Strategic Bias and Professional Affiliations of Macroeconomic Forecasters

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This paper investigates strategic motives of macroeconomic forecasters and the effect of their professional affiliations. "Wishful expectations hypothesis" suggests that a forecaster predicts what his employer wishes. "Publicity hypothesis" argues that, since forecasters are evaluated by accuracy and ability to generate publicity, forecasters in industries that emphasize publicity most will make most extreme and least accurate predictions. "Signaling hypothesis" asserts that an extreme forecast signals confidence in own ability, because incompetent forecasters would mimic others to avoid public notice. Empirical evidence from a twenty-four-year panel of annual GDP forecasts is consistent with the publicity hypothesis only. Implication to the rationality test is discussed.

1. Introduction

Over the last few decades, rationality of macroeconomic forecasts has been the subject of controversy. The empirical evidence is totally mixed: while some studies find bias and inefficiency,[1] others do not.[2] The conclusions of these analyses, however, rely on the crucial assumption that forecasters aim to minimize expected squared forecast errors. This assumption might be at variance with the reality, because there are various reasons for rational forecasters to announce forecasts different from the conditional expected value. Ito (1990) analyzes yen-dollar exchange rate forecasts and finds industry-specific bias in the direction that would benefit the forecaster's employer ("wishful expectations hypothesis"). Laster, Bennett, and Geoum (1999) develop a model of rational forecast bias in which forecasters compromise accuracy to gain publicity for their firms. The model predicts that, the more the forecaster's wage depends on publicity, the more extreme and the less accurate his forecast is ("publicity hypothesis"). Ashiya and Doi (2001) argue that incompetent forecasters try to reduce the risk of an extremely low reputation by mimicking other forecasters, and hence a person whose forecast is different from others must have confidence in own ability ("signaling hypothesis").

Little is known, however, about the validity of these hypotheses. Pons-Novell (2003) finds industry-specific bias in the U.S. unemployment rate forecasts, but this result is difficult to interpret as the evidence for the wishful expectations hypothesis.[3] Furthermore, Laster et al. fail to find evidence for this hypothesis in the growth rate forecasts. As for the publicity hypothesis, the empirical test of Laster et al. is incomplete,[4] and there is no other empirical study on it. Ehrbeck and Waldman (1996) and Ashiya (2003) analyze the rationality of forecast revisions, and reject the signaling hypothesis. Their results, however, might be marred by the publicity effect.[5]

This paper examines these three hypotheses using a twenty-four-year panel of annual GDP forecasts. Section 2 explains the data, and Section 3 shows the results. Section 3-1 evaluates the wishful expectations hypothesis, but we do not find positive evidence. Section 3-2 employs an improved method of Laster et al. and confirms the publicity hypothesis. This result is significant in that it establishes the publicity hypothesis for the first time. Moreover, it indicates that conventional tests of rationality might reject the rational expectations hypothesis falsely if professional affiliations of

forecasters are not taken into account. Section 3-3 tests the signaling hypothesis. Unlike the previous literature, we carefully control the publicity effect. Then the regression result is still inconsistent with the signaling hypothesis. Section 4 concludes.

2. Data

Toyo Keizai Inc. has published the forecasts of about 70 Japanese institutions (banks, securities firms, trading companies, insurance companies, and research institutions) in the February or March issue of "Monthly Statistics (Tokei Geppo)" since 1970s. In every December, institution *i* releases forecasts of the Japanese real GDP growth rate for the ongoing fiscal year and for the next fiscal year. We call the former $f_{t,t}^i$ and the latter $f_{t,t+1}^i$. For example, February 2004 issue contains forecasts for fiscal year 2003 (from April 2003 to March 2004) and for fiscal year 2004 (from April 2004 to March 2005). We treat the former as $f_{2003,2003}^i$ and the latter as $f_{2003,2004}^i$.

To avoid the effect of the second Oil Shock, we use the forecasts published from February 1981 on. That is, we use $f_{t,t}^i$ for the fiscal years 1980 through 2003 and $f_{t,t+1}^i$ for the fiscal years 1981 through 2003. We exclude institutions that participate in less than 10 surveys, leaving 53 institutions. The average number of observations per institution is 18.42 for current-year forecast ($f_{t,t}^i$) and 18.21 for year-ahead forecast ($f_{t,t+1}^i$). We divide these 53 institutions into five industry categories: banks (19 institutions), securities firms (12), trading companies (8), insurance companies (7), and research institutions (7). Let $Bank^i$, $Security^i$, $Trading^i$, $Insurance^i$, and $Research^i$ be the industry dummies.

As for the actual growth rate g_t, Keane and Runkle (1990) argue that the revised data introduces a systematic bias because the extent of revision is unpredictable for the forecasters (See also Stark and Croushore (2002)). For this reason we use the initial announcement of the Japanese government usually released in June. [6] The Japanese economy experienced four business cycles in our sample period: the peaks were 1984, 1990, 1996, and 2000, and the troughs were 1981, 1986, 1993, 1998, and 2001. [7]

3. Results

3-1. Wishful expectations hypothesis

Ito (1990) analyzes a survey data of yen-dollar exchange rate expectations, and finds that there are "wishful expectations" among forecasters: Japanese exporters expect a yen depreciation (relative to others), and Japanese importers expect a yen appreciation.

As for the GDP forecast, security firms and insurance companies wish strong growth (relative to other institutions), because it stimulates sales of stocks and insurance. The wishful expectations hypothesis implies that forecasters in these industries make optimistic forecasts relative to others. We test this implication by regressing the deviation of individual forecasts from the consensus (i.e. the mean forecast) on industry dummies. Let $\bar{f}_{t,t}^{-i} \equiv \frac{1}{52} \sum_{j \neq i} f_{t,t}^{j}$ be the average of current-year forecasts excluding institution i. Then $DEV_{t,t}^{i} \equiv f_{t,t}^{i} - \bar{f}_{t,t}^{-i}$, the forecast deviation, indicates the degree of i's optimism relative to the mean forecast in year t. $DEV_{t,t}^{i} > 0$ ($DEV_{t,t}^{i} < 0$) indicates forecaster i is relatively optimistic (pessimistic) in year t. The regression we consider is

$$DEV_{t,t}^{i} = \alpha + \beta_{B} \cdot Bank^{i} + \beta_{S} \cdot Security^{i} + \beta_{I} \cdot Insurance^{i}$$
$$+ \beta_{R} \cdot Research^{i} + \sum_{s=1980}^{2002} \gamma_{s} \cdot dum_{t}(s) + u_{t,t}^{i}$$

where $dum_{t}(s)$ ($s = 1980, \cdots, 2002$) denotes the year dummy and

$$dum_{t}(s) = \begin{cases} 1 & \text{if} \quad s = t \\ 0 & \text{otherwise} \end{cases}.$$

We add the year dummies to control on specific factors in each year. If β_{j} is positive, forecasters in industry j tend to be more optimistic than those in the trading companies. The wishful expectations hypothesis predicts β_{S} and β_{I} to be significantly positive. The same regression is also considered for year-ahead forecast.

Table 1 summarizes the result. Standard errors of estimated coefficients are in parentheses. The coefficients of the year dummies are not reported. The only significant coefficient in Table 1 is the dummy for research institutions in year-ahead forecast. The dummies for security firms and insurance companies are not significantly positive. Therefore the wishful expectations hypothesis is not supported by our data. One possible explanation for this result is that security firms and insurance companies in

4

reality are indifferent to the growth rates so that they do not form distinctively optimistic expectations.

3.2 Publicity hypothesis

Laster et al. (1999) assume that forecasters' wages are based on both their accuracy and their ability to generate publicity for their firms. The most accurate forecaster in a given period gains media exposure, which is more effective than a paid advertisement in attracting new clients to the firm. The chance of winning extensive publicity, however, decreases as the number of similar forecasts increases. Each forecaster thus has an incentive to differentiate his forecast from others at the price of forecast accuracy.

Their model implies that forecasters working in industries that offer the greatest relative reward for publicity will make predictions that are most extreme and least accurate. Namely the model indicates

(H1) reward for publicity and extremeness of forecasts are positively correlated, and

(H2) reward for publicity and accuracy of forecasts are negatively correlated.

Consequently,

(H3) accuracy and extremeness of forecasts are negatively correlated.

To establish this "publicity hypothesis", at least two of (H1), (H2), and (H3) must be confirmed. Since Laster et al. have tested only (H1), their empirical method is imperfect and unsatisfactory. This paper examines all three hypotheses in order.

We expect that those who work for research institutions benefit relatively more from favorable publicity, and hence they produce extreme and inaccurate forecasts. On the other hand, trading companies will use economic forecasts for internal planning purpose and therefore emphasize accuracy. Banks, securities firms, and insurance companies occupy an intermediate position.

First we examine (H1) by the following regression:

$$\left| DEV_{t,t}^i \right| = \alpha + \beta_B \cdot Bank^i + \beta_S \cdot Security^i + \beta_I \cdot Insurance^i$$
$$+ \beta_R \cdot Research^i + \sum_{s=1980}^{2002} \gamma_s \cdot dum_t(s) + u_{t,t}^i .$$

$\left| DEV_{t,t}^i \right|$ is the absolute forecast deviation from the mean forecast. If β_j is positive, forecasters in industry j tend to make forecasts more different from the consensus than those in the trading companies do. We expect β_R to be significantly positive.

The results in Table 2 clearly support (H1): the coefficients for the research-institutions dummy are significantly positive in both current-year and year-ahead forecasts. It indicates that the research institutions on average release more extreme forecasts compared with the trading companies. For other industries, the coefficient for the securities-firms dummy in year-ahead forecast is significantly positive. This result will be used in the test of (H3).

Next we examine (H2) by the following regression:

$$\left| FE_{t,t}^{i} \right| = \alpha + \beta_B \cdot Bank^i + \beta_S \cdot Security^i + \beta_I \cdot Insurance^i$$
$$+ \beta_R \cdot Research^i + \sum_{s=1980}^{2002} \gamma_s \cdot dum_t(s) + u_{t,t}^{i}$$

where $\left| FE_{t,t}^{i} \right| \equiv \left| f_{t,t}^{i} - g_t \right|$ is the absolute forecast error of the current-year forecast made by institution i in year t. If β_j is positive, forecasters in industry j tend to make forecasts less accurate than those in the trading companies do. We expect β_R to be significantly positive.

Table 3 presents the results. Although β_R in current-year forecast is not significant, β_R in year-ahead forecast is significantly positive at the 0.10 level. Namely year-ahead forecasts of research institutions are less accurate than trading companies. This result offers considerable support of (H2). For other industries, the coefficient for the securities-firms dummy in current-year forecast is significantly negative. This result will be used in the test of (H3).

Finally, we test (H3) by the joint result of Table 2 and 3. (H3) is rejected if forecasts of some industry are more extreme and at the same time more accurate (or less extreme and less accurate) than other industries. In other words, (H3) is rejected if there exists some industry j such that β_j is significantly positive in one table and significantly negative in another.

As for the banks and the insurance companies, no coefficient is significantly different from zero. As for the securities firms in current-year forecast, the coefficient in Table 3 is significantly negative but that in Table 2 is not significant. As for the securities firms in year-ahead forecast, the coefficient in Table 2 is significantly positive but that in Table 3 is not significant. As for the research institutions, all coefficients are positive. Therefore the results in Table 2 and 3 are consistent with (H3).

Since all of (H1), (H2), and (H3) are supported, our empirical results validate the publicity hypothesis.

3-3. Signaling hypothesis

Ashiya and Doi (1999, 2001) generalize the model of Scharfstein and Stein (1990) and consider the situation that forecasters and their clients do not know the true ability of each forecaster. The forecaster receives a private signal of which accuracy is correlated with his ability. Signals of competent forecasters are correlated with each other, but signals of incompetent forecasters are independent. The clients revise the belief about each forecaster's ability using past forecast records, and the forecasters revise the belief about own ability using accuracy of own past signals.

In this model, it is risky to make a forecast different from others because he acquires a bad reputation when only his forecast is inaccurate (Note that competent forecasters receive similar signals). Hence a person who has no confidence in own ability mimics others in order to avoid a low evaluation. A forecaster whose past signals were accurate, on the other hand, demonstrates his confidence in own ability by making a forecast different from others.

If this argument were correct, then we would observe a negative correlation between $\left|FE_{t,t}^{i}\right|$ (the absolute forecast error) and $\left|DEV_{t,t}^{i}\right|$ (the absolute forecast deviation from the mean forecast). Table 4(a) presents the result of the following regression:

$$\left|FE_{t,t}^{i}\right| = \alpha + \beta \cdot \left|DEV_{t,t}^{i}\right| + \sum_{s=1980}^{2002} \gamma_{s} \cdot dum_{t}(s) + u_{t,t}^{i}.$$

β is significantly positive for both current-year and year-ahead forecasts, which is in contradiction to the "signaling hypothesis".

One might argue that the "publicity effect" has blurred out the "signaling effect" in the above regression. As we saw in Section 3-2, the publicity hypothesis implies that forecast accuracy and extremeness of forecasts are negatively correlated (See (H3)). That is, $\left|FE_{t,t}^{i}\right|$ and $\left|DEV_{t,t}^{i}\right|$ must be *positively* correlated across industries under the publicity hypothesis. Therefore the joint effect of the publicity hypothesis and the signaling hypothesis on the coefficient of $\left|DEV_{t,t}^{i}\right|$ is indeterminate.

7

We address this problem by estimating the intra-industry effect of $\left|DEV_{t,t}^{i}\right|$ on $\left|FE_{t,t}^{i}\right|$: the publicity effect must be insignificant *within* industries because similar importance will be attached to accuracy relative to publicity in the same industry. The modified regression we consider is

$$\left|FE_{t,t}^{i}\right| = \alpha + \beta_{B} \cdot \left|DEV_{t,t}^{i}\right| \cdot Bank^{i} + \beta_{S} \cdot \left|DEV_{t,t}^{i}\right| \cdot Security^{i} + \beta_{I} \cdot \left|DEV_{t,t}^{i}\right| \cdot Insurance^{i}$$
$$+ \beta_{T} \cdot \left|DEV_{t,t}^{i}\right| \cdot Trading^{i} + \beta_{R} \cdot \left|DEV_{t,t}^{i}\right| \cdot Research^{i} + \sum_{s=1980}^{2002} \gamma_{s} \cdot dum_{t}(s) + u_{t,t}^{i}.$$

If firms in industry j offer similar relative reward for publicity, then the publicity effect must be negligible and the signaling effect must prevail within industry j. Therefore we expect β_{j} to be significantly negative.

Table 4(b) shows the result, which is opposite to the prediction. All but the trading-companies dummy in year-ahead forecasts are significantly positive, and what is worse, no β_{j} is negative. The signaling hypothesis of Ashiya and Doi (2001) is rejected even after eliminating the publicity effect.

Ehrbeck and Waldman (1996) and Ashiya (2003) also investigate the signaling hypothesis, but they are interested in the rationality of forecast revision (i.e. new forecasts minus previous forecasts for the same period). They find that forecast revisions are excessive enough to reject the rational expectations hypothesis, so they consider a reputation model to explain this excessive revision. When each forecaster's ability is private information, rational forecasters mimic what able forecasters will do. Thus forecasters revise their forecast excessively if and only if abler forecasters tend to do so. It implies a *negative* correlation between each forecaster's mean squared forecast revision and mean squared forecast error. The empirical results, however, are contrary to this prediction: Ehrbeck and Waldman (1996) find a *positive* correlation, and Ashiya (2003) finds no correlation between them.

Unfortunately, their approach is not free from contamination of the publicity effect. Suppose that extremeness of the final forecast is more important for generating publicity than that of the initial forecast. Then those who are rewarded for publicity will release extreme final forecasts (at the price of accuracy), but they will not distort their initial forecasts. Consequently their forecast revisions will be larger than others, leading to a *positive* correlation between the degree of forecast revision and forecast error. Since

the signaling hypothesis predicts a negative correlation, the joint effect on the sign of the correlation is indeterminate. This is an important caveat against the results of Ehrbeck and Waldman (1996) and Ashiya (2003).

Our method is complementary to theirs, and has the added advantage: by taking account of the professional affiliations of the forecasters, it succeeds in controlling the publicity effect and isolating the signaling effect.

4. Conclusions

This paper has examined three strategic motives of macroeconomic forecasters by a twenty-four-year panel of annual GDP forecasts. "Wishful expectations hypothesis" suggests forecasters distort their predictions in the direction that would benefit their employers, but we have not found such tendencies. "Signaling hypothesis" argues that competent forecasters signal confidence in own ability by differentiating their forecasts from others, and that we would observe a negative correlation between the absolute forecast error and the degree of forecast extremeness. This assertion, however, is unequivocally rejected by the data.

"Publicity hypothesis" predicts that, since forecasters' wages are based on both their accuracy and their ability to generate publicity for their firms, forecasters in industries that emphasize publicity most will make most extreme and least accurate forecasts. We have made thorough investigation into this hypothesis, and have confirmed it for the first time.

Our result indicates that rational forecasters compromise accuracy to gain publicity for their firms. Since they have objectives other than minimizing expected forecast errors, predictable bias in forecasts may not be the sign of irrationality. Therefore the unbiasedness test and the efficiency test, which are common in the literature, are biased toward rejecting the rational expectations hypothesis.

To eliminate the publicity effect from the rationality test, we must take account of the professional affiliations of the survey participants. Whether the publicity effect is observed in other forecasts is an important topic for future research.

Notes

1. Batchelor and Dua (1992), Davies and Lahiri (1995), Jansen and Kishan (1996), Pons (1999), and Loungani (2001).

2. Holden and Peel (1985), Keane and Runkle (1990), Batchelor and Dua (1991), Joutz and Stekler (2000), Oller and Barot (2000), and Ashiya (forthcoming).

3. More specifically, Pons-Novell (2003) finds (1) the dummy for miscellaneous institutions is significantly positive and (2) the dummy for the investment banking is significantly negative. However, the first result is difficult to interpret because all of the government, Federal Reserve, insurance companies, and labor organizations are classified into this category. The relevance of the second result to the wishful expectations hypothesis is also unclear because we do not know whether the investment banks benefit from low unemployment rates more than the government or the commercial banks do.

4. We will discuss this issue in Section 3-2.

5. We will review their findings and discuss the possible effect of the publicity hypothesis in Section 3-3.

6. We obtain the same results by using the revised data of g_t released in June of year $t+2$.

7. The initial announcements of the actual growth rates for fiscal years 1980 to 2003 were 3.8%, 2.7%, 3.3%, 3.7%, 5.7%, 4.2%, 2.6%, 4.9%, 5.1%, 5.0%, 5.7%, 3.5%, 0.8%, 0.0%, 0.6%, 2.3%, 3.0%, -0.7%, -2.0%, 0.5%, 0.9%, -1.3%, 1.6%, and 3.2%.

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Table 1: Wishful expectations hypothesis

Dependent variable: $DEV_{t,t}^{i} \equiv f_{t,t}^{i} - \bar{f}_{t,t}^{-i}$

	Current year	Year-ahead
Constant	-0.002 (0.056)	-0.027 (0.101)
Bank	-0.006 (0.025)	-0.048 (0.041)
Security	-0.018 (0.028)	0.014 (0.045)
Insurance	-0.009 (0.032)	0.049 (0.051)
Research	0.047 (0.031)	0.161 (0.050)***
Year dummies	Yes	Yes
R^2	0.006	0.027
Obs.	976	965

Notes
Standard errors are in parentheses.
***: Significant at the 0.01 level.

Table 2: Extremeness of forecasts

Dependent variable: $\left|DEV_{t,t}^{i}\right| \equiv \left|f_{t,t}^{i} - \bar{f}_{t,t}^{-i}\right|$

	Current year	Year-ahead
Constant	0.294 (0.037)***	0.286 (0.063)***
Bank	-0.020 (0.017)	0.019 (0.026)
Security	-0.005 (0.019)	0.099 (0.028)***
Insurance	-0.009 (0.022)	0.044 (0.032)
Research	0.035 (0.021)*	0.172 (0.031)***
Year dummies	Yes	Yes
R^2	0.060	0.094
Obs.	976	965

Notes
Standard errors are in parentheses.
***: Significant at the 0.01 level.
**: Significant at the 0.05 level.
*: Significant at the 0.10 level.

Table 3: Forecast accuracy

Dependent variable: $\left| FE_{t,t}^{i} \right| \equiv \left| f_{t,t}^{i} - g_{t} \right|$

	Current year	Year-ahead
Constant	0.859 (0.047)***	1.614 (0.121)***
Bank	-0.005 (0.022)	0.060 (0.037)
Security	-0.046 (0.024)*	0.014 (0.040)
Insurance	-0.023 (0.027)	0.061 (0.046)
Research	0.006 (0.026)	0.082 (0.045)*
Year dummies	Yes	Yes
R^2	0.736	0.865
Obs.	976	965

Notes
Standard errors are in parentheses.
***: Significant at the 0.01 level.
**: Significant at the 0.05 level.
*: Significant at the 0.10 level.

Table 4: Signaling hypothesis

(a) $\left|FE_{t,t}^{i}\right| = \alpha + \beta \cdot \left|DEV_{t,t}^{i}\right| + \sum_{s=1980}^{2002} \gamma_s \cdot dum_t(s) + u_{t,t}^{i}$

	Current year	Year-ahead
β	0.404 (0.039)***	0.279 (0.045)***
Year dummies	Yes	Yes
R^2	0.762	0.869
Obs.	976	965

(b) $\left|FE_{t,t}^{i}\right| = \alpha + \beta_B \cdot \left|DEV_{t,t}^{i}\right| \cdot Bank^i + \beta_S \cdot \left|DEV_{t,t}^{i}\right| \cdot Security^i + \beta_I \cdot \left|DEV_{t,t}^{i}\right| \cdot Insurance^i$
$+ \beta_T \cdot \left|DEV_{t,t}^{i}\right| \cdot Trading^i + \beta_R \cdot \left|DEV_{t,t}^{i}\right| \cdot Research^i + \sum_{s=1980}^{2002} \gamma_s \cdot dum_t(s) + u_{t,t}^{i}$

	Current year	Year-ahead
Bank	0.521 (0.059)***	0.376 (0.067)***
Security	0.105 (0.059)*	0.185 (0.063)***
Insurance	0.418 (0.085)***	0.389 (0.098)***
Trading	0.546 (0.062)***	0.054 (0.105)
Research	0.477 (0.067)***	0.310 (0.064)***
Year dummies	Yes	Yes
R^2	0.772	0.871
Obs.	976	965

Notes
Standard errors are in parentheses.
***: Significant at the 0.01 level.
**: Significant at the 0.05 level.
*: Significant at the 0.10 level.