



## What Do We Know About G-7 Macro Forecasts?

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# Was wissen wir über die makroökonomischen Vorhersagen für die Länder der G 7?

What Do We Know About G-7 Macro Forecasts?

Von Herman O. Stekler<sup>1</sup>

Fildes & Stekler's (2002) survey of the state of knowledge about the quality of economic forecasts focused primarily on US and UK data. This paper will draw on some of their findings but it will not examine any additional US forecasts. The purpose is to determine whether their results are robust by examining the predictions of other countries. The focus will be on (1) directional errors, (2) the magnitude of the errors made in estimating growth and inflation, (3) whether there were biases and systematic errors, (4) the sources of the errors and (5) whether there has been an improvement in forecasting ability. It appears that few of the papers that have analyzed any of the G7 forecasts have examined all of these issues. A notable exception is a paper coauthored by Ullrich Heilemann, whom we are honoring.<sup>2</sup> However, a number of the papers that are cited here provided data that give us a greater understanding of the forecasting process. Some the forecasts were issued by international organizations such as the OECD and IMF. The others come from institutions or from private forecasters as reported in *Consensus Forecasts*.

The next section examines directional errors followed by a discussion of the magnitude of the quantitative discrepancies. The third section questions whether the accuracy of forecasts has improved. The subsequent sections discuss the existence of bias in the various G7 countries and the sources of the errors. The final section summarizes what we have learned about forecasting in the G7 countries from the evaluation studies that have been summarized here.

## I Directional Errors

There is only limited information about forecasters' ability to predict turning points because most evaluations focused on the magnitude of the errors. Fildes & Stekler indicated that forecasters were not able to forecast the cyclical turning points in the UK economy and were only partially successful in identifying a turn when it occurred. The inflation surges of 1979-80 and 1989-90 were also not predicted until a number of months after prices had started rising rapidly; a similar result was observed when inflation tapered off.

As for other countries, the turning points in German GDP were not predicted. However, the accelerations and decelerations of GDP but not of inflation were forecast accurately.

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2 Heilemann & Stekler (2003).

(Heilemann & Stekler, 2003; Dopke & Fritsche, 2006a). Loungani (2001) indicates that there were 60 cyclical turns in his sample but private forecasters forecast only three of them a year in advance.<sup>3</sup> The evidence is similar for the forecasts of research institutes and international organizations.<sup>4</sup> (Ash et al., 1998; Öller & Barot, 2000; Blix et al., 2001; Vogel, 2007). In fact, Ashiya (2003) shows that the IMF's forecasts of the direction of change GDP made 15 months in advance are not significantly related to the actual changes. Going even further, Vuchelen & Guitierrez (2005b) found that the 24 month OECD forecasts for the G7 countries were worthless.<sup>5</sup> *The preponderance of the evidence is that most forecasters are not able to predict turning points in advance and even a suggestion that they are not detected quickly.*

## II Magnitude of the Errors

Because most evaluations focus on the magnitude of the errors, there is considerable information that permits us to synthesize the results. Fildes & Stekler (2002) reported that the Mean Absolute Error (MAE) of the UK annual GDP forecasts was around 1%, but Öller & Barot (2000) found that the errors were larger for some of the other European countries. Newer studies found similar results: the MAE of the GDP forecasts for the G7 countries was around 1% and the MAE of the one year-ahead inflation predictions was as low as 0.33% (Mestre, 2007), but others found it to be between 0.5% and 0.75% (Loungani, 2001; Heilemann & Stekler, 2003; Ashiya, 2006; Dopke & Fritsche, 2006a; Isiklar & Lahiri, 2007; Bowles et al., 2007; Timmermann, 2007).<sup>6</sup> *The universality of these results suggests, that given present knowledge and procedures, we cannot expect to achieve higher levels of accuracy.*<sup>7</sup>

## III Have the Forecasts Improved?

Given the number of papers that have evaluated forecasts, it is surprising how few have asked whether the quality of the forecasts has improved over time. There are sufficient data because we have 40 years worth of forecasts for some countries. The evidence from a limited number of analyses is not definitive. Heilemann & Stekler (2003) examined German forecasts and adjusted the errors for the difficulty in forecasting the relevant periods.

3 Loungani did not distinguish between the cyclical turns of developed and underdeveloped countries.

4 Batchelor (2001) found that the private sector forecasts were superior to those of the international organizations, but Boweles et al (2007) indicated that the ECB SPF forecasts were comparable to those of the private Consensus Forecasts.

5 But same authors (Vuchelen and Guitierrez, 2005a) and other studies had found that the one year forecasts were useful.

6 Unfortunately, Campbell & Murphy (2006) showed that the range of the GDP forecasts made by Canadian economists who provide information to the government encompassed the actual GDP numbers only 10-35% of the time depending upon the sample period. The inflation rate forecasts were better: the actual value was within the range of the forecasts 60% of the time.

7 An appropriate procedure would be to compare these errors to the mean absolute change or the volatility of the series.

The results were mixed. Dopke & Fritsche (2006a) surveyed previous studies of German forecasts which had differing results but they suggest that accuracy may have improved. Vogel (2007) shows that the RMSE of the OECD forecasts had declined over time, but these statistics had not been adjusted for the changes in the volatility of the economies. On the other hand, Timmerman (2007) indicates that the quality of the IMF forecasts had declined since they had been last evaluated in the 1990s. Earlier Fildes & Stekler (2002) had summarized the conclusions about US forecasts and found mixed results. *Despite all the efforts that have been devoted to forecasting, there is no clear evidence that accuracy has improved. We need to ask why? Stock and Watson (2007) provided one explanation. The decline in volatility has made it harder to forecast inflation.*<sup>8</sup>

## IV Bias, Rationality, and Systematic Errors

There are a number of possible explanations for the existence of these errors. While they might be the lowest achievable errors, there are at least two alternative explanations. If there were symmetric loss functions, the errors might be biased and thus irrational. Alternatively, individuals might have asymmetric loss functions that explain the existence of these errors. (Elliot & Timmermann, 2008). Most evaluations have focused on the possibility that the forecasts were biased.

Many studies have indicated that forecasters make systematic errors and are biased. (Fildes & Stekler, 2002). These biases consist of overestimates of growth rates during slowdowns and recessions and underestimates during recoveries and booms. Similar systematic errors are observed with regard to inflation forecasts: overpredictions occur when inflation is low and underpredictions are observed when inflation is high.

Among non-US and UK studies cited by Fildes & Stekler, the IMF end of year forecasts were rational for all countries Pons (2001) and the six month-ahead predictions of German research institutes were rational while the year-ahead were not Kirchgassner (1993). The OECD predictions did not include all available information (Ash et al. 1990) and tended to underestimate changes in the trends of both real output growth and inflation. (Anderson, 1997).<sup>9</sup> As shown below, the newer studies do not reach a single definitive conclusion.

**Consensus Forecasts:** Loungani (2001) found that the year-ahead Consensus Forecasts of GDP had an optimistic bias that had diminished by the end of the year for which the predictions were made. More recently and examining a longer time period, Batchelor (2007) and Ager et al. (2007) reach different conclusions regarding the predictions of GDP for the G7 countries. Batchelor finds that there is a difference between the US and other G7 forecasters. The latter have large biases that diminish only gradually. Ager et al. used the pooled method of Clements et al. (2007) and found that over all only the Italian growth forecasts were biased. For other countries there were biases at some hori-

8 On the other hand, if individuals have expectations that are anchored on an inflation target, that forecast may be sufficiently accurate and no further improvement in accuracy should be expected. Secondly, the Great Moderation may mean that small forecast errors, while statistically significant are not economically meaningful. However, the economic events of 2007-2008 may signify the end of the Great Moderation.

9 However, in periods when inflation was decelerating, the rate of inflation was overpredicted.

zons and some of the revisions were predictable. The two studies agree that the inflation predictions were not biased.

**Canadian Forecasts:** Some Canadian forecasters are systematically optimistic or pessimistic. (Campbell & Murphy, 2006).

**Eurozone Forecasts:** The European Central Bank has selected a group of individuals to prepare forecasts for the ECB. The evidence indicates that inflation forecasts made one and two years in advance are both biased: the rate of inflation is underpredicted. Only the two-year-ahead GDP estimates are biased. (Bowles et al., 2007; Garcia & Manzanares, 2007).

**German Forecasts:** Heilemann & Stekler (2003) indicated that there were systematic errors in German predictions of inflation but that these errors were not observed in the GDP forecasts. Dopke & Fritsche (2006a) agreed that the German GDP forecasts were unbiased, but argued that the inflation forecasts were unbiased but inefficient.

**Japanese Forecasts:** Ashiya (2006) found that some Japanese institutions were always either optimistic or pessimistic. Moreover, they frequently overreact to new information, make excessive revisions and thus are not rational. (Ashiya, 2003).

**UK Forecasts:** In order to provide more information about the probabilities of specific rates of inflation, the Bank of England issues both a point forecast and also provides a fan chart. The NIESR now also publishes a fan chart. The evidence indicates that the Bank's point forecasts are unbiased. (Wallis, 2003; Clements, 2004; Mitchell & Hall, 2005). However, the Bank's probability forecasts are biased because of the exaggerated concern with upside risks but better than the appropriate benchmark. The Bank of England also conducts a survey of professional forecasters. The evidence from that survey indicates that the professional forecasters' uncertainty about the rate of inflation has declined but they also may not have noticed that the persistence of UK inflation had declined. (Boero et al, 2008).

**International Agency Forecasts:** Timmermann (2007) showed that the IMF forecasts of both growth and inflation for the G7 countries were significantly biased. Economic growth was overpredicted for all countries except the US while inflation was also overpredicted for four of the G7 countries. These forecasts are similar in quality to those made by Consensus Forecasts, but the current year IMF forecasts are slightly less biased than the others. Vogel's (2007) analysis of the OECD found that the current year forecasts were not biased, but that the year-ahead predictions were biased. They were overly optimistic when growth was slowing down and were more biased than the Consensus estimates.

*These findings are diverse making it hard to generalize, but there are two common themes: (1) forecaster beliefs are persistent and make consistent over or under estimates (Isiklar and Lahiri (2008), and (2) they use information inefficiently Kirchgassner (1993) and Dopke & Fritsche (2006a).* Furthermore, there is a large variation among the forecasters, with some perennially optimistic or pessimistic. In fact, their biases exist even at short horizons. Ashiya (2006) reported this result for Japanese forecasters and Batchelor (2007) noted this among the Consensus forecasters. This finding can be explained in a number of ways: (1) the forecasters are irrational and do not learn from their perennial mistakes, (2) they have asymmetric loss functions or (3) they exhibit this characteristic for strategic reasons. Additional research is required to test these alternative explanations.<sup>10</sup>

<sup>10</sup> However, it is important to note that weather forecasters have had biases but these systematic errors were reduced when they had quick feedback on the quality of their predictions.

## V Sources of Errors

Our discussion has indicated that there are analytic difficulties associated with determining why the errors occurred. Nevertheless these newer studies have provided some evidence about the sources of the errors. Heilemann & Stekler (2003) indicated that a large portion of the German forecast errors were attributable to the failure to predict recessions. Similarly, Dopke & Fritsche (2006b) found that the variability (dispersion) of the German GDP forecasts was higher before and during recessions. They surmised that forecasters must disagree about the importance of shocks and the economy's response to these shocks. Bowles et al. (2007) argue that the European SPF underestimates of inflation were due to asymmetric shocks. All the shocks tended to raise the rate of inflation, and when the forecasts were adjusted for the impact of these shocks, there was less evidence of a bias.

## VI What Have We Learned?

The evidence about the G7 macro forecasts that has been presented here is very similar to the findings of Fildes & Stekler that primarily related only to US and UK forecasters. Both studies found that recessions are not predicted in advance and account for a significant portion of the quantitative errors. Neither study was able to show that forecast accuracy has improved and both found that there were systematic errors.

However, the studies that are summarized here provide us with some new insights. There may be a limit beyond which forecast accuracy cannot be improved. (Heilemann & Stekler, 2003; Isiklar & Lahiri, 2007). A second important insight is that forecasts longer than 12-18 months might not be valuable. (Vuchelen & Guitierrez, 2005b; Isiklar & Lahiri, 2007). While studies found systematic errors, they are now not necessarily considered biases; they may be attributable to asymmetric loss functions. Finally, we now have a somewhat better understanding of the forecasting process. Batchelor (2007) showed how the systematic errors or "bias" was related to the forecasters' optimism (pessimism) and conservatism in revising their predictions. He notes that standard rationality tests are not appropriate if there has been a structural break. The pattern of the errors can then provide a way of understanding the forecasters' learning process about the impact of this structural break. Isiklar & Lahiri (2007) use forecast revisions to explain the behavioral characteristics of forecasters, i.e. how they react to news and when is news important.<sup>11</sup> We have also learned that there is much more work to be done in determining the importance of asymmetric losses, the sources of biases, the limits of accuracy, etc. Much can be learned if we undertake more studies, about the sources of error, similar to the paper published by our honoree. (Heilemann, 2002).

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<sup>11</sup> In the forecasts made for year  $t$ , the most important revisions occur at the end of  $t-1$ .

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