

Economic perspectives

How wrong were we? The accuracy of the Fraser of Allander Institute's forecasts of the Scottish economy since 2000

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Abstract

The Fraser of Allander Institute regularly forecasts the annual growth of the Scottish economy. This paper measures the accuracy of these forecasts. It contrasts official measures of the growth performance of the Scottish economy and FAI forecasts for growth. Specifically, official measures of growth for the calendar years 2001 to 2010 are compared to forecasts for growth in these years made between January 2000 and spring 2011. Results show that: FAI forecasts of the direction of economic growth from one year to the next was statistically better than chance; the accuracy of forecasts improve as we get closer to the publication of the first growth estimate; excluding the 'Great Recession', the mean absolute error of forecasts made up to eighteen months before publication of the first growth estimate for a year is approximately half a percentage point (i.e. 0.5%). There have often been significant revisions to Scottish GVA data, particularly at the start of the sample period. This emphasises the need for quality, and timely, indicators of economic performance for the Scottish economy as part of the information required for accurate forecasts in the future.

"The only function of economic forecasting is to make astrology look respectable", (John Kenneth Galbraith, quoted in US News and World Report, 11th January 1988)

1. Introduction

Whether aware of it or not, we all use forecasts, and the accuracy of these is important. Weather forecasters will state the pattern of weather likely for particular areas during certain hours of the day, with their accuracy (or an idea of the likely margin of error) being crucial for users reliant on such forecasts. Astrologers will suggest particular influences

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or outcomes for people born between specific calendar dates. Economic forecasters will, typically, produce estimates of the likely growth of an economy in a future year. These forecasts may be considered a “barometer” of the potential strength of that economy in the future. All users of forecasts will be helped to understand the nature of uncertainty around this specific forecasts is the forecasts also provide the scale of margins of error on these forecasts.

Since 1975, the Fraser of Allander Institute (FAI) has published forecasts of elements of the Scottish economy, including annual economic growth. The accuracy of these forecasts can be empirically quantified. To the author’s knowledge, this is the first academic assessment of the accuracy of the FAI forecasts¹. We consider forecasts for the growth of the Scottish economy published between January 2000 and Spring 2011. These relate to annual growth between 2001 to 2010. While this is a relatively short time period, it allows us to evaluate how accurate the FAI’s forecasts of the Scottish economy have been over the last decade. Here we are not concerned with issues relating to the production of the forecasts, rather we are solely focusing on the accuracy of the published forecasts². The availability of recent data produced by the Scottish Government on the growth of the Scottish economy begins in 1998, so analysis cannot go before this date on a comparable basis.

Figures for economic growth in Scotland are published by the Scottish Government and produced on a less timely basis than for growth in the UK as a whole (produced by the Office for National Statistics). The first estimates of annual growth figures for Scotland for each year of the decade in question have typically been available around seventeen weeks after the end of the calendar year to which they relate.

For example, the first estimate of growth in the final quarter of 2010 was published on the 20th of April 2011, sixteen weeks after the end of the year. This is three weeks longer than the time taken for the first three official estimates of UK growth as a whole to be published. Preliminary data for growth in the UK in the final three months of 2010 was published on the 25th of January 2011, a second estimate published on the 25th of February 2011, and the third estimate was reported in the UK national accounts publication produced on the 29th of March 2011. The longer delay in Scottish GVA series appears to be due to all of the information used to calculate this series not being available earlier. Some data is available reasonably quickly – for example, the most recent Retail Sales Index, for example, for the second quarter of 2011 was published less than five weeks after the end of that quarter. This is however a relatively small part of the data requirements for Scottish GVA series. Monthly surveys are typically more important for the GVA series, but are available at a much longer delay (around two months).

In addition to the delay in the GVA data being published, the first estimates of Scottish GDP growth figures have also been subject to considerable revision. A recent assessment of the revisions to Scottish GDP figures (Scottish Government, 2010) looked at revisions over the last ten years. This used a “rolling” five-year average which would take account of changes in methodology over the last decade. This concluded that future revisions to quarterly data had not been always positive or negative (i.e. first estimates of growth were not systematically biased). Mean Absolute Errors however showed that first estimates of quarterly growth were likely to be revised by around 0.15 percentage points by the same time the following year. This is broadly in line with absolute revisions to initial UK quarterly growth estimates.

The implications of slower release of Scottish growth data and revisions increase the complexity of evaluating the accuracy of forecasts. For example, part of the information available when forecasts are produced relates to the past performance of the Scottish economy as represented in the data released up to that point in time. If that information had subsequently been revised, it is likely that our forecasts would have been different from those published. Revisions to the growth series have implications for the accuracy of FAI forecasts and we explore these by comparing forecasts for growth to estimates of growth published initially, after one year, and the latest estimates³.

This paper proceeds as follows: Section 2 discusses the provision of figures on growth in the Scottish economy, including revisions between the first estimate of annual growth and later periods. This section also describes the forecasts for economic growth made by the FAI over the period, and how “errors” (i.e. differences between what was forecast and the actual growth figures) are calculated. Diagrams reveal the scale of these “errors”. Section 3 introduces two statistical measures which use the errors to examine the accuracy of the FAI forecasts. Section 4 presents and discuss the results, while Section 5 makes some conclusions.

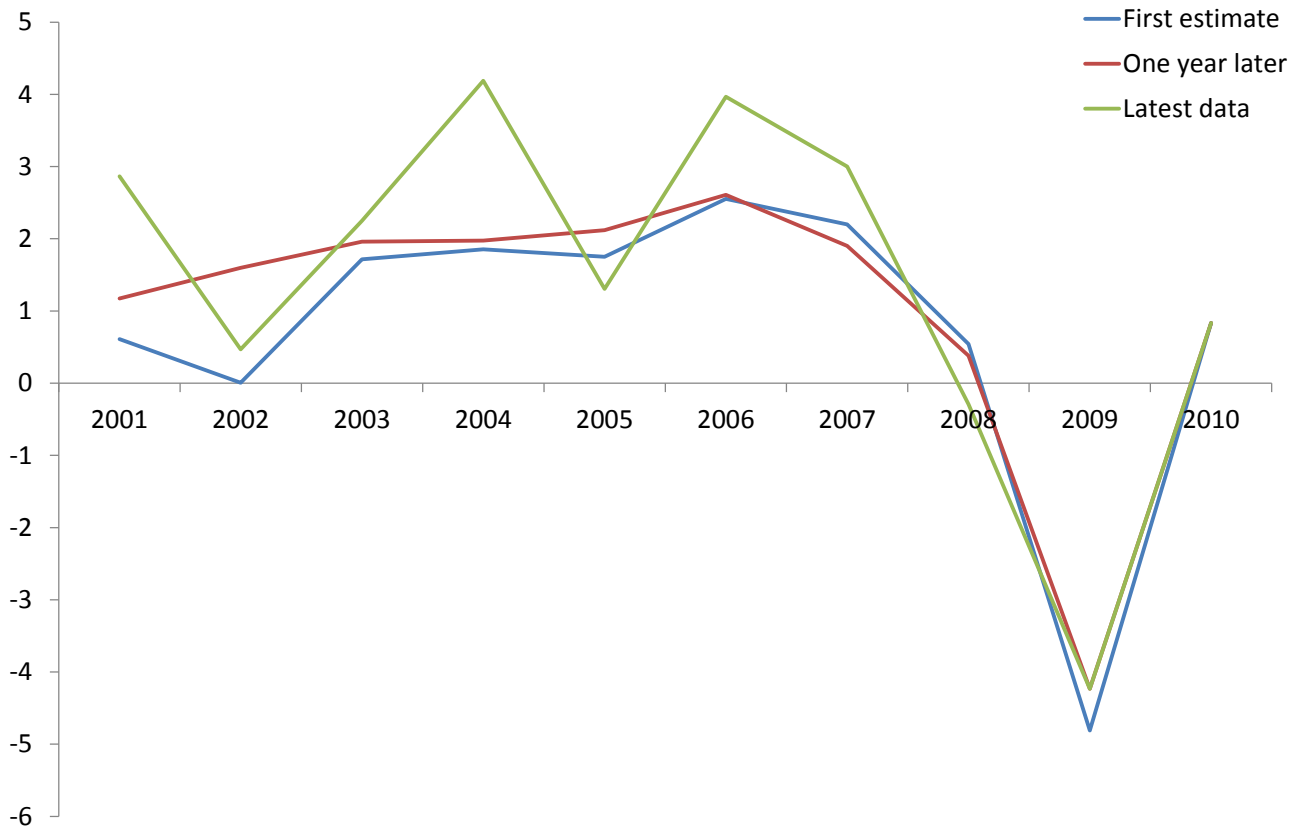
2. Data

2.1 Growth in the Scottish economy

Gross Value Added (GVA) measures the amount of goods and services produced in an economy. Annual GVA growth figures reveal by how much economic activity has increased from one year to the next. GVA figures for the Scottish economy have been produced on a quarterly basis beginning in the first quarter of 1998. As mentioned in the introduction these are typically produced around seventeen weeks after the end of the quarter to which they refer, although it must be noted that this time period has reduced slightly over the last decade. The first estimate of annual GVA growth in a year is available with the publication of the GVA growth figures for the final quarter of that calendar year. The annual growth rate is constructed by “annualising” from the quarterly growth series. We refer to that figure of

GVA growth given initially for annual growth as the “first estimate”.

Figure 1: Annual GVA growth in Scotland, the importance of revisions



As noted earlier there are revisions made to a given year’s GVA growth in subsequent periods as more data becomes available about the true state of the economy during each (previous) quarter. Such revisions can be quite sizeable, and can affect the annual growth figures. For example, the first estimate of annual GVA growth for 2002 was 0.0%. One year later, the estimated growth was 1.6%⁴. In fact this has been the largest revision in the first year after the first estimate of GVA growth for any year in the sample. Other sizeable revisions evolve more gradually throughout the sample. The first outturn figure for growth in 2004, for instance, was 1.9%; however data now suggest that GVA grew by 4.2%. A similar upward revision – albeit not as dramatic – occurred between the first estimate of GVA growth in 2006 (2.6%) and that suggested now⁵ (4.0%).

For simplicity we focus on three measures for the “actual” growth rate of the Scottish economy: the first estimate, that is available one year later, and the latest data. The differences between these three estimates for annual growth rates can be striking, as Figure 1 shows. What we are interested in is the differences (the errors) between FAI forecasts and actual growth estimates. While it is the first published estimate of GVA growth that forecasts are more normally evaluated against in the media, the growth estimates available from the most recent data are likely to

be the most accurate description of what growth was seen in an economy during that period.

2.2 Forecasts of growth in the Scottish economy

We analyse all the forecasts for annual GVA growth between 2001 and 2010 in Scotland published by the FAI between January 2000 and March 2011⁶. In order to take appropriate account of the varying months in which the FAI produced forecasts, we group the months of the year into three periods. We compare the forecasts made in each of these periods to the outturn figures on a consistent basis across the sample.

We consider forecasts for each year made at seven different forecast horizons, shown in Table 1. Each of the published forecasts included were made prior to the publication of the first estimate of annual growth for the year being forecast. We include therefore forecasts made in the year before that which the forecast relates to, the year itself and the spring of the subsequent year (i.e. before the first estimate of annual growth is published).

To clarify with a specific example, we look at the separate FAI forecasts for annual GVA growth in the year 2005 that were published during the Spring, Summer and Winter of 2004, as well as three further forecasts during 2005, and the final forecast made before the first release of official data

Table 1: Forecast horizons for each annual growth rate

Forecast horizon	Year	Months
Previous spring	Year before the year forecast	January to April
Previous summer	Year before the year forecast	May to August
Previous winter	Year before the year forecast	September to December
Spring	During the year being forecast	January to April
Summer	During the year being forecast	May to August
Winter	During the year being forecast	September to December
Following spring	The year after that being forecast	January to April

which was published in March 2006. The first release of annual growth figures for 2005 was published on the 26th of April 2006. Data for longer forecast horizons are not available on a consistent basis over the sample, so we do not include any forecasts produced any earlier than the start of the year before that being forecast (e.g. we do not include any forecasts for 2005 published in 2003)⁷.

evaluate the accuracy of the FAI's forecasts of the Scottish economy over the sample. The first column lists the forecast horizon, while each subsequent column gives the forecast for Scottish GVA growth for a particular year for a given forecast horizon. Reading across the rows of this table shows the forecasts made at a specific forecast horizon. Reading down the columns shows how forecasts for specific years have changed as the forecast horizon has shortened.

Table 2 below summarises all the information used to

Table 2: Annual GVA growth forecasts published by FAI, by forecast horizon for each calendar year, and three official GVA estimates for annual GVA growth

Forecast horizon	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Previous spring	3.3	2.3	1.5	1.8	2.7	1.5	2.1	2.1	-	-1.2
Previous summer	2.9	1.9	1.3	2.2	2.0	1.8	2.3	2.3	1.2	-0.9
Previous winter	-	1.3	1.4	2.1	1.9	1.9	2.3	-	-1.1	0.1
Spring	2.0	1.2	1.1	2.1	1.7	1.9	2.2	-	-2.6	0.6
Summer	1.6	0.9	1.3	2.2	1.8	2.1	2.5	1.4	-2.9	0.7
Winter	0.9	0.7	1.3	2.1	1.8	2.2	-	0.7	-5.0	1.0
Following spring	0.7	-0.2	-	2.0	1.7	2.3	-	0.6	-4.8	1.1
GVA estimates	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
First release	0.6	0.0	1.7	1.9	1.8	2.6	2.2	0.5	-4.8	0.8
One year later	1.2	1.6	2.0	2.0	2.1	2.6	1.9	0.4	-4.2	0.8
Latest data	2.9	0.5	2.2	4.2	1.3	4.0	3.0	-0.3	-4.2	0.8

Note: "-" indicates that no forecast was published in this period. See footnote six.

2.3 Analysis of "errors" between forecasts and GVA estimates

The difference between the forecast and the estimate of GVA data is described as the "error" of the forecast. We can show the absolute size of these errors over time using histograms. Good forecasts will have small "errors". Forecasts with larger errors will lie further away from the centre of the histograms below. The labels on the horizontal axis of each histogram shows the range in which each of the errors lies. The label (0,1), for example, records those forecasts with errors greater than zero but less than (plus) one percentage point. The height up the vertical axis shows

the number of forecasts which had an error of this size and direction. In total, Table 2 shows that forecasts for a total of 63 points in time are evaluated.

Figure 2 shows the histograms for errors over the sample period, comparing the forecast against the value of growth. Figure 2a, for example shows that the majority of the errors between the forecast and the first estimate lie between -1 and 1 percentage point. The shading in each column of Figure 2 identifies which period the forecast error was made in. The darker colours show forecasts made closer to the release of the first estimate of GVA. The same diagram is

Figure 2: Errors between forecasts and estimates of GVA data (a) First estimate, (b) One year later, and (c) Latest estimate

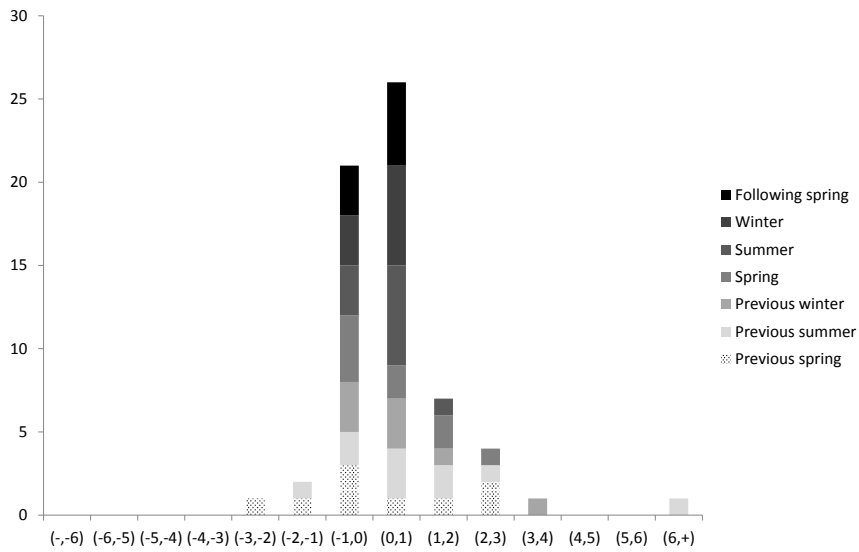


Figure 2a: Difference between forecasts and first estimate

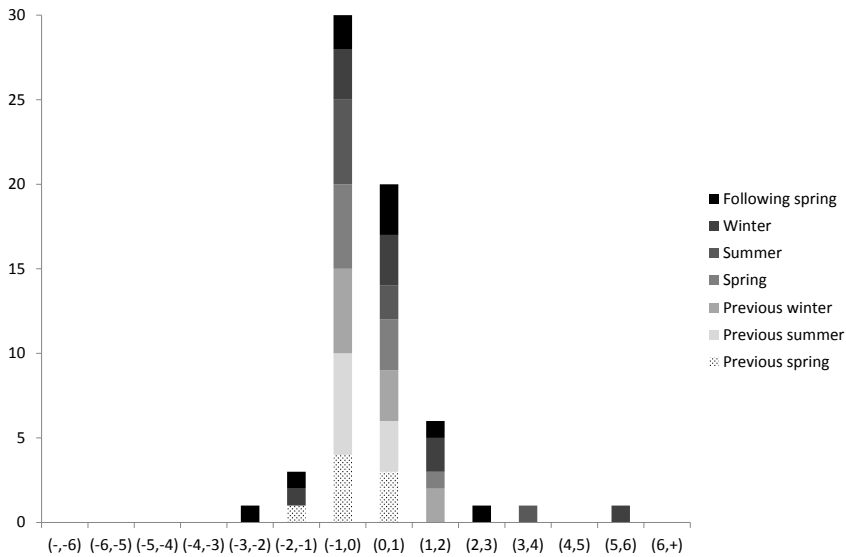


Figure 2b: Difference between forecasts and estimate one year later

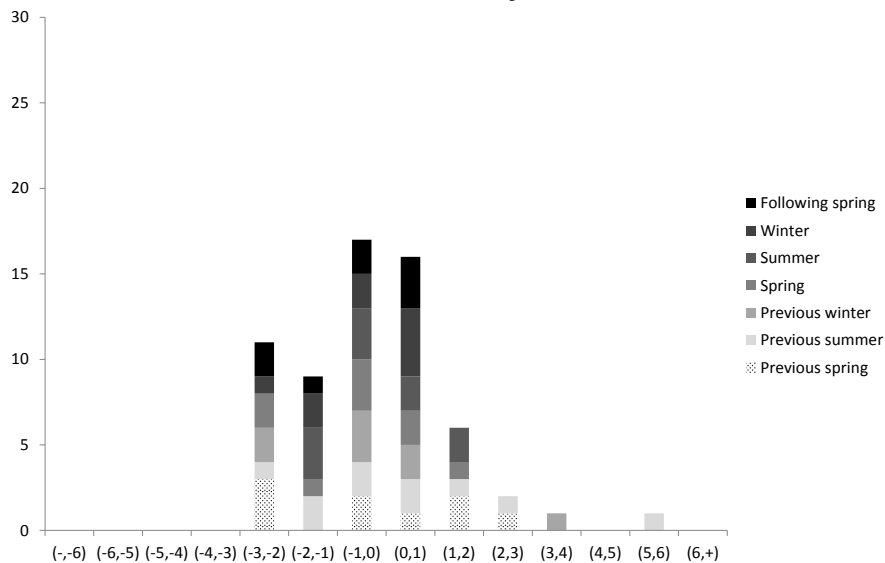


Figure 2c: Difference between forecasts and latest estimate

reproduced for the errors between forecasts and the values for growth published one year later and the latest data (Figures 2b and 2c).

We can see from Figures 2a, 2b and 2c that in each of the three comparison cases, the most frequent forecast error is between the -1 and +1 range, i.e. are concentrated within one percentage point (above or below) the official estimate of growth. This is particularly evident in Figures 2a and 2b.

Further, in each of these figures darker shading indicates the forecasts made closer to the publication of official growth figures. We can see the improvement in the forecasts as the horizon between the forecast publication and the first estimate of annual growth. In Figure 2a, for example, all forecasts made at the shortest forecast horizon are within one percentage point of the first estimate of growth.

Table 3: Share of directions for growth correctly forecast and p-value result for significance

	Percentage of forecasts correctly predicting direction of change in growth	Significance (p-value)
Summer of year forecasts	89%	0.02

2.4 Directional analysis

Aside from “eyeballing” the errors, a further simple test is to see how well FAI forecasts have predicted the direction of growth, i.e. did growth increase or decrease from the previous year’s figure, and was this direction for growth correctly predicted? We follow Ashiya (2006) in calculating the accuracy of the direction of forecasts against those from the first estimate of annual GVA growth in each year. Against these known directions for annual growth, we compare the directions as predicted in the summer of the year (i.e. the first forecasts after the growth in the previous year is known). By comparing the actual change in growth and that forecast, we can calculate the proportion of changes which are forecast correctly.

On this measure, a result of 50% would mean that the forecasts are correctly identifying the direction of growth changes only half of the time. A figure less than 50% would suggest that a coin-toss would be a better predictor than the forecast. A figure above 50% would indicate that there is value in the forecast for its direction of growth from one year to the next. We can use a test statistic (p-value) to show if the number of forecast record is statistically better than chance would suggest. A p-value below 0.05 means that we can reject the null hypothesis and conclude that the FAI forecasts are better than a “coin-toss” at predicting the direction of change in growth in the Scottish economy. The results from this analysis are shown in Table 3. FAI forecasts has correctly predicted the annual direction of growth on eight out of nine occasions.

3. Statistical measures of forecast accuracy

We next use two statistical measures to calculate the accuracy of the FAI forecasts. These are the mean absolute error (MAE) and the mean absolute proportionate error (MAPE)⁸. These are defined as follows:

$$MAE = \sum_{t=1}^T T^{-1} |e_t(k)|$$

$$MAPE = \sum_{t=1}^T T^{-1} (|e_t(k)| / y_t)$$

Where k is the period in which T forecasts are made, $e_t(k)$ is the error between the forecasts made in period k ($f_t(k)$) and the actual value for growth in year t (y).

The MAE measures the mean absolute error between the forecast and the actual annual growth figures, and so is probably the most easily understood measure of forecast accuracy. Unlike other measures, such as the mean error, it is not affected by errors which are positive or negative (i.e. if growth is above or below that forecast, then the mean average will be smaller than the mean absolute average) since it is the absolute size of each forecast error which matters.

The MAPE shows the relationship between the mean absolute error and the growth outturn. Mills and Pepper (1999, p. 252) note that a value for MAPE of greater than one means that, on average, the forecast error is greater than the growth estimate. We will see that for particular years the very low (first release) figures for annual growth in Scotland has an impact upon the values of the MAPE statistic.

4. Results and discussion

We evaluate the accuracy of FAI forecasts for economic growth in Scotland over two periods. Firstly, we report the values of each of the measures of forecast accuracy over the whole sample period, i.e. for forecasts made between Spring 2000 and Spring 2011 for annual growth between 2001 and 2010. Secondly, we exclude forecasts for the year of the “great recession”, i.e. 2009 when Scottish GVA fell by 4.2%.

As is well documented, the vast majority of professional forecasters did not forecast the timing or scale of the “great recession”. For example, from the HM Treasury’s collection

of forecasting organisations published in May 2008, the average UK growth forecast for 2009 was 1.7%. The Treasury's own range forecast for growth in 2009 (produced in March 2008) was between 2.25% and 2.75%. Only one of the thirty-seven forecasts available in May 2008 forecast a decline in GDP in 2009 for the UK economy as a whole⁹,

while the latest data shows in fact UK GVA declined by 4.3% during 2009. Since the failure to forecast this decline is likely to dominate the results on forecast accuracy over our sample, it seems appropriate to consider the accuracy of the FAI forecasts for Scottish GVA growth with and without the forecasts for 2009.

Table 4: Precision of FAI forecasts made between Spring 2000 and Spring 2011, forecasts for 2001 to 2010

Forecast horizon	First estimate		One year later estimate		Latest estimate	
	MAE	MAPE1	MAE	MAPE	MAE	MAPE
Previous spring	1.216	1.357	1.011	1.150	1.622	0.134
Previous summer	1.555	0.969	1.333	0.854	1.773	-0.279
Previous winter	0.894	0.112	0.766	0.154	1.381	0.501
Spring	0.733	0.359	0.611	0.220	1.107	0.428
Summer	0.635	0.415	0.592	0.445	1.066	-0.266
Winter	0.284	0.186	0.448	0.269	1.047	-0.060
Following spring	0.135	0.110	0.510	0.328	1.101	0.070

Note: 1 = MAPE calculated excluding 2003 where annual growth was 0.01% in the first release. This was subsequently revised to 1.6% one year later.

4.1 Whole sample

What is not known when publishing forecasts is the extent to which (any or all) of the official quarterly growth figures will be revised in the future. As already noted, the fact that official data are revised highlights the importance of clarity in relation to which official figures the forecasts are to be evaluated against. As noted above, there have often been some quite significant revisions to Scottish GVA data over the last decade. We therefore show the accuracy of forecasts made at each of the second forecast horizons against three estimates of the growth rate: the first estimate, that available one year later, and the most recent estimates (available in Summer 2011).

Smaller values of mean absolute errors (MAE) and mean absolute proportionate errors (MAPE) reflect better forecast accuracy. If we look at the columns relating to "first estimate" in Table 4, reading down the column we see that on both measures the accuracy of the forecasts improve as the forecast horizon shortens. That is, as the forecasts are made closer to the point at which the first estimate growth figures are produced.

The same general pattern is evident when we compare the forecasts to the growth estimates known one year later. Note that the forecast will not have changed, but what was understood about growth in the Scottish economy during the year being forecast will have changed. The reduction in MAE and MAPE between the earliest and latest forecasts is much less pronounced than the pattern observed for the accuracy of forecasts compared to the first estimate. It would appear therefore that our forecasts have been reasonably successful in taking in economic information available throughout the year being forecast and producing an improved estimate of the first estimate of the annual growth rate.

Turning to the accuracy of the forecasts compared to the latest estimates, we again see the same reducing MAE and MAPE over the forecast horizons. It is clear is that there is a larger error on each of these measures between the forecast of annual growth and the latest estimates of growth. Part of this difference will be due to changes in the methodology used to calculate growth in the Scottish economy over the sample period while we do not – in line with other forecasters - continue to publish forecasts after the release of the first estimate of growth.

Of further interest is the extent to which these results – comparing forecasts and growth outturns over our whole sample – is affected by the decline in GVA seen in 2009 (and not predicted by many forecasters). We therefore calculate the same statistics for the sample but removing forecasts and growth estimates for 2009.

4.2 Whole sample, excluding 2009

The dominance of poor forecast performance in 2009 is clearly shown in the comparison between Table 4 and Table 5 (where 2009 is omitted from the analysis). If we begin by comparing the accuracy of the forecasts against the first estimates, the MAE for the forecast produced around eighteen months in advance of the first official estimate (after summer of the previous year) is less than 0.55 points. So if the first estimate of growth is 2%, then in the winter of the previous year the FAI forecast would, on average, lie between 1.5% and 2.5%. The accuracy of the first official estimate improves as its publication nears, and the forecast produced in the winter of the year and spring of the following year have an mean absolute error of 0.296 and 0.153 respectively.

Table 5: Precision of FAI forecasts made between Spring 2000 and Spring 2011, forecasts for 2001 to 2010, excluding forecasts for 2009

Forecast horizon	First estimate		One year later estimate		Latest estimate	
	MAE	MAPE ¹	MAE	MAPE	MAE	MAPE
Previous spring	1.216	1.357	1.011	1.239	1.622	0.134
Previous summer	1.060	1.246	0.877	1.205	1.366	-0.168
Previous winter	0.492	0.259	0.427	0.298	1.131	0.679
Spring	0.548	0.476	0.484	0.302	1.042	0.530
Summer	0.493	0.516	0.510	0.541	1.036	-0.261
Winter	0.296	0.218	0.409	0.287	1.082	-0.044
Following spring	0.153	0.129	0.501	0.272	1.178	0.099

Note: 1 = MAPE calculated excluding 2003 where annual growth was 0.01% in the first release. This was subsequently revised to 1.6% one year later.

Looking at the MAPE results – and again focusing on the accuracy of the forecasts against the first release estimate – from the previous winter forecast these values are (typically) less than 0.5. For the longer forecast horizons, published in the spring and summer of the previous year MAPE is greater than one. This is explained by the presence of two years of relatively low initial growth estimates – i.e. 2001 (0.6%) and 2008 (0.5%) – meaning that the errors for forecasts made in the spring and summer of the previous year were greater than the outturn growth (in the first release). Interestingly, if the revised figure of 1.2% growth for 2001 which was estimated one year on is used rather than that from the first release, then both these MAPE figures reduce significantly.

Looking at the accuracy with regard to later estimates of the annual growth rates, we again see the importance of revisions. FAI forecasts for growth are not produced after the first official estimate is produced, but the estimates for annual growth will be revised. As we have seen, some of these revisions have been quite sizeable over the sample using in this paper. This suggests that perhaps a greater emphasis should be placed on comparing forecasted estimates of GVA growth to later estimates of growth. It might be several quarters before the annual growth rates are no longer affected by revisions. This however is a possible tension between placing forecasts in context with regular updates on the current state of the economy. Uncertainty in the history of economic performance serves to multiply the possible states of the future economy.

With relation to the MAE between forecasts and the values one year on, we can see that the FAI forecasts have an absolute error of around 0.5 for all forecasts produced from a horizon of one year or less (that is, from the winter of the year before that being forecast onwards). If we look at the accuracy of the forecasts against the latest estimates, again we see the huge impact of revisions. FAI forecasts in each of the periods have an average absolute error of over 1 percentage point. This result is particularly driven by the sizeable revisions to GVA figures for 2004 and 2006 more

than one year after their first release (see Figure 1). Without comparison forecasts of the Scottish economy, we are unable to say if these errors are superior than those produced by other forecasting organisations. What they do suggest is the scale of uncertainty which should be attached to future forecasts made by the FAI.

5. Conclusions

We have evaluated the accuracy of FAI forecasts of annual Scottish GVA growth between 2001 and 2010, and have examined the accuracy over a range of forecast horizons. We have compared growth forecasts to the first estimate and subsequent official figures published by the Scottish Government. We have noted that revisions to official data are a normal phenomenon of economic statistics and that the Scottish Government's analysis has indicated that there is no systematic bias in the revisions made to the quarterly growth figures between their first and subsequent releases. Such revisions however mean that the accuracy of FAI forecasts appears better for the first estimate of GVA growth than for the subsequently revised data.

Revisions to the GDP series are a natural part of production of official economic statistics, particularly for series compiled from components of evidence, e.g. partial surveys supplemented with fuller information that is necessarily accumulated over a period of time. In addition the initial publication of Scottish GDP data occurs after three separate releases of official UK GDP data for the same period. These combine to cloud our understanding of the position of the Scottish economy at a given instant. The forecasts are made with the set of information which is available at a given time. Where the information turns out to have been incorrect given subsequent revisions it is unsurprising that the forecast accuracy worsens.

In this paper we find that:

- Forecast errors are concentrated close to zero and which typically reduce in size as the forecast horizon is reduced (i.e. we get closer to the release of first estimate of growth).

- FAI forecasts perform significantly better than chance would suggest in predicting whether growth in one year will be greater or less than growth in the previous year.
- If we exclude the “great recession” of 2009 – an event missed by economic forecasts at the UK level – the Mean Absolute Error between forecasts made in the winter of the year preceding the forecast year is approximately 0.5. This means that if the first estimate of annual growth is revealed to be 2%, the forecast made up to eighteen months previously would lie between 1.5% and 2.5%.
- It is crucial whether the forecast is compared against the first release of GVA data or that available after one year, given the size of some revisions to GVA data for Scotland over the last decade.

Acknowledgements

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Footnotes

¹The author is aware of an assessment of the accuracy of Scottish forecasters made in 2000 or 2001, published by Business AM, which reported that the FAI forecasts were the most accurate.

²Granger (1996) argues that forecasts typically do not provide adequate information to allow others to replicate the forecast and so it is therefore “correct” to judge the forecasts on their accuracy, rather than the assumptions used.

³A second important point may be to evaluate the accuracy of the forecasts by taking into account what was known at the time the forecasts were made. This is not explicitly addressed in this paper, but could be a line for future research.

⁴The current estimate for annual growth in 2002 is 0.5%.

⁵The latest data we use for growth in each year are those given from the publication of Q4 2010, published in April 2011.

⁶During the sample number of forecasts by the FAI varied from year to year. Forecasts were produced four times a year between 2000 to 2003, and then three times in each year between 2004 and 2006. There were two forecasts (April and June) published in 2007 before there was a break in the production of the Fraser Commentary. This break meant that no forecasts were published from July 2007 until June 2008. The Fraser Economic Commentary was relaunched with the support of PWC in June 2008 and has been published three times a year, typically in February, June and November of each year.

⁷Further, in a small number of instances where two forecasts of annual growth were published in the same period we have used a mean average of the two forecasts.

⁸Other articles evaluating economic forecasts include Pain and Britton (1992) and Melliss and Whittaker (1998). The first article here examines if National Institute forecasts are “efficient” (i.e. unbiased either positively or negatively in relation to the outcome), and not whether the forecasts are accurate, while the second paper examines the accuracy of HM Treasury forecasts and applies some of the measures identified above for a different time period and for the UK as a whole.

⁹This was Economic Perspectives, who, in May 2008, forecast UK GDP growth for 2009 of minus 1.

