic performance.

2. Gross National Income (GNI) – the market value of all final goods and services produced by enterprises owned by a country's citizens.

In effect, the main difference between GNI and GDP is that the latter defines its scope according to location, while the former defines its scope according to ownership. Hence, GDP covers production within a country's borders, while GNI covers production by enterprises owned by a country's citizens. Consequently, production within a country's borders, but by an enterprise owned by somebody outside the country, counts as part of its GDP but not its GNI; on the other hand, production by an enterprise located outside the country, but owned by one of its citizens, counts as part of its GNI but not its GDP.

For most countries the difference between the two types of output measure is minor. However for some countries, where overseas ownership within a country or where ownership of assets outside of a country is particularly large, then the two measures can differ quite significantly. The OECD note that the countries where GNI per capita is significantly below GDP per capita are: Luxembourg, Iceland and Ireland, while for Switzerland the reverse would be true, boosting income per head (see Table 4).

Scotland is likely to have significantly higher GDP than GNI as much of the output relating to North Sea activity is overseas owned. In addition, the ownership of the production of spirits and financial services may be significantly affected.

This difference can also be important, as, if a country becomes increasingly in debt, and spends large amounts of income servicing this debt, this will be reflected in a decreased GNI but not a decreased GDP. Similarly, if a country sells off its resources to entities outside their country this will also be reflected over time in decreased GNI, but not decreased GDP.

3. GDP/GNI per capita – is an attempt to get closer to a measurement of the standard of living in a country. Clearly the distribution of wealth will have a significant impact on the standard of living across a country, nevertheless the average GDP per capita does act as a reasonable proxy, especially of changes in living standards.

GDP (or GNI) per capita is the measure most typically used to compare prosperity (or living standards) across countries by bodies like the OECD (see annual OECD Factbook).

B. Calculation of real terms Scottish GDP including Oil & Gas

Unlike all the other measures of GDP shown in Table 1, no official published data is available for real terms Scottish GDP including Oil & Gas. The methodology used to calculate such a measure consists of:

- i. identifying the UK Oil & Gas only volume index for 2001 and 2011;
- ii. applying this UK Oil and Gas volume index to Scotland by weighting it based on Oil and Gas's higher contribution to Scottish GDP (around 16% using 2009 weights as opposed to the UK's 2% weight for 2009).

While this calculation is only an approximation, the resultant impact on Scottish growth fits in with that experienced by the UK. At the UK level the inclusion of Oil and Gas reduced average annual growth by one quarter of a percentage point (2001-2011), whereas at the Scottish level, with NSO accounting for around 8 times the weight in overall GDP, then this impact reduces annual average growth by close to 2 percentage points.

Annex 2: Deflators

One of the most puzzling aspects of the results shown in Table 1 is why, when excluding oil and gas, Scotland outperforms the UK in cash terms by 0.3 of a percentage point per annum, but the reverse is true in real terms, again, by 0.3 of a percentage point per annum.

This could be explained by a number of factors:

- first, the different survey sources used to collect the data could have an impact;
- second, different deflators could apply between Scotland and the UK;
- third, shifts between applying the 2003 and 2007 Standard Industrial Classifications (SIC's)⁸.

A deflator serves as such a price index, measuring the effects of inflation only. It's purpose is to allow us to be able to distinguish between the changes in the money value of a product that come from (a) a change in prices, and (b) a change in physical output.

Hence in Table 1 of the main paper, the cash terms growth rates reflect the changes in the money value of a product, while the real terms growth rates reflect how much of that is due to output changing and the (implied) deflator reflects how much is due to prices changing.

Differences in GDP deflators could be caused by:

- differences in the make up of the economy, ie different sectors (eg Manufacturing) having higher or lower weights (Scotland vs the UK) and where each sector has its own deflator;
- differences in the individual deflators for each industrial sector, Scotland vs the UK;
- a combination of both.

Assuming that the use of different survey sources does not seriously affect the results then Table 2 shows the implied deflator effect for total Scottish and UK GDP.

Table 2 implies that the Scottish mainland GDP deflator is around 0.5 of a percentage point higher than the UK GDP deflator, ie, inflation, as measured across all mainland output, is higher in Scotland than the UK as a whole.

It would be useful to know the sectoral deflators (e.g. for Manufacturing, Construction, Public and Private Services) within this overall total GDP deflator measure, in order to identify where this higher inflation is coming from. However, at present these are being recalculated for Scotland in light of industrial reclassifications.

In due course further work is needed, using more disaggregated data, in order to understand this effect. In particular, it would be useful to know whether it is private or public sector services that have been experiencing higher inflation in Scotland, and why.

⁸ At present Scottish real terms GDP data is published based on SIC 2007 classifications, while the cash based estimates are based on 2003 SIC classifications. This may affect comparison of growth rates and hence implied deflators. Fully consistent estimates are due to be available in May 2013.

Table 2: Scottish and UK deflators, per annum, 2001 to 2011

	Scotland	UK	Scotland minus UK % points
IMPLIED DEFLATORS*			
Total GDP (inc NS oil & gas)	4.96%	2.43%	2.53%
Total GDP (exc NS oil & gas)	2.78%	2.16%	0.62%
PUBLISHED DEFLATORS**			
Total GDP	3.02% (exc NS)	2.5% (inc NS)	(0.52)***

* The implied deflator equates to the deflator as calculated by taking away the real terms growth rate from the nominal terms growth rate.

** Scotland deflator is calculated using UK deflators for each sector and re-weighting by Scottish production.

*** Given that inflation related to Oil and Gas output was higher than for mainland GDP over this period, then the UK exc NS figure would have been lower than the published 2.5%.

Sources: Scottish Government 'Gross Domestic Product 3rd Quarter 2012', Tables 2a and 2b; SNAP Quarterly National Accounts tables – 2012 Quarter 2; Regional GVA annual publication; Blue Book National accounts aggregates.