

Notes: Informal Remarks of Eugene H. Rotberg

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It may be useful to talk a bit about how we predict interest rates and how we make decisions on what securities to buy or sell or hold on the management of our liquid resources.

Once or twice a week five of us sit around a room and talk about interest rates. First, we set forth the precise rate for a three-month treasury bill, a three-month C.D., a one-year C.D., a one-year government note, a one-year U.S. agency security, a two-year government and agency securities, and a five-year government and agency bond. We determine what would be the prevailing rate of buying and selling blocks of \$50 or \$100 million. Then we produce discreetly and individually what each of us thinks interest rates will be for each of the maturities - one week from now, one month from now, three months from now and six months from now. These are put into computer format, and we receive a printout telling us the total rate of return for each investment at each of the time periods mentioned. By rate of return, I mean the total rate of return after considering the coupon, the accrued interest, the rate of interest on the reinvestment of the coupon, and the projected unrealized capital gain or loss. A matrix is produced which reflects all of our views; we determine then whether any one of us has input a projection which significantly distorts the composite. Each of us sits back, and for each of the rates projected, assigns a risk factor; that is, how sure are we of our projections -- 10% sure - 50% certain - 90% certain,

etc.? There are those, for example, who may believe that interest rates for a five-year government bond will rise 200 basis points in the next month and ^{and} as certain of their forecast; others may believe rate will decline by 200 basis points but are not so certain. And again the ubiquitous computer can tell us what the "right" investment should be in terms of total rate of return after considering how certain or uncertain we are about each of our projections.

Finally, as an added twist, we produce a sensitivity analysis which shows us what happens if we are wrong. It may tell us quite simply that the highest rate of return would come from a purchase of a five-year bond -- to be sold after one month under our rate forecast. The report also tells us, however, how much we lose should we be wrong. As most of you know, being wrong by 200 basis points on the purchase of a six-month instrument one month from now is not so disastrous as being wrong only 20 basis points one month from now on a purchase of a five-year bond.

Let it not be said that we don't really have to sell off any purchase - certainly not after one month - (because of the high level of our liquidity) so it doesn't matter. It does matter because every opportunity lost is a profit foregone just as if a capital loss were taken on the books. And every unrealized loss shown one month from now is as much a loss and reflection of a wrong decision as if the loss had to be taken and was in fact taken. Accountants are not the measure of financial wisdom. They reflect what the books show, not the mistakes made.

We maintain a running tabulation of our projections and one week from now, one month from now, three months from now and six months from now we see precisely how far we were wrong. Some are quite good at predicting interest rates for tomorrow morning's opening; that is no mean feat. Others are better at one month or three month projections -- but perhaps only for certain instruments. Our projections as tested against reality, as it develops, are circulated to about a half dozen people; it has the effect of making one modest indeed.

All of us make projections on the basis of the weighting we give to different market information. In short, what goes into the makeup of our interest rate projections is, to a large extent, a matter of individual taste, preference and judgment. We review, on a regular basis, the analyses and writings of perhaps a dozen economists who regularly talk about the state of the economy, projected industrial production, rates of employment, changes in the labor force, wage price agreements, and scores of other items which go into the econometrics models which are supposed to tell us what will happen to our economy in the coming months. We also review pronouncements of government officials and of the Federal Reserve Board. We subscribe to several compilations of statistical data disseminated by the various federal departments and federal reserve banks. We talk to perhaps 25 commercial banks a day and perhaps a dozen securities dealers. We review international monetary reports and the documentation supplied by leading central banks in an effort to evaluate, not

only changes in the money supply in the United States, but also shifts in the reserve holdings of central banks and the nature and type of reserve holdings projected for the future. In short, like sponges, we try to absorb the bewildering array of data, analyses and information, hopefully, in an effort to more accurately predict the level of interest rates for all instruments of maturity between one day and five years - one month, three months and six months from today.

Often, through a sort of reverse osmosis, we tend to project or become wary of certain kinds of announcements or certain types of analyses. We try to evaluate the conclusions of the forecasters in the context of their predilection to holding preconceived ideas irrespective of a changing environment.

Finally, we make an honest attempt to evaluate not only what would be politically feasible in terms of government policies, but what we think those who have to make decisions will consider to be politically feasible or unfeasible. Then we sit down and prepare the interest rate matrix I have described. From that point on, the exercise loses its sense of academia as decisions are made to buy or sell or hold. A decision not to buy a particular maturity (which we may already hold) is in effect a decision to sell. A decision to hold is a conscious decision that we would wish to buy that item at that precise time. Every non-decision is a conscious affirmative decision. And every decision to buy involves a corollary decision, assuming we have no new inflow of funds, that we have also made a specific and precise

decision on what we want to sell. There is no such thing as knowing what to buy without the same precise analyses also being made as to exactly what we want to sell. Theoretically, the structure of our portfolio in terms of its maturity at any point in time is precisely the portfolio we would wish to have if someone handed us the entire 4.5 billion dollars at that moment and asked us to buy whatever we wished.

After making a restructuring decision (and it can be a constant process) we then evaluate the technical state of the market and the opportunities for swaps within the same maturity. We do not consider the capital gain or loss of securities sold. The historical cost is irrelevant in determining the financial ^{implications} evidence of what to liquidate and purchase.

The basis for the various trading tools used by the World Bank in its day-to-day trading operations is a price history file for each security in the Government and Agency market. This file is available on an "on line" basis and contains both the bid and ask prices on a daily basis. In addition, within day prices are entered on days which have dramatic movements. Several analytical tools have been developed to work from the data contained in the price history file. The concept is based on the fact that there are, currently and in the last few years, significant and changing relationships between maturities and between securities of the same maturity. We believe over time a careful review of these relationships and actions based

on such review will increase substantially the return on a portfolio - and is far less speculative than relying on a one shot decision to "stay short" or "extend the portfolio," hold to maturity and hope for the best. The latter approach will keep bookkeepers happy. It will produce random results as compared to a managed portfolio which looks to increase the overall rate of return over time. What are the tools we use?

1) Spread Analysis: The yield and price spreads between pairs of securities is tracked on a daily basis. This system measures the actual spread between two securities versus a smoothed average of that spread. Outer limits can be set so that a report prints out when the actual spread exceeds the high or low smoothed limits. The bid price of one security can be tracked against the asked price of another so that the spread between bid and asked prices does not mislead the portfolio manager into thinking that a swap is attractive when it actually is not. This information can be displayed as a frequency distribution graph, an actual graph of the spread and the moving average outer limits, or as a numerical presentation of the standard distribution of the spread.

2) Spread Analysis of Market Sectors: The system also tracks the spread of yields and prices of various market sectors, e.g., the spread between all U.S. Treasuries in 1977 versus all FNMA's in 1977. All securities with these characteristics are combined as one security and tracked as explained above.

3) Yield Curve Analysis: Each day a yield curve is fitted for all Treasury securities and for all Agency securities. Each security is given a yield curve value according to a computer fitted curve. The actual bid and asked yield curve value of the security is measured against this curve value. For example, a particular Treasury Note might yield 8.10% while its curve value was 8.0%. The computer also keeps track of its average deviation from the yield curve value over time. Thus, the above Treasury Note might normally average 5 basis points above the curve in yield. Therefore, since it is 10 points over the yield curve in the example, it is 5 basis points cheap based on its historical relationship.

As a further refinement, the yield curve analysis also eliminates the spread between bid and asked prices. If the asked price of a security is low as in the above example, this quality is measured against the average deviation from the curve of the bid price. Thus, if a security is purchased because of its price, it should be measured against what it can be expected to be sold for (the bid price).

4) Yield Over Time: Making use of the price history file, the actual change in price of each security is measured for the last week and the last four weeks. This change includes accrued interest to make adjustment for the various coupon rates available in the market. The theory behind this analysis is that a security which has not kept up with the general level of market movement in the recent past offers a possible opportunity. Thus, after a market rally such as we have experienced recently, securities which have not gained as much as

those of similar maturity must be expected to catch up -- assuming there is no fundamental or structural reason why the previous history is no longer applicable. And that takes a good deal of thought.

5) Spread From The Federal Funds Rate: Various short maturity instruments are measured against the federal funds rate to obtain an approximation of the "cost of carry" of these securities. This report is produced daily. We review it on the assumption that the dealers react according to their cost of holding inventory. Thus, if the spread on any given day for the cost of carrying inventory is wide as compared to the average spread, an opportunity may exist for the Bank to purchase certain securities being offered on the market.

6) Visual Analysis of the Yield Curve: Each day a yield curve is printed in graphic form. This curve is inspected visually to look for opportunities such as a "rise" in the Agency yield curve in 1977. This visual inspection allows the portfolio manager to detect areas of the market where the curve is irrational -- possibly because of tax considerations, i.e. a spate of low coupon issues, and thus to find buying or selling opportunities.

I could go on with many other techniques that we use. Fundamentally, they are tools. The test of the manager is to realize their limitations and be able to detect and predict when the historical relationships between securities, or maturities is no longer valid.

I would like to conclude these informal remarks with a word or two about "management." In the area of forecasting interest rates,

I think the best manager will simply let his staff breathe. It is sometimes thought to be consistent with the highest principles of efficient management to reward those who make the right decisions and to penalize those who make the wrong ones. Usually, the punishments take the form of requested resignations or no merit salary increases, or chastisement, or perhaps most invidious of all -- a non-verbalized look of dissatisfaction. The rewards are reflected by salary increases and a general state of euphoria. I must confess to you that I cannot accept this kind of reward/punishment system in evaluating and motivating people who have to predict interest rates. There is nothing about predicting interest rates which lends itself to rewards and punishments. Indeed, it can be counterproductive as those directly responsible, given a system of rewards and punishments, will seek to make the safest decision, not the one believed right. Safe decisions clearly should be made, but only after one calculates the risk of error whether it be in terms of one's liquidity needs, the strength of one's convictions, or the effect of being wrong in the context of the financial implications of the decision. Safety should not be sought only to avoid personal penalty. All the computer technology, all of our knowledge, our evaluation, our intelligence will be for naught, if our own feelings about our own security - our own egos - affect our decisions.

I am reasonably convinced that given a staff with a reasonable degree of intelligence and a desire to be right that the manager's

role is simply to maintain motivation by making people honest and open about themselves and their mistakes. I would suggest that the manager's ultimate responsibility is to require that his staff devise the most self-critical techniques available to measure how they, and how he himself is doing against optimum performance, random performance, a balanced portfolio, one's competitors performance, and the performance of a 10-year old child. I would suggest the manager must then look at the people he works with after he has measured what each of them does and decide whether to confront his colleagues with the results of their performance. He must determine quite simply whether he will further motivate them or weaken them. In short, he must know what makes them respond and what will permit them to flower and make use of their sense.

I suspect that human behavior responds to rewards and punishments in the situation just as in our normal interpersonal relationships. It can be quite dangerous and most debilitating to confront a colleague with proof of failure and to exact punishment. Nor is it enough simply to remove the external punishments since the knowledge of error can indeed make one chary about making further recommendations, making decisions and honestly expressing one's views. I personally believe that on balance most individuals when confronted with the knowledge of error or failure, and all of us must by definition fail in matters I have described (since none of us can optimize our decisions) will tend to hedge and not speak our mind. That is the greatest challenge - the

greatest problem. To encourage those who have made mistakes to continue to speak their minds and act on their views.

In short, I would suggest maintaining a staff of intelligent men and women who are comfortable with each other; people who have not only the technical skills but whose heads are reasonably well put together and who most of all, can be open and honest with themselves -- whose egos do not require constant support and who can accept and admit to error without being shattered. For better or worse, that is one admittedly very personal view. I think on balance, over time, it will result in a responsible and effective management of our liquid resources.