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PREDICTING US RECESSIONS: DOES A WISHFUL BIAS EXIST?

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DOES A WISHFUL BIAS EXIST?[2]

There is evidence in the economic literature that near cyclical peaks an optimistic bias exists in private expert forecasts of real GDP growth rates. Other evidence concerns differences in the accuracy of GDP forecasts made during expansions and those made during contractions. It has also been hypothesized that a wishful bias may hamper the ability to recognize the beginning of a recession in real-time.

We tested consensus forecasts of quarterly GDP growth rates taken from SPFs conducted by PhilFed and found that they may be seen as unbiased only for time horizons j=0,1,2; for greater horizons they are over-optimistic. This over-optimism may also be observed for (j=1, 2) for forecasts made at peaks (at these moments the consensus usually points only to a slowdown of the economy but not to a contraction). Lastly, over-optimism may be observed for nowcasts (j=0) during cyclical contractions, including the first two quarters of a recession (in these cases the reality is usually worse than expected).

Taken together, all these facts mean that some aversion to predicting US recessions exists. There are two possible reasons for this: a) experts rely too heavily on extrapolations (then changes in medium-long tendencies would be missed in real time); b) there is a wishful bias in forecasts against predicting recessions (this reluctance may be rooted in psychological factors). We give some arguments in favor of the thesis that the second factor is more important.

Keywords: Business cycles, Turning points, Recessions, Biased forecasts, SPF

JEL Classification: E32 Business Fluctuations; Cycles; E37 Forecasting and Simulation: Models and Applications

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1 Introduction

There is evidence in the economic literature that an optimistic bias exists in private expert forecasts of real GDP growth rates, especially near cyclical peaks[3] (Loungani (2001); Loungani and Trehan (2002); Fildes and Stekler (2002); Batchelor (2007); Elliott et al. (2008), Sinclair et al. (2012)). Other evidence concerns differences in the accuracy of GDP forecasts made during expansions (periods from troughs to peaks) and those made during contractions (periods from peaks to troughs). Loungani (2001), Schuh (2001), Patton and Timmermann (2007), Croushore (2012), Sinclair et al. (2012), Wieland and Wolters (2013) paid some attention to this phenomenon. Our descriptive analysis (Smirnov, 2011) also showed that a wishful bias may hamper the ability to recognize the beginning of a recession in real-time. In this paper we refine those ideas and prove them statistically.

In the next section we briefly describe the data. Section 3 formulates and tests several simple hypotheses concerning possible over-optimism in GDP forecasts. Section 4 discusses the main results and offers some concluding remarks.

2 The Data

The main block of our data consists of consensus (median) forecasts of quarter-to-quarter real GDP growth rates from the Surveys of Professional Forecasters (SPF) conducted by the PhilFed. As we are interested not in individual strategies of different experts but in a possible bias in consensus forecasts, we do not refer to individual estimates.[4]

We used all available SPFs which were conducted during the period 1968:Q4-2013:Q4.[5] Hence, there are a total of 181 quarters in our sample; 154 belonging to phases of expansion, and 27 belonging to phases of contraction. There are 7 pairs of cyclical turning points (peaks and troughs) during this time interval.

For each Survey (usually made in the middle of a quarter t we consider five consensus forecasts: one for the current quarter (nowcast f_{t+0}) and four for the subsequent quarters (f_{t+1}, f_{t+2}, f_{t+3}, and f_{t+4}). Each of these estimates is compared in various manners with actual GDP growth rates

[3] (Un) biasedness of non-private macroeconomic forecasts is a special research topic. See Corder (2005), Clements et al. (2007), Patton and Timmermann (2007), Guler et al. (2014).

[4] See Schuh (2001), Elliot et al (2008), Dovern and Weisser (2009) for an investigation of individual experts' biases.

[5] In fact, up to 1991:Q4 the PhilFed used GNP instead of GDP. For our purposes this doesn't matter, so – just for the simplicity - we use the term "GDP" everywhere.

(a_{t+0}, a_{t+1}, a_{t+2}, a_{t+3}, and a_{t+4}) also taken from the PhilFed historical database. As an actual we used the first (or advance) GDP estimate published by the BEA.[6] We preferred the first estimate to the last available (as of January 30, 2014) because in the course of 45 years the difference between those two is heavily dependent on changes in the methodology; it is quite clear that nobody could ever keep them in mind while providing regular forecasts.

The SPF set of data is very well known. The novelty of our paper is a deeper examination not only of nowcasts for the current quarter (f_{t+0}) and forecasts for one quarter ahead (f_{t+1}), but of all five forecasts up to the same quarter of the next year (f_{t+4}).[7]

In our comparisons we use the NBER set of business cycle turning points (peaks and troughs) in its quarterly version.

3 Hypotheses and Empirical Results

If f_t is an unbiased estimate of a_t then the simplest hypothesis assumes that the average difference (D) between a_t and f_t should not significantly differ from zero:

$$H_0: D = \text{mean}(a_t) - \text{mean}(f_t) = 0. \quad (1)$$

We may anticipate equation (1) being fulfilled not only for the whole sample but also for subsamples with various time horizons of forecasting (j=0,1,…4). But the figures from Table 1 show that this is not the case. For the whole period 1968:Q4-2013:Q4 our null hypothesis H_0: D=0 cannot be rejected at ordinary levels of significance only for nowcasts f_{t+0} and forecasts for one quarter ahead f_{t+1}. For time horizons of two quarters and more the average actual is significantly *less* than an average forecast; for one year ahead it is almost 0.9 percentage points less. This is a very significant magnitude not only from a statistical but also from an economic point of view. Thus, the bias for forecasts f_{t+2}, f_{t+3}, f_{t+4} is positive: on average experts are too optimistic for the future which is far enough ahead.

[6] For a discussion of different concepts for "actual" GDP growth in the context of forecasting quality, see Fildes and Stekler (2002), Croushore (2012).

[7] All forecasting horizons from the SPF are analysed surprisingly rarely. Zarnowitz (1992) and Wieland & Wolters (2013) are among the few.

Table 1. Average Differences Between Actual and Forecasted Real GDP Growth Rates, by Various Horizons of Forecasting

Horizons of Forecasting					
t+0	t+1	t+2	t+3	t+4	All horizons pooled
Whole period, 1968:Q4 – 2013:Q					
0.117	-0.211	-0.442	-0.734	-0.857	-0.427
(0.398)	(0.269)	(0.044)	(0.002)	(0.000)	(0.000)
Periods of Expansion					
0.333	0.001	-0.264	-0.596	-0.705	-0.250
(0.017)	(0.996)	(0.150)	(0.004)	(0.003)	(0.003)
Periods of Contraction					
-1.105	-1.406	-1.432	-1.505	-1.743	-1.434
(0.014)	(0.073)	(0.164)	(0.162)	(0.060)	(0.000)

The probabilities of random rejection of the null hypothesis (H_0: D=0) with the alternative hypothesis (H_1: D ≠ 0) are in parentheses.
Source: Authors' calculations

The results for the subsamples for separated periods of expansion and contraction are distinctly different from each other. Nowcasts f_{t+0} made during expansions are significantly less than actuals (positive difference, excessive caution or excessive pessimism); forecasts for one quarter ahead f_{t+1} are unbiased, and forecasts for longer time horizons are more than actuals (negative difference, excessive optimism), at least for j=3 and 4. On the other side, forecasts made during periods of contraction are always too optimistic: differences between average actual and forecasted GDP growth rates are always negative, and the magnitude increases as the horizon grows.

Note that all forecasts being pooled for all time horizons are definitely positively biased. The next hypothesis which concerns possible biases in forecasts of GDP growth rates may be written as follows (see Mincer and Zarnowitz (1969)):

$$a_t = \alpha + \beta f_t + e_t, \quad (2)$$

If f_t is an unbiased and effective forecast for a_t then α=0 and β=1, or

H_0: α=0, β=1.

We tested these hypotheses for α and β separately and jointly as well. As there were only a few equations with statistically significant α, we re-estimated equation (2) without constant:

$$a_t=\beta f_t+e_t, \quad (3)$$

and checked the hypothesis H_0: $\beta=1$.

We also suppose that it is more difficult to make an unbiased forecast at the moment of a cyclical turning point. So, we added two dummies to equations (2) and (3): $D_p=1$ for all peaks and 0 otherwise; and $D_t=1$ for all troughs and 0 otherwise.[8] If we are right, the coefficients of these dummies should be significantly negative for the first (over-optimism) and significantly positive for the second (over-pessimism).

Hence, there are four regressions in our set. We estimated them for the entire period 1968:Q1 – 2013:Q4 and separately for periods of expansions and contractions.

The main results of our calculations (see the Appendix for details) are:

– Hypothesis H_0: $\alpha=0$, $\beta=1$ from equation (2) may not be rejected at 0.05 and higher levels for time horizons $j=0, 1, 2$ and for all horizons pooled. On the contrary, for time horizons $j=3, 4$ the hypothesis may be rejected. So, f_t is hardly an unbiased forecast of a_t if the time horizon is more than half a year. Coefficients β in these cases are usually less than 1, which means that the forecasts for distant quarters are over-optimistic;

– For periods of expansion the main results are the same, excluding the fact that for $j=0$ (nowcasts) H_0: $\alpha=0$, $\beta=1$ may also be rejected. Most probably this is caused by a significantly positive α. This means that while the US economy is growing nowcasts may be too cautious or too pessimistic;

– For periods of contraction the hypothesis H_0: $\alpha=0$, $\beta=1$ for nowcasts may also be rejected but the reason for this is not positive but significantly negative α. Hence, a decline during the first quarters of recessions is usually deeper than expert expectations;

– Dummies for cyclical peaks (D_p) and troughs (D_t) are very significant for time-horizons $j=1,2$, D_p being negative (which means over-optimism for nearest future at peaks) and D_t being positive (which means over-pessimism for nearest future at troughs). Both dummies are insignificant for nowcasts.

[8] Sinclair et al. (2012) used a dummy for periods of contraction, it's not the same.

The serious difficulty of predicting recessions in real time may also be easily illustrated by consensus forecasts made just at the quarter of peak. Table 2 shows that at the peak experts usually give over-optimistic forecasts: in five cases out of seven (the total number of peaks and troughs from 1968:Q4 to 2013:Q4) all consensus forecasts for all time-horizons are positive. Hence, at these moments the consensuses did not predict any contraction, but only a deceleration of the US economy (hence, there is no place for the prediction of a recession). Only for the two recessions of 1974-1975 and 1980 did experts predict two consequent quarters of decline, so one could expect that a recession would come.

As for the consensus forecasts made at troughs, they are much better. Only in two cases (the same recessions of 1974-1975 and 1980) did they give one-quarter lagged predictions of oncoming growth; in all other cases all forecasted GDP growth rates were positive for all time horizons. Really, to forecast the end of a recession is much easier than to forecast its beginning.

Table 2. Consensus Forecasts of Real GDP Growth Rates Made at Turning Points, by Various Horizons of Forecasting

	Actuals		Horizons of Forecasting				
Turing points	First estimate	Last available	t+0	t+1	t+2	t+3	t+4
			Peaks				
1969:Q4	-0.1	-1.7	0.2	0.3	0.6	2.5	3.1
1973:Q4	1.3	3.8	1.4	-0.3	-0.6	2.1	2.7
1980:Q1	1.1	1.3	0.0	-2.5	-0.7	0.8	2.2
1981:Q3	-0.6	4.7	0.0	2.1	3.5	4.0	4.3
1990:Q3	1.8	0.1	1.4	0.8	0.8	0.8	2.4
2001:Q1	2.0	-1.1	0.8	2.2	3.3	3.7	3.7
2007:Q4	0.6	1.5	1.5	2.2	2.3	2.7	2.8
			Troughs				
1970:Q4	-3.3	-4.1	-1.3	5.9	4.5	2.9	3.8
1975:Q1	-10.4	-4.7	-5.5	-0.5	3.3	4.9	5.7
1980:Q3	1.0	-0.6	-3.8	-1.6	4.0	2.3	4.9
1982:Q4	-2.5	0.4	1.1	2.4	3.3	4.3	4.0
1991:Q1	-2.8	-1.9	-1.9	0.2	1.7	2.9	3.2
2001:Q4	0.2	1.0	-1.9	0.1	2.4	3.6	4.0
2009:Q2	-1.0	-0.4	-1.5	0.4	1.7	2.2	2.9

Source: PhilFed

4 Conclusions

We tested consensus (median) forecasts of quarterly GDP growth rates taken from SPF conducted by PhilFed. Usually they may be seen as unbiased only for time horizons j=0,1,2; for greater horizons they are over-optimistic. The over-optimism may also be observed for (j=1, 2) for forecasts made at peaks (at these moments, the consensus usually points only to a slowdown of the US economy but not to a contraction)[9] and for nowcasts (j=0) during cyclical contractions, including two first quarters of a recession (in these cases the reality is usually worse than expected).

Taken together, all these facts mean that some aversion to predicting recessions exists. There are two possible reasons for this: a) experts rely too heavily on extrapolations (therefore changes in medium-run tendencies would be missed in real time); b) there is a wishful bias in forecasts against predicting recessions. This reluctance may be rooted in psychological factors. For discussions of this hypothesis, symmetric and asymmetric loss-functions, etc. see Batchelor (2007), Patton and Timmermann (2007), Elliott et al. (2008), Ashiya (2009), Smirnov (2011), Guler et al (2014).

The second factor is more important because over-pessimism does not occur as often as over-optimism does (if inaccurate extrapolation were the main reason, then some kind of symmetry between over-optimism and over-pessimism while passing the turning points would exist). We found over-pessimism only for nowcasts (j=0) during expansions where it is possibly not over-pessimism but over-caution and for forecasts with time horizons j=1, 2 if they are made at troughs. These latter forecasts are really less than actuals in most cases but usually they are more than zero; so even they point to expansion, not to contraction. Hence, real-time predictions of troughs are usually quite satisfactory.

We strongly believe that a wishful bias exists which prevents experts from predicting recessions properly and in time. To some extent, expert over-optimism or over-pessimism exists at other phases of business cycles, but the inability to predict the beginning of a recession is possibly the most important shortcoming of macroeconomic forecasting.

[9] See Loungani and Trehan (2002); Fildes and Stekler (2002) for similar assertions (but not similar explanations).

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Appendix. Regressions of Actual on Forecasted GDP Growth Rates, Various Horizons of Forecasting

Table A.0. Current Quarter (Nowcasts)

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
-0.138	1.107	-	-	0.154	-	0.655
-	1.076	-	-	0.072	-	0.785
-0.122	1.101	0.158	-0.232	0.204	0.850	0.655
-	1.073	0.057	-0.413	0.089	-	0.785
Periods of Expansion						
0.751+	0.854	-	-	0.016	-	0.401
-	1.050	-	-	0.228	-	0.807
0.845+	0.832	-0.601	-	0.011	0.707	0.404
-	1.050	0.075	-	0.232	-	0.807
Periods of Contraction						
-0.911	1.159	-	-	0.037	-	0.608
-	1.326	-	-	0.069	-	0.696
-1.110*	1.202	-	0.970	0.032	0.882	0.623
-	1.338	-	0.148	0.092	-	0.696

Table A.1. One Quarter Ahead

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
-0.211	0.997	-	-	0.512	-	0.341
-	0.587	-	-	0.332	-	0.587
-0.061	0.959	-3.806+	2.542+	0.586	0.310	0.423
-	0.943	-3.857+	2.496+	0.308	-	0.640
Periods of Expansion						
0.199	0.930	-	-	0.814	-	0.318
-	0.981	-	-	0.721	-	0.700
0.993+	0.734*	-4.708*	-	0.026	0.000	0.438
-	0.992	-3.890+	-	0.869	-	0.744
Periods of Contraction						
-1.079	0.525	-	-	0.116	-	0.116
-	0.405	-	-	0.104	-	0.048
-2.404+	0.525	-	5.316+	0.001	0.007	0.441
-	0.227	-	3.208*	0.031	-	0.208

Table A.2. Two Quarters Ahead

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
-0.034	0.855+	-	-	0.075	-	0.157
-	0.846+	-	-	0.023	-	0.472
0.085	0.796+	-1.854x	3.153+	0.027	0.369	0.209
-	0.819+	-1.800x	3.170+	0.007	-	0.496
Periods of Expansion						
-0.051	0.924+	-	-	0.268	-	0.268
-	0.910+	-	-	0.105	-	0.642
0.265	0.849+	-2.104*	-	0.292	0.033	0.295
-	0.921+	-1.932*	-	0.149	-	0.655
Periods of Contraction						
0.782	0.102	-	-	0.193	-	0.001
-	0.348	-	-	0.073	-	0.037
0.278	-0.367	-	6.403+	0.006	0.015	0.305
-	-0.282	-	6.429+	0.001	-	0.334

Table A.3. Three Quarters Ahead

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
0.577	0.584+	-	-	0.001	-	0.043
-	0.747+	-	-	0.000	-	0.397
0.711	0.551+	-1.193	1.209	0.002	0.983	0.049
-	0.748+	-0.945	0.499		-	0.400
Periods of Expansion						
0.200	0.748+	-	-	0.006	-	0.104
-	0.814+	-	-	0.003	-	0.549
0.375	0.710+	-1.231	-	0.009	0.407	0.113
-	0.814+	-1.100	-	0.003	-	0.549
Periods of Contraction						
3.150	-0.500	-	-	0.122	-	0.011
-	0.410	-	-	0.069	-	0.063
2.946	-0.606	-	2.057	0.092	0.204	0.041
-	0.232	-	2.215	0.045	-	0.095

Table A.4. Four Quarters Ahead

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
0.484	0.586	-	-	0.000	-	0.036
-	0.722^{+}	-	-	0.000	-	0.396
0.678	0.553	-2.459*	0.291	0.002	0.427	0.061
-	0.744^{+}	-2.358*	0.192	0.000	-	0.410
Periods of Expansion						
0.174	0.721^{+}	-	-	0.005	-	0.063
-	0.771^{+}	-	-	0.005	-	0.486
0.358	0.702^{+}	-2.587*	-	0.018	0.074	0.101
-	0.804^{+}	-2.538*	-	0.005	-	0.486
Periods of Contraction						
1.508	0.121	-	-	0.114	-	0.001
-	0.504*	-	-	0.039	-	0.170
1.788	-0.092	-	1.811	0.016	0.411	0.035
-	0.369	-	1.723	0.032	-	0.196

Table A.5. All Horizons

α	β	D_p	D_t	$P_{\alpha=0,\beta=1}$	$P_{\alpha+D's=0}$	R^2
Whole period, 1968:Q4 – 2013:Q4						
-0.161	0.907+	-	-	0.000	-	0.229
-	0.864+	-	-	0.000	-	0.518
-0.072	0.888+	-1.842+	0.944*	0.000	0.140	0.246
-	0.869+	-1.884+	0.906*	0.000	-	0.529
Periods of Expansion						
0.221	0.845+	-	-	0.001	-	0.204
-	0.905+	-	-	0.000	-	0.630
0.562+	0.768+	-2.281+	-	0.000	0.000	0.237
-	0.919+	-1.964+	-	0.001	-	0.643
Periods of Contraction						
-1.040*	0.774+	-	-	0.000	-	-0.160
-	0.569+	-	-	0.001		0.131
-1.774+	0.760+	-	2.882+	0.000	0.114	0.234
-	0.479+	-	1.627*	0.000	-	0.159

Wild's test: * - significant at 0.05 level; + - significant at 0.01 level (for H_0: α=0 and H_0: β=1). $P_{\alpha=0,\beta=1}$ – probability of a random rejection of the null hypothesis H_0: α=0, β=1; $P_{\alpha+D's=0}$ – probabilities of a random rejection of the null hypothesis which matches to the appropriate line (H_0: $\alpha+D_p=0$; or H_0: $\alpha+D_t=0$; or H_0: $\alpha+D_p+D_t=0$).

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