

## A New Look on Evaluation Methods of Foreign Exchange Rate Forecasting Services

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### 1. INTRODUCTION

With so many adverse comments on the forecasting ability of leading forecasting services, a manager in one forecasting service was delighted to see his old subscriber renew the subscription. The manager delightedly said "You must be impressed by our track record". The answer, however, was "No, I'm impressed by my track record using your forecast".<sup>(1)</sup>

Partly influenced by extensive empirical works in the behavior of stock prices, which argue very convincingly that one might as well throw darts than pay unproductive consulting fees, researchers of foreign exchange forecasting services also generally concluded that respective services empirically could not outsmart forecasted contents in forward exchange rates.

Based on the measurement of Mean Squared Errors, various researches concluded that forward exchange rates which can be collected at no price from market had been as good as or sometimes even better than most exchange services. These research papers were then caught with beliefs that they had convincingly showed that forecasting services were not worth even a cent excepting a political role of scapegoat.

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(1) "The forecasters reply," *Euromoney*, March 1979, p. 99.

The earlier episode, however, reveals more stories than that. It is true that research papers so far have successfully downgraded the reliability of forecasting services. However, the episode also reveals clearly that the subscriber does not believe in the evaluation methods of track record of the service. We have a similar analogy in recent debacle of "Young Jimmy." The article successfully convinced that drug problem is serious but it suffers from its own confidence gap. In as much as there are serious and continuing attempts to improve forecasting ability from the forecasting services, same degree of serious attempts to improve evaluation methods of the forecasting services must also be pursued.

## 2. DIRECTION ACCURACY TESTS

Direction accuracy in literatures has two meanings. One definition refers to a forecast that successfully predicted appreciation or depreciation of a certain currency value. We will call this direction accuracy a ADDA. Another definition refers to a forecast that resulted in a correct advice on the covering (or hedging) decision and this will be called a CADA.

To highlight characteristics of each test, let's suppose we have following constellation of spot, forward, and actual future spot and 5 forecasts, as in Figure 1.

Measured in terms of squared forecasting error, Forecast 4 was the "best" forecast followed by Forecast 3, Forward, Forecast 2, Forecast 1 and Forecast 5

**Fig 1. Constellation of Spot, Forward, Future Spot and 5 Forecasts**

	F1 (2.10)
	F2 (2.06)
	Forward (2.05)
	F3 (2.03)
	Future Spot (2.01)
Spot 2.00	F4 (1.99)
	F5 (1.85)

Table 1. Ranking of 5 forward rate

Evaluation methods	Squared Error	Ranking	ADDA*	CADA**	Action signal	Rank
Forecasts						
1	$2.10 - 2.01^2 = (0.09)^2$	5	○(App)	×(buy)	strong(0.05)	5
2	$2.06 - 2.01^2 = (0.05)^2$	4	○(App)	×(buy)	weak (0.01)	3
3	$2.04 - 2.01^2 = (0.03)^2$	2	○(App)	○(sell)	weak (0.01)	3
4	$1.99 - 2.01^2 = (0.02)^2$	1	×(Dep)	○(Sell)	strong(0.06)	2
5	$1.85 - 2.01^2 = (0.16)^2$	6	×(Dep)	○(sell)	strong(0.20)	1
6 (Forward)	$2.05 - 2.01^2 = (0.04)^2$	3	0	—	—	—

\* Appreciation, Depreciation Direction Accuracy (ADDA)

\*\* Correct Advice Direction Accuracy (CADA)

in descending order (Table 1). One irony here, however, was that presumably the "best" Forecast 4 did not even forecast correctly whether the foreign currency would be appreciated or depreciated. This realization prompted an addition of appreciation/ depreciation direction accuracy test (ADDA) to the conventional mean squared forecasting error test.

### Limit of ADDA

Notwithstanding the intuitive attractiveness, the ADDA test of a forecast did not provide subscribers with any real value. It is nice to know whether a currency will be appreciated, but it is not enough because the forward rate with which covering or hedging contracts are settled already contains its own assessment of appreciation or depreciation. What the subscriber needs is a guide as to whether the appreciation or depreciation is more than the implicitly assumed degree of appreciation or depreciation. One may thus safely conclude that ADDA is not a sufficient condition for meaningful use. Then is ADDA a necessary condition?

### CADA

To answer this question, researchers developed a Correct Advice Direction Accuracy(CADA) test. It tests, on ex post basis as other tests, whether a deriv-

ed advice on covering decision from a forecast was correct or wrong. This in effect tests whether a forecasted value is on the "right" side of the forward rate. The definition of "right" side of the forward rate is based on the relative positions between forward rate and future spot rate. If the future spot rate is lower than forward rate, the lower forecasted values than forward rate are on the "right" side. If, however, the future spot rate is higher than forward rate, the higher forecasted values than forward rate are on the "right" side. In our example, the future spot rate(2.01) is lower than forward rate(2.05). Thus Forecast 3(2.03), Forecast 4(1.99) and Forecast 5(1.85) were on the "right" side of forward rate. And covering recommendations, sell forward, based on these forecasts were correct. Let's recall that Forecast 1 and 2 had correctly forecasted the direction of an appreciation. But this ADDA test was not a sufficient condition. These forecasts should result in incorrect covering recommendation. Let's also recall that Forecast 4 and 5 had incorrectly forecasted that the currency would be depreciated, but these forecasts resulted in correct covering recommendation. Therefore, ADDA test is not a sufficient nor a necessary condition for Correct Advice Direction Accuracy. The only sufficient and necessary condition is that the forecast be on the "right" side of the forward rate.

### **CADA's recommendation**

Thus a follower of CADA will conclude that ADDA is not only useless but also outright misleading. Looking from the CADA's viewpoint, Squared Forecast Error also has serious problems. First, Forecast 5 which was rated last by SFE test resulted in correct covering recommendation while better rated Forecast 1 and 2 resulted in wrong recommendation. Secondly, among three forecasts that correctly advised covering decision, namely Forecast 3, 4 and 5, SFE test gives an impression that Forecast 5 was worst simply because point estimate was the furthest from actual future spot rate. However, in covering decision, point estimate of future exchange rate has totally no meaning. The only im-

portant thing is whether the forecast correctly advice whether forward sell or purchase decision will be made. Despite the differences in point estimates, ex post contributions of Forecast 3, 4 and 5 are all the same at 0.04 which is the difference between forward sell contract (2.05) and actual future spot rate (2.01). Following this logic, a subscriber would be indifferent to point estimates of a forecasting service and he will only be interested in whether the forecast is on the "right" side. The implication, then, is forecasting services should not spend time to be point accurate but spend time whether forward rate is bullish or bearish.

### Hurdle Difference

Does this mean that the point forecasts of forecasting services are totally useless? That is not also true. First, if subscribers all followed Forecast 3, 4 and 5 and made forward sell contracts, contributions of the three forecasts are the same at 0.04. However, a subscriber to the Forecast 3 which showed only 0.01 difference between forward rate of 2.05 and expected future spot rate of 2.04 would not have been fully convinced of a need to make a forward sell contract. Most likely he will not sign a forward contract and would not enjoy opportunity profit of 0.04. On the other hand, a subscriber to Forecast 4, 5 would be strongly encouraged to sign a forward sell contract. It does not matter how far the forecasted spot rate is from actual spot rate but it does matter how far the forecasted spot rate is from the forward rate assuming the former is on the "right" side of the latter. Since there is no empirical field survey that studied a hurdle difference between forecasted spot and forward beyond which a subscriber would sign a forward contract, it is impossible to judge the contribution of Forecast 4 objectively. If the hurdle difference is 0.05\*, the actual contribution of Forecast 4 would be same as that of Forecast 5 at 0.04. If the hurdle difference is 0.10, then even though Forecast 4 was

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\* Assuming it is 3 month contract, this difference amounts to  $10\% \left( \frac{0.05}{2.00} \times 4 \right)$  expected profit an annual term.

on the right side of forward, the actual contribution of Forecast 4 would be zero because the action signal was not strong enough to let subscriber sign forward contract.

### **New evaluation measure**

The current state of art in the evaluation method of forecasting services relies on MSFE, ADDA and CADA, putting more weight on the last method. This is an improvement because the evaluation departed from statistical exercise of measuring forecasting errors to the measurement of usefulness to the subscriber. One unfortunate thing, however, is that the "usefulness" is still too naively defined. It is implicitly assumed in CADA test that a subscriber uses forecasted values to decide whether or not to sign a forward contract and whether to sign sell or purchase contract. For a dominantly domestic company who had an one-time export and wants to decide whether or not to cover this foreign exchange risk, or for a pure foreign exchange speculator whose profit or loss is determined separately by each forward contract, forecasted exchange rate will only be used to decide whether or not to sign and whether to sign sell or purchase forward contracts.

However, for a multinational company which maintains real and financial investments around the world, the use of forecasted exchange rate is much wider than the limited use in forward contract decision. Actually only limited area of international transaction, namely less than 1 year financial transactions, can be covered or hedged meaningfully by forward contracts. But multinational company has various real investments or long term financial investments as well to maximize global profit and/or to minimize profit fluctuation. To satisfy this need, then, forecasting service must provide subscribers not only with spot expected exchange rate but also expected variances of the exchange rate and also the covariances of a certain currency's exchange rate fluctuation with that of other currencies. Sadly enough this important issue has been neglected by forecasting services as well as evaluators of the forecasting services.

To illustrate, let's use our previous example of Forecast 1. When Forecast 1 says the future exchange rate will be 2.10, a subscriber knows very well that chances are almost nil that the forecast be spot accurate. If a mistake is destined to be made, the naturally following questions will be would it be random around the forecasted value or how far would it go. Technically speaking, the subscriber needs not only the expected mean but also distribution form of expected mistakes, whether it is normal, symmetric or skewed and also expected variance of the mistakes. There is a strong suspicion that distribution form of Forecast 1 is most likely skewed to the left, but Forecast 1 did not say anything. If presentation of expected variance and expected distribution form looks unnecessarily too sophisticated, forecasting service must at least present forecasts in three levels; highest, most likely, lowest.

Importance of covariance analysis also should not be neglected. So far evaluation of forecasting services was done on currency basis. Conclusions tend to be that Forecast A was good in currency A forecast and Forecast B was good in Currency B. Since a multinational company by definition transacts in more than 1 country and also a financial manager of the multinational company is not likely to subscribe to various forecasting services for a specific currency forecast, forecasting services need to highlight expected relative movement of various currencies. Thus an evaluation of forecasting service must also devise a method to measure the performance of covariance forecasts by services.

### 3. CONCLUSION

It became a fad nowadays to write an article to the effect that foreign exchange forecasting services are "no better than the toss of a coin". The conclusion of the articles may well be accurate. However the reliability of the articles is greatly constrained because of methodological problems of their own. Limitation of Mean Squared Forecasting Error is widely discussed and thus this method is very seldom used. But the Appreciation-Depreciation Direction Accuracy (ADDA)

test, which is presumably an improvement from MSFE, suffers from inacceptability mainly because it has no practical value.

Recently attentions are correctly transferred to the user's point of view. The Correct Advice Direction Accuracy (CADA) tests whether a forecast is on the "right" side of forward rate and sees if a forecast made correct advice on the need and the direction of forward contract.

However, even CADA viewed the use of forecasted rate too narrowly and limited to forward transaction. Since multinational corporation must also make international real investment and long term portfolio investment which can not be covered or hedged by forward transaction, it is recommended that forecasting service present range forecasting than point forecast and also present an expected covariance of various currencies.

The ultimate value of forecasting service is in the eye of its user. Thus proper evaluation method of forecasting service must also be based on the proper understanding of how these forecasts are being used.

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