共 同 研 究 室

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▶テーマ　合理的期待仮説の実証的検討
——西独ビジネス・サーベイを用いて——

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報告要旨

My talk was based on my joint paper with Klaus F. Zimmermann titled "Testing the Rationality of Price Expectations for Manufacuturing Firms," so that the present note is a summary of this paper.

The critical importance of expectations in economics has been becoming increasingly clearer in recent years. For instance, the rational expectations hypothesis proposed by Muth is one of the key assumptions of the "new classical macroeconomics" of Lucas, Sargent, Wallace, Barro and others.

The purpose of our work is to examine whether price expectations satisfy the rationality hypothesis in Muth's sense, using the IFO business-survey data. The IFO Institute of Munich has been conducting monthly panel surveys for over five thousand manufacturing establishments. They are asked, for one thing, whether their selling prices will increase, remain the same or decrease over the next three months. The question about the actual price changes is also included in the survey.

Available were two sets of IFO data for about 3, 500 establishments (1977/78 period) and for about 4, 500 establishments (1980/81).

The expectational data included in the IFO survey have some special features compared to others used in the previous empirical studies of rathonal expectations. 1. Such studies have relied mainly on surveys of professional forecasters or of households, whereas our data are concerned with business firms. 2. The IFO data allow us to observe the expectational phenomena at the level of individual establishments. 3. All variables in the data are qualitative, so that appropriate statistical

treatments are needed. 4. There is another technical problem in the IFO survey: price realizations are given monthly, whereas price expectations are for a three-month peiod. In order to match the realizations to the expectations, we constructed the three-month realizations in the following way. If all three consecutive signs of realized changes are the same, we take them as the sign for the three-month period. If the changes consist of only "no change" and "increase" (or "decrease"), then the three-month change is "increase" (or "decrease"). The change becomes ambiguous when there are both 'increase" and "decrease" in the same set. Since we do not know the actual magnitudes of them, we eliminate such cases from the sample.

A system of measurement for qualitative expectations was developed by Theil. His starting point is a table cross-classified by prediction and realization (table 1). The rows and columns represent the nature of changes (namely, increase (+), no change (=) and decrease (−)) for prediction and for realization respectively. Each entry denoted by f(· , ·) is a relative frequency for the occurrence of a certain combination of prediction and realization.

TABLE 1 PREDICTION-REALIZATION TABLE

PREDICTION	REALIZATION		
	INCREASE (+)	NO CHANGE (=)	DECREASE (−)
INCREASE (+)	f (+, +)	f (+, =)	f (+, −)
NO CHANGE (=)	f (=, +)	f (=, =)	f (=, −)
DECREASE (−)	f (−, +)	f (−, =)	f (−, −)

Note: f(· , ·) denotes a relative frequency

The diagonal sum of the table, f(+, +)+f(=, =)+f(−, −), is the proportion of correct prediction in a qualitative sense. In this paper we measure the proportion of incorrect prediction ER (=1−f(+, +)−f(=, =)−f(−, −)).

The sum OE1 (=f(+, =)+f(+, −)+f(=, −)) is the proportion of overestimation of level in a qualitative sense: the predicted level is greater than the realized level. In the similar way underestimation of level UE1 is given by the sum f(=, +)+f(−, +)+f(−, =). Another way to measure the bias of prediction is to

consider changes. The sum OE2 (=f(+, =)+(−, =)) is called overestimation of change in a qualitative sense. Namely, some changes are predicted although there is no actual change. On the other hand, underestimation of change (UE2) is given by f(=, +)+f(=, −).

In this paper we introduce bias indices (B1 and B2) in order to evaluate the direction of bias concisely:

$$B1=(OE1-UE1)/(OE1+UE1), \quad \text{and}$$
$$B2=(OE2-UE2)/(OE2+UE2).$$

Namely, these indices measure the degree of overestimation relative to underestimation out of total bias: the index is +1 if the bias consists of only overestimation, 0 if the proportions of over and underestimation are the same, and −1 if the bias is completely dominated by underestimation.

The asymptotic standard errors of the measures can be computed through the delta method.

The basic proposition of the rational expectations hypothesis of Muth is that economic agent's subjective expectation are, on average, equal to the mathematical expectation of the variable conditional on all the information available to the agent. The forecasting errors generated by the conditional mathematical expectation as predictor have two important properties, namely unbiasedness and orthogonality.

Usual tests of rationality consist of regression analysis of these two properties.

Since our data are qualitative, we cannot use the conventional tests of unbiasedness and efficiency. Some methods must be developed to test the forecasting properties. If the forecasts are unbiased, the off-diagonal patterns on the prediction-realization table, which represent the structure of forecast errors, should not be systematically biased over time. Such consistent biases would imply the violation of the unbiasedness property. Thus we can reject the unbiasedness hypothesis if either B1 or B2 is consistently biased over time.

Table 2 and 3 show that B1 was positive for every month of the two sample periods and, moreover, that it was significantly positive at the 5% level except for one time point (November 1980, January 1981). These facts imply that the

TABLE 2 TESTS OF RATIONALITY: 1977-1978

PERIOD		(P_t^e, P_t)			(P_{t-1}, P_t)	(P_{t-1}, S_t)	
	N	ER	B1	B2	ER	B1	B2
9/77-11/77	3,781	.195 (.0064)	.420 (.0334)	−.414 (.0342)	.220 (.0077)	.217 (.0354)	.068 (.0377)
10/77-12/77	3,771	.191 (.0064)	.387 (.0343)	−.397 (.0347)	.225 (.0078)	.150 (.0352)	.069 (.0367)
11/77- 1/78	3,585	.279 (.0075)	.090 (.0315)	−.376 (.0298)	.332 (.0083)	−.025 (.0300)	−.218 (.0305)
12/77- 2/78	3,448	.286 (.0077)	.269 (.0307)	−.161 (.0320)	.365 (.0087)	.070 (.0302)	−.192 (.0311)
1/78- 3/78	3,443	.287 (.0077)	.396 (.0292)	−.005 (.0324)	.400 (.0088)	.208 (.0292)	−.211 (.0304)
2/78- 4/78	3,599	.278 (.0075)	.301 (.0301)	−.083 (.0321)	.441 (.0090)	.390 (.0252)	.115 (.0284)
3/78- 5/78	3,633	.271 (.0074)	.168 (.0314)	−.138 (.0322)	.471 (.0085)	.424 (.0238)	.199 (.0268)
4/78- 6/78	3,734	.254 (.0071)	.240 (.0315)	−.129 (.0329)	.495 (.0088)	.505 (.0218)	.297 (.0252)
5/78- 7/78	3,660	.228 (.0069)	.305 (.0330)	−.066 (.0352)	.428 (.0088)	.536 (.0224)	.352 (.0261)
6/78- 8/78	3,607	.185 (.0065)	.270 (.0373)	−.201 (.0383)	.378 (.0085)	.574 (.0225)	.495 (.0250)
7/78- 9/78	3,531	.165 (.0062)	.162 (.0409)	−.139 (.0340)	.346 (.0084)	.543 (.0239)	.485 (.0259)
8/78-10/78	3,591	.172 (.0063)	.172 (.0397)	−.346 (.0383)	.292 (.0081)	.449 (.0281)	.308 (.0311)
9/78-11/78	3,682	.167 (.0061)	.147 (.0399)	−.375 (.0377)	.247 (.0076)	.335 (.0318)	.157 (.0347)
10/78-12/78	3,665	.171 (.0062)	.161 (.0393)	−.321 (.0380)	.233 (.0074)	.303 (.0322)	.071 (.0353)
TOTAL	50,730	.219 (.0017)	.273 (.0086)	−.240 (.0088)	.349 (.0023)	.359 (.0074)	.162 (.0081)

Note: Standard errors are given in parentheses. P_t denotes price change, P_t^e expected price change, P_{t-1} one-period lagged price change, S_t price surprise and N number of observations.

predicted level of prices tended to be consistently greater than the realized level. Thus, our tests reject the unbiasedness hypothesis.

B2 was on the whole significantly negative except for six out of forty-eight time points, and it was never significantly positive. This fact again contradicts the unbiasedness property.

According to the orthogonality or efficiency property, the forecast errors $(P_t - P_t^e)$ or price surprises are not systematically related to the information incorporated

TABLE 3 TESTS OF RATIONALITY: 1980-1981

PERIOD		(P_t^e, P_t)			(P_{t-1}, P_t)	(P_{t-1}, S_t)	
	N	ER	B1	B2	ER	B1	B2
9/80-11/80	4,750	.205 (.0059)	.201 (.0314)	−.346 (.0307)	.237 (.0072)	.586 (.0248)	.284 (.0306)
10/80-12/80	4,423	.215 (.0062)	.189 (.0318)	−.324 (.0314)	.275 (.0075)	.382 (.0273)	.012 (.0310)
11/80- 1/81	4,350	.268 (.0067)	.027 (.0293)	−.229 (.029)	.327 (.0073)	.124 (.0259)	−.207 (.0265)
12/80- 2/81	4,328	.297 (.0070)	.170 (.0275)	−.029 (.029)	.409 (.0079)	.246 (.0244)	−.153 (.0259)
1/81- 3/81	4,366	.294 (.0069)	.182 (.0275)	−.021 (.0287)	.454 (.0080)	.268 (.0248)	−.175 (.0264)
2/81- 4/81	4,488	.305 (.0069)	.204 (.0264)	.043 (.0276)	.499 (.0080)	.413 (.0215)	.039 (.0249)
3/81- 5/81	4,620	.286 (.0067)	.145 (.0272)	−.022 (.028)	.534 (.0079)	.546 (.0184)	.285 (.0222)
4/81- 6/81	4,533	.265 (.0066)	.198 (.0283)	−.048 (.0294)	.548 (.0079)	.649 (.0162)	.462 (.0200)
5/81- 7/81	4,447	.256 (.0066)	.182 (.0291)	−.117 (.0300)	.468 (.0079)	.689 (.0161)	.442 (.0210)
6/81- 8/81	4,474	.239 (.0064)	.198 (.0300)	−.165 (.0308)	.426 (.0079)	.692 (.0162)	.498 (.0207)
7/81- 9/81	4,367	.229).0064)	.178 (.0311)	−.204 (.0316)	.381 (.0078)	.610 (.0187)	.431 (.0225)
8/81-10/81	4,583	.275 (.0066)	.217 (.0275)	−.261 (.0280)	.364 (.0076)	.540 (.0202)	.254 (.0251)
9/81-11/81	4,665	.280 (.0066)	.317 (.0263)	−.152 (.0282)	.332 (.0075)	.479 (.0222)	.068 (.0274)
10/81-12/81	4,586	.256 (.0064)	.291 (.0279)	−.251 (.0290)	.333 (.0075)	.418 (.0232)	.091 (.0271)
TOTAL	62,980	.256 (.0016)	.212 (.0072)	−.130 (.0075)	.401 (.0021)	.491 (.0057)	.191 (.0068)

Note: Standard errors are given in parentheses. P_t denotes price change, P_t^e expected price change, P_{t-1} one-period lagged price change, S_t price surprise and N number observations.

in the past history of the prices. In order to test this property, we must first construct a new variable for price surprises, which we denote as S_t. As a matter of fact, the bias measure B1 is closely connected with S_t: the overestimation of level implies a negative surprise, the exact prediction no surprise and the underestimation of level a positive surprise. Thus, we can construct a new trichotomous variable S_t from the predicted price change P_t^e and the actual price change P_t. The efficiency property can be then tested by examining whether or not the

surprises are systematically related to the past price changes.

Since B1 and B2 measure systematic biases in the prediction-realization table, we can again employ these bias measures for the test of efficiency. The columns 6 and 7 in table 2 and 3 present computed B1 and B2 between the price surprises S_t and the one-period lagged price changes P_{t-1}. B1 was at every time point except one statistically significantly positive, while B2 was significantly positive at eighteen out of twenty-four time point. The test of orthogonality indicates, as does the unbiasedness test, that the rational expectations hypothesis is not supported by the IFO data.

So far several empirical studies have been conducted to test the rationality of commodity price expectations. Most of the studies were concerned with consumers' expectations or professional economists' forecasts. The results were on the whole ambiguous, depending on what time period was studied, or what econometric method was employed. One interesting fact is, however, that all studies that dealt with either manufacturing firms or micro-level expectations rejected the rational expectations hypothesis. De Leuuw-McKelvey and Aiginger studied the manufacturing sector at the aggregated level and rejected the hypothesis. Theil's micro-studies disclosed the existence of biases in the prediction-realization table. Figlewski and Wachtel utilized the Livingston tata at the micro level and found that the expectations were biased and inefficient. And our study also rejected the rational expectations hypothesis. One may thus conjecture that the price expectations are not rational in Muth's sense for manufacturing firms, especially if one examines expectational behaviors at the micro level. Of course, the examined data are rather limited, and more extensive studies for different industries, different countries and various phases of business cycle are needed before some firm conclusions are drawn.

昭和59年度第2回研究会（6月1日）

▶テーマ　価値法則と独占価格の関連および社会の総需要の構造について
——小檜山政克『価値法則と独占価格』の第6，7章を中心として——

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報告要旨

報告者は，こんにち独占資本がその製品につける価格つまり独占価格（いわゆる「管理価格」）は，労働価値論からみた場合に，それまでの自由競争の際の価格の基礎となっていた価値とは違った新しい価値を基礎としているものと考え，それを計画的独占価格（この場合の「価格」はいわゆる「価値価格」つまり価値との背離のない価格のこと）と名づけた。

しかしこのように考えるためには，そもそも価値とはなにかについて再吟味をすることが必要なので，報告者は価値法則の中味（社会的労働配分），価値概念の2つの側面（経験的および実体的側面），価値の総体的把握（資本論1，2，3巻の次元での把握，価値成立の前提条件の検討，需給関係の考察），市場価値論における平均原理と限界原理の問題などについて，検討を行なった。

その上で報告者は，上述の計画的独占価格と価値法則の関係について，いろいろな側面から考察を加えた。例えば計画的独占価格は社会的労働配分という価値法則の作用をどのように侵害するか，計画的独占価格が成立する場合の独占利潤の源泉はなにか，計画的独占価格と市場価格さらには生産価格との関係，また計画的独占価格と超過利潤の関係などについて，その見解を述べた。

報告者はその報告の第2の部分で，社会の総需要の構造を解明する理論的アプローチのひとつとして国民所得分析をとりあげ，まず，資本論第3巻第7編をもとに国民所得分析の原理を説明した。ついで現実の資本主義諸国における具体的な国民所得分析には，独立小商品生産者ないし自営業者（日本では就業者の3割をしめる）のことを考察の対象に入れなければならない点を強調しつつ，最近のわが国の国民所得に対する簡単な分析の試みを行なった。