Prospective Real Yields and Active Global Bond Management

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The prospective-real-yield approach, based on the purchasing power parity concept, appears to have real-world application, with a minimal need for forecasting. Only inflation need be forecast. Both perfect foresight and lagged M2 forecasts appear to produce stable results in the long run.

The prospective-real-yield approach is a simple discipline built on the concept of today's yield minus tomorrow's inflation. Its appeal is that it works without the need to predict short-term interest rates or short-term exchange rate movements; the only variable that needs to be predicted is inflation. Given out-of-sample inflation forecasts that are available from a moment in time with tolerable ranges, this process can add considerable value.

The classic approach to global bond management, as opposed to the prospective-real-yield approach, involves forecasting interest and currency rates within some macroeconomic scenario and then adjusting country allocations according to that scenario. Most managers believe the currency component of return is where applying their efforts will add the greatest value. Unfortunately, most models for forecasting exchange rates and interest rates have proved to be difficult to apply consistently over time. Consequently, global bond managers use a variety of techniques, including econometric modelling, technical analysis, and eclectic reasoning.

We believe that strong excess returns in the world bond market can be achieved by focusing on the highest prospective real yield. We are fairly comfortable that the prospective-real-yield concept has application in the real world, without the need for a lot of data. The theoretical building blocks central to the whole approach are that purchasing power parity (PPP) holds in the long run, that bonds will be redeemed at par on the same date, and that reinvestment rates are negligible.

The PPP concept, one of the oldest economic theories, dates back to 15th century Spain. In words, the theory states that exchange rates between two countries are a function of the price of a basket of goods in one country divided by the price of a basket of goods in the second country. Most foreign exchange observers have found significant deviations from PPP at any given moment, although in the long run, exchange rates do follow price differentials. The reasons for the short-run deviations include major differences in economic cycles and worldwide demand, and current-account differences all of which create immediate dislocations in the relationship between spot prices and PPP. As a result, the hypothesis that countries with the highest *ex post* long-run prospective real yields provide the highest returns is not merely a function of observations or of data mining but is a tautology, if the inflation forecast is correct.

An example of how long-run prospective real yield works is presented in **Table 1.** Assume today's yields are 6.5 percent in the United States and 7 percent in Germany. Also assume that during the next 10-20 years, the inflation rate will be 2 percent in the United States and 4 percent in Germany. Subtracting the expected inflation rates

Table 1. Purchasing Power Parity Example

| Country	Yield	Inflation	Currency Return (PPP holds)	Nominal Return in U.S. Dollars	Prospective Real Yield
United States	6.5%	2.0%	0.0%	6.5%	4.5%
Germany	7.0	4.0	-2.0	5.0	3.0

Source: Ian G. Sims.

from today's yields for each country produces the prospective yields of 4.5 percent and 3 percent, respectively. Assuming PPP holds, the nominal returns in U.S. dollars are 6.5 percent and 5.0 percent, respectively. Thus' both the nominal return in U.S. dollars and the prospective real yield are higher for the United States.

The empirical evidence of this simple framework escapes a great number of practitioners. Figure 1 illustrates this relationship using countries in the Salomon World Bond Index from 1974 to 1990. The *ex post* prospective real yield at the time of the index's inception is plotted against the annualised returns of a long-term bond purchased on the basis of those prospective real yields. The relationship between returns and the prospective real yields is solid.

Of course, portfolio managers in the real world do not buy and hold securities for 17-year periods, nor can they accurately forecast inflation over 17-year time frames. From a real-world perspective, portfolios will be rebalanced more frequently and two years is probably the time frame in which an inflation forecast has some value. Anything significantly less than two years provides a strong argument that the embodiment of that forecast is in the current rates, and anything significantly longer involves predicting major political changes, which ul-

Figure 1. Annualized Returns and Prospective Real Yields: Countries in Salomon World Bond index, 1974-90
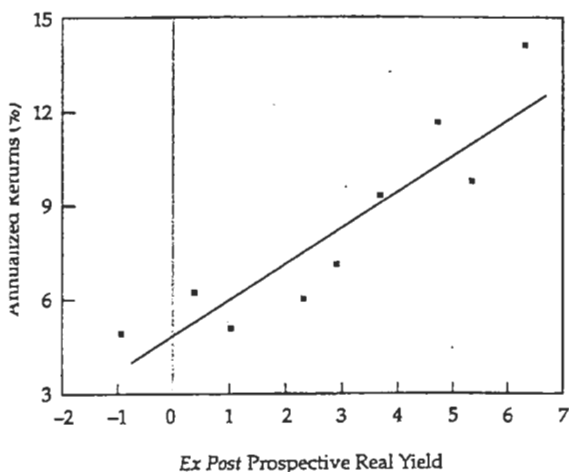
Source: Ian G. Sims.

timately have a significant impact on inflation rates.

Tests of Prospective Real Yield

Two tests were performed to evaluate the usefulness of the prospective-real-yield *(PRY)* technique. The first is a statistical test using regression analysis. The second is a simulated investment strategy that constructs portfolios using a mean-variance optimiser.

The Statistical Test

The statistical test is a simple linear regression:

$$RELRET_{j,t+1} = a + b \, PRYDF_{j,t,t-24} + E_{t+1},$$

where

$RELRET_{i,t+1} =$ monthly unhedged total return differential with the U.S. of the jth country bond market in U.S. dollars, and

$$PRYD_{j,t,t-24} = PRY_{j,t,t-24} - PRY_{us,t,t-24}.$$

In this definition,

$$PRY_{j,t,t-24} = 100 \left[\frac{(1 + Y_{j,t}) / 100}{(1 + P_{j,t,t+24} / 100)} - 1 \right]$$

where

$Y_{j,t} =$ yield to maturity of jth country benchmark maturity bond at time t, and

$P_{j,t,t-24} =$ annualized future two-year (24-month) inflation rate of the jth country.

The linear regression represents the relative return of another country's bond market in U.S. dollars less the U.S. bond market return in U.S. dollars as a function of the previous month's prospective-real-yield differential between those two countries. For example, in March 1993, the difference in return (in U.S. dol-lars) of owning a Japanese bond at the end of that month and a U.S. bond will be a function of the difference in their prospective real yields in February. The prospective real yield is defined as the yield less the next two years' inflation rate.

The data for the analysis are monthly, unhedged country bond market returns in U.S. dollars. The study used the Salomon World Bond Index, which begins in 1978, and extended it back four years to 1974, the

inception of the floating-rate era (although this technique also works well before the beginning of floating rates). The ending time period of the study is 1990. The Salomon index tracks nine countries: the United States, Canada, Australia, Japan, the United Kingdom, Germany, Holland, France, and Switzerland. Data on yields in each country on benchmark bonds of about 10 years in maturity are from the Organization for Economic Cooperation and Development (OECD).

The formulation was tested with three definitions of inflation-two forecasts and the actual outcome. The first inflation forecast for each country was generated from an M2 money supply model based on Friedman's original work (1956, 1970), which proposes that an increase in money supply is followed by a proportional increase in inflation about two years later. This procedure was repeated monthly for each country on an out-of-sample basis, so (9 countries x 17 years x 12 months) 1,836 regressions were performed in total. The two-year lag ensures that these inflation forecasts could have been made with the published data at the time.

The second set of inflation forecasts are those published by the OECD, a large international economic agency based in Paris that has published fore-casts for the major 24 industrialized countries for the past 25 years.

The third inflation "forecast" is perfect foresight. This method assumes we know what inflation is. It does not tell us anything we could achieve practically, because no one is capable of making perfectly accurate inflation forecasts, but it does establish a bound on what can be achieved using this model.

The results of the hypothesis-testing regression model using each of the three measures of inflation are presented in **Table 2.** The results suggest that the prospective-real-yield differentials when the M2 model and the OECD forecast are used appear to be good predictors of future monthly return differentials. For the regression using the M2 model to fore-cast inflation, the average slope across countries is statistically significant at 0-31. The R^2 is 2.9 percent, which may seem low, but these are monthly data and, therefore, have a lot of noise; with quarterly, six-month, or one-year data, the R^2 would increase. With the OECD forecast, the slope is 0.24 with a t-statistic of 1.56 and an R^2 of 1.6 percent. Despite the low R^2, this technique achieves a lot of consistency, as will be seen later from the simulations. Finally, the perfect foresight forecast shows a strong positive slope of 0.39 and an R^2 of 5.7 percent.

Table 2. Regression Results: Average over Nine Countries

Predictor	Slope	t-statistic	R^2
M2 model	*0.311*	*2.35*	*0.029*
OECD	*0.240*	*1.56*	*0.016*
Perfect foresight	*0.394*	*3.44*	*0.057*

Source: Ian G. Sims.

To strengthen the results, we tested the accuracy of the inflation forecasts. The M2 model, for example, may actually be a poor predictor of inflation, but it may capture some other aspect of currency movements, which would then make it a good predictor of future returns. **Table 3** shows the results of tests of inflation forecast accuracy for the three methods. The M2 model forecast, with a variance of 11.3, has the largest variance between predicted and actual outcome. M2 monetary models worked well in the early 1970s, but because of financial deregulation and liberalization in the 1980s, these models lost much of their explanatory power and fell into some degree of disrepute. The current inflation rate as a predictor of the next two years' rate has a variance of 9.3. The OECD forecasts have the least variance of the three methods.

We also used variance analysis to examine inflation differentials between countries. The usefulness of the prospective-real-yield technique does not depend on the absolute level of inflation but on the differentials between countries. The results are identical to the actual variances for the, OECD rate and slightly worse for the current inflation rate forecast. The M2 inflation forecast, however, is significantly better at forecasting differentials between countries' inflation rates than at forecasting the actual level of inflation in each country. The fact that the M2 model is better at forecasting country-differential inflation than the current inflation rate is very promising, because even though analysts may not have a particularly good inflation forecast for a particular country, they can still get good returns if the inflation differentials are being forecast well.

To illustrate this point, **Table 4** is a hypothetical example, using Germany and the United States, of a comparison of inflation forecasts based on differentials and actual levels of inflation. Assume that actual future inflation rates will be 2 percent in the United States and 4 percent in Germany. The U.S./Germany differential is -2. The next two columns compare two inflation forecasts. Forecast X shows 4.percent inflation in the United States and 3 percent in Germany. Forecast Y shows 5 percent in

Table 3. Inflation Forecast Accuracy

	Variance		Snedecor's.F-Value	
Predictor	Actual	Country Differentials	Actual vs. Differentials	Forecast vs. Current Differentials
M2	11.3	8.4	1.35**	1.24**

OECD	7.5	7.5	1.03	1.42**
Current inflation rate	9.3	9.8	1.05	

Source: Ian G. Sims.
** Significant at the 1 percent level or better.

the United States and 6 percent in Germany. Forecast X is closer to the actual rate than forecast Y in both countries. Forecast Y, however, is implicitly fore-casting a differential of -1, which is much closer to the -2 outcome than the differential of forecast X, 1, which is closer at the individual country level.

The prospective real yields based on actual inflation are 4.5 percent in the United States and 3.0 percent in Germany, giving a differential of 1.5. With the inflation forecast from forecast X, the prospective real yields are 2.5 percent in the United States and 4.0 percent in Germany, giving a differential of -1.5. For forecast Y, the prospective real yield is 1.5 percent in .the United States and 1.0 percent in Germany, giving a differential of 0.5. To the extent that prospective real yield is a good predictor of country return differentials, forecast Y will have better investment success because Y's differential forecast is better than X's.

Of course, many factors that affect world inflation are hard to predict. For example, oil prices have been very volatile over the years, which affects all countries to some extent. The method's dependency on forecasting inflation differentials, rather than absolute inflation levels, strengthens the prospective real yield as a practical investment tool.

Investment Strategy Simulation

Simulation may provide more interesting results than the statistical approach. In this study's simulation, we used mean-variance optimization to create a global bond portfolio each month. The prospective real yield was used as the expected return estimate, and the variance-covariance of returns relative to the Salomon World Bond Index was used as the risk es-timate. (Using relative risk is more appropriate than using the absolute level of risk for an active global bond manager because the manager's benchmark is generally the index and it is the responsibility of the client and consultant to monitor and plan the risk of the overall fund.)

Because this test extends over time, several portfolios were created. A consistent point on the efficient frontier must be selected, and we chose three-quarters of the expected excess return. The choice may seem a little aggressive, but in global bond management, most managers outperform the index. No one can afford to fall too far behind competitors, so return is of great importance.

The simulation approach provides strong support for the use of prospective real yields. **Table 5** shows the results of the simulation for each of the three inflation-forecasting methods. With the M2 inflation forecast, the excess return exceeded the benchmark index by 4.6 percent, or 460 basis points. That is top-decile performance. When the OECD inflation forecast and the perfect foresight forecast were used, the excess returns exceeded the benchmark by 2.3 percent and 7.3 percent, respectively. These numbers are net of management fees and transaction costs, so at least 100 basis points have been taken out of these numbers annually.

The cumulative net performance of the prospective-real-yield strategies are shown in **Figure 2**. For the 1974-90 period, perfect foresight, not surprisingly, gives significantly higher returns than the other measures. The performance is extremely stable, with no two-year underperformance periods. Considering how many factors affect

Table 4. Inflation Forecasts: Differentials versus Actual

Country	Actual Future Inflation (a)	Inflation Forecast		Bond Yield (d)	Ex Post Prospective Real Yield (d) - (a)	Prospective Real Yield	
		X (b)	Y (c)			X (d) – (b)	Y (d) – (c)
United States	2	4	5	6.5	4.5	2.5	1.5
Germany	4	3	6	7.0	3.0	4.0	1.0
U.S./Germany Differential	-2	1	-1		1.5	-1.5	0.5

Source: Ian G. Sims

Table 5. Investment Strategy Annualized Net Returns

Predictor	Net Return	Standard Deviation	Currency Contribution	Turnover
M2 model	15.7%	10.0%	2.8%	170%
	(4.6)*	(1.0)	(1.6)	
OECD	13.2	10.8	1.0	205
	(2.3)*	(1.8)	(-0.2)	
Perfect foresight	18.7	11.6	4.4	144
	(7.3)*	(1.6)	(3.6)*	

Source: Ian G. Sims.
* Significant at the 5 percent level or better.

currencies, this result is quite interesting. During this period, there were oil shocks the Reagan years of twin (budget and trade) deficits; massive fiscal

shocks to the world economy; German unification; large deficits in the late 1980s, particularly on a bilateral basis between Japan and the United States; and some significant changes in monetary policy. Throughout these political and economic changes, the perfect foresight approach generates stable returns. This result stands perhaps in some contrast to the perception that currencies are irrational, speculative, or hard to explain.

The result for the M2 model is surprising because of its consistency. The M2 model gave a 4.6 annualized excess return, but over time-apart from some underperformance in very strong markets in 1985 and 1986, when investors were getting 30-

Figure 2. Cumulative Net Performance Relative to Unhedged Index: Prospective

Source: Ian G. Sims
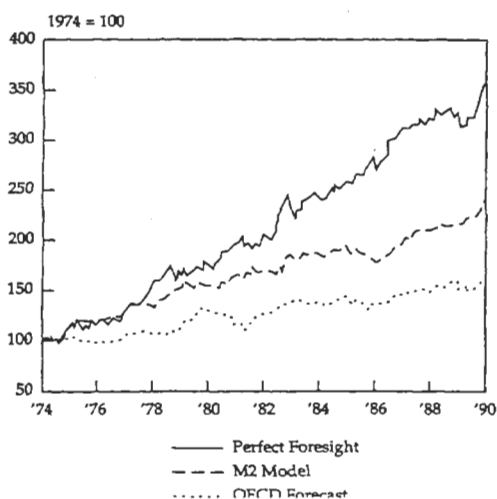
40 percent annual returns on international bonds from a U.S. base-M2 has had a consistent and stable cumulative out-performance pattern. The 1970s are not much of a surprise, because money supply models worked well then. What may be surprising is how well this model worked throughout the 1980s; money supply was not a good predictor of domestic inflation in the 1980s because of financial liberalization and deregulation. Those processes were occurring to a greater or lesser extent in various countries, however. When looking at the differences between those countries' inflation rates, as forecasted by M2, a lot of netting out occurs. The forecast errors are closely correlated in some cases, particularly in the Anglo-Saxon world.

On the whole, the OECD forecasts had a stable outperformance pattern over time, except for 1980 and 1981. In those two years, the OECD forecasts underperformed the M2 forecasts because the OECD did not believe U.S. Federal Reserve Chairman Paul Volker. The OECD analysts forecast that inflation in the United States would continue at high double-digit levels for several years, but they were very benign about the German inflation outlook.

Extensions to the Study

Nothing is free in using the prospective-real-yield technique: If you get inflation wrong, you will suffer. The overall message, however, is that inflation forecasts of sufficient accuracy to enable this technique to be successful do exist

Because of the sensitivity of the strategy to inflation forecasts, we tested alternative proxies for future inflation. First, we looked at the results for the prospective real yield assuming current inflation rates and zero inflation-that is, the nominal yield. **Figure 3** shows the cumulative net performance relative to an unhedged index of the nominal and real-yield strategies. In both cases, the pattern is quite volatile. In some subperiods, the outperformance of real yield is very strong. For example, it performed well in the late 1970s; its cumulative outperformance reached 130, which would have been 3-4 percent annually. From 1980 onward, however, performance deteriorated.

These results suggest that the current real yield is not a consistently good forecast of future returns. This finding is in contrast to studies that have demonstrated that using the present inflation rate has some benefit in this framework. Those studies do not include Australia, however, and between 1985 and 1986, when Australia had high current real yields but performed very badly, that naïve strategy failed.

Figure 3. Cumulative Net Performance Relative to Unhedged Index: Nominal and Real-Yield Strategies

1974 = 100

Real Yield
Nominal Yield
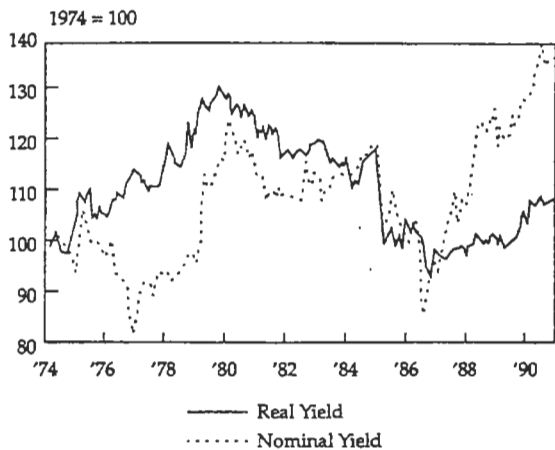
Source: Ian G. Sims

How about simply investing in high-yielding countries and ignoring inflation? A number of global bond managers operating from a U.S. base are fairly new, and many have merely played the yield game and it worked. It did not work in 1992 because the European exchange rate mechanism (ERM) fell apart. Although simple yield does work at times, it is not a good technique if one is looking for something stable for long periods.

Using short-term interest rates instead of yields provides somewhat better results. Figure 4 shows the results for the same analysis as applied in

Figure 4. Cumulative Net Performance Relative to Unhedged Index: Nominal and Real Short-Term Rate Strategies

1974 = 100

Real Short-Term Rate
Nominal Short-Term Rate
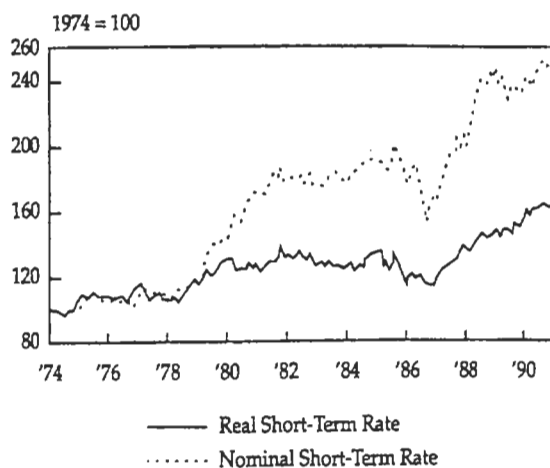
Source: Ian G. Sims

Figure 3 but with the nominal and the real short-term rates used. Over time, the absolute performance achieved with nominal short-term rates is close to the prospective real yield using the M2 inflation forecast-about 4.5 percent annualized. The approach has appeared to be reasonably successful in the past, but it has been very volatile. It can work strongly over subperiods, but it fell apart in 1992 similarly to the simple-yield approach because of the ERM's collapse. The strategy of investing in countries with the highest nominal short-term rates is also devoid of theory. Actually, it runs counter to the theory of uncovered interest parity without risk premiums, which states that currency depreciation should offset short-term rate differences. The performance of the real short-term interest rate is uninspiring.

Finally, we considered using inflation forecasts within domestic markets. If an analyst is good at forecasting inflation, then that analyst should be able to make money in the domestic market by taking long- or short-duration positions. We looked at this possibility for a number of countries. For the United States, for example, we constructed a T-bill/T-bond index-half bills or short-rate instruments and half long bonds. The strategy involved investing 100 per-cent in T-bills if the forecast for the next two years' inflation rose and 100 percent in T-bonds if the forecast for the next two years' inflation fell. The results for each of the three forecasting models are shown in **Figure 5.**

Most people think they could make a lot of money if they had perfect foresight about inflation. As Figure 5 shows, in the United States, perfect fore-

Figure 5. Cumulative Net Returns versus Bill/Bond Index

1974 = 100

M2 Model
Perfect Foresight
OECD Forecast
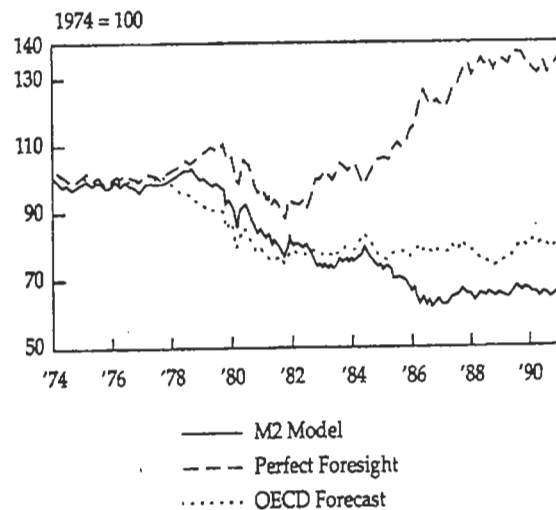
Source: Ian G. Sims

sight does not provide a consistent advantage. The strategy took a big dive in the early 1980s, and significant under-performance resulted. This outcome suggests that the real-yield effect-the difference between yield and inflation-is both volatile and significant. If an investment manager is managing money domestically on a duration-play basis, the real-yield components of the yield must be forecast; forecasting inflation and adding an average real-yield premium over time is not enough.

The results of the domestic tests are a bit of an enigma, because these same forecasts work extremely well when applied to country allocations in a global bond portfolio. The reason for the result lies in the relationship between currency appreciation or depreciation and the real yield. If the inflation rate declines, the yield will not necessarily follow; it could stay the same or even rise. If yield does not decline, the investor will not make any money in domestic markets but will make money in the currency market and because the rise in the real yield will put upward pressure on the currency. Conversely, if inflation rises, yield may not rise; if it stays where it is or falls, the real yield will get significantly squeezed. In this case, the domestic bond will perform all right, but the downward pressure on real yield will put downward pressure on the currency in a global bond portfolio.

Conclusion

When domestic markets during the past 20 years and global markets during the past several years are examined, some observations stand out. The most significant is that forecasting inflation, specifically the differentials, is the necessary link to a prospective real-yield framework. It is a worthy predictor variable. The stability of the relationship with both perfect foresight, which is the ultimate benchmark, and (more importantly) with the lagged M2 models is significant. The economic rationale is that PPP works in the long run. Both types of forecasts have the benefit or value of literally half a millennium of time behind them, as well as strong empirical evidence from the past 15-17 years. The combination of those two sources of experience provides strong conviction that theory underlies this particular issue.

The prospective-real-yield technique is appealing because it does not depend on forecasting either short-term interest rates or exchange rates. The complexities of budget deficits-the issue of debt to GDP with which forecasters grapple in the market- create very unstable relationships. For example, Germany recently had 9 percent bond yields with 3 percent inflation rates, but the situation quickly changed to 6.5 percent bond yields with 4.5 percent inflation rates.

Question and Answer Session

Robert J. Bernstein
Ian G. Sims

Question: What is your measure of inflation? What other inflation forecasts might be worth considering?

Sims: We measure inflation by the consumer price index (CPI), but all the different measures of inflation work pretty well. One that does not work well is unit labor costs, but that is not a strict measure of inflation. The OECD data are a good reference point. I do not know of any other body that has gone back and produced consistent inflation forecasts for each country during this period. Different agencies in different countries have similar data-usually expectation-type data rather than people analysing and forecasting, which is a big distinction.

Question: The presumably better method of forecasting inflation and differentials (i.e., OECD) performs more poorly than M2. Which do you believe more? Has M2's performance deteriorated?

Sims: The difference in the accuracy of the OECD and the M2 model at forecasting inflation differentials is not statistically significant. In terms of the strategy performing better when M2 inflation forecasts are used, the case is one of skewness,

because the vast majority of the OECD's failure to match the M2 model's performance when applied in this framework is attributable to one 12-month period. Repeating the simulation several times, using Monte Carlo simulation techniques, for example, would show that the better inflation forecast gives a better actual result in a strategy, on average.

Question: How does the prospective-real-yield method hold up for periods other than between 1974 and 1990-for example, for periods since 1990, between 1981 and 1992, or for rolling five-year periods?

Sims: The simulation works for any such sub-period. For regression models, the results worsen as the sub-periods are sliced finer. With the perfect foresight model, if the test is of two sub-periods of, say, eight or nine years, it is good for both periods. The M2 model is extremely good in the 1970s but not as good in the 1980s, although the slopes have a good spattering of significant t-statistics. For the OECD, the significance is reduced, but on the whole, it is good at the 10 percent level. From a regression viewpoint, the stability is strong for perfect foresight, so the underlying mechanism is very strong.

From a simulation viewpoint, the stability over time can be seen from the cumulative out performance graph.

Question: Does your model assume that real yield differentials between countries should move toward zero in the long term? In other words, should Italian real yields eventually equal U.S. real yields (i.e., with no risk premiums)?

Sims: The model does not make that assumption. It says take the yield, forecast inflation as far as reasonable (in this case, two years), and over-weight those markets with the highest prospective real yields.

Bernstein: The real question is whether government policy-makers will take the real yield differentials and motivate the countries in a different direction. There is clearly an income benefit in starting with the high-yielding/developed countries. As those yields decline, the capital gain offsets the currency side.

Question: Global bond management involves making separate decisions about bond markets (interest rates) and currencies. How do you make such decisions with your model?

Sims: The strength of this technique is that you do not know exactly where your returns are coming from. We are not making any judgments about what the future yield will be or about what the level of currency will be commensurate with. that future real yield. Sometimes returns come through local bond market appreciation and sometimes through currency. This technique is probably a better way to manage global bond portfolios than to try and separate them *ex ante*.

Question: How does your investment process account for currency overshoot undershoot?

Your model may prove correct from a real yield standpoint, but currencies often deviate significantly from PPP equilibrium levels for extended periods of time.

Sims: We are not using PPP here in the conventional sense, which measures the deviation from its fair value; if the value is under the fair value, go long, and if it is over, go short. The PPP argument from this conventional viewpoint is a long-run rationale. Because we are only forecasting inflation for two years, we cannot claim PPP makes this approach work. We know PPP does not work in such a short period. We have tried to state a long-term rationale and move on to try to apply the approach to the best of our ability-knowing we cannot forecast 17-year inflation but can do a reasonable job on two-year inflation.

Question: Have you looked at the concept of world money supply instead of individual country M2s as another explanatory variable because of the international transmission of inflation?

Sims: I do look at that to improve my inflation forecasting; it makes a lot of sense. You can either model each country individually and accept that the forecast errors are correlated, or you can first try to net out the world money supply effect and then model what is left.

Question: Do you currently manage portfolios based on this approach? Which inflation-forecasting model do you use, and why?

Sims: Yes, we do manage money in this way. I have a bias toward monetary-based models. They have been unjustly discarded, particularly from a country differential-inflation viewpoint. We have some proprietary. techniques to get around some of the problems of deregulation and other extraneous factors. I believe this area is of increasing interest to economists. People have said that the simple money figures do not work, but they have not tried to look behind those numbers. There are often some simple reasons why the numbers did what they did, and you can adjust for that.

We do supplement the forecast equations with some subjective analysis. Subjective analysis has not worked well this year, however. A simple M2 model on Japan predicted significant deflation, which put prospective real yield up very high and meant the Japanese bond market or yen would appreciate, which it has done. We missed a lot of that because we did not believe in the 4 percent deflation in Japan that the model was suggesting. In prac-

tice, we are not going to put everything on automatic pilot. These models are a very good first step. They provide a substantial part of an investment process, but I do not know anyone who would want to base a decision solely on this quantitative type of analysis.

Question: How does your actual performance compare with the simulated performance?

Sims: It's not as good. The money supply models have worked really well. They helped avoid last year's ERM debacle. For example, Spain had high money supply, and the model certainly would have told you to avoid that market in 1992 and go with France and Japan, which would have been good markets to be in from the summer of last year onward. Canada as well.

Question: Do methods of forecasting two-year inflation work equally well for all nine countries, or might the model be improved by considering other variables?

Sims: The accuracy of inflation forecasts can certainly be improved by considering different variables in different countries. The model we proposed in this study was largely an illustration rather than an attempt to develop an optimal inflation-forecasting model.

Question: Can your studies and results also be applied to stock market returns and allocations? How important are the return expectations of the various stock markets to the results?

Sims: I have done some preliminary work on equity country allocation, and the results are encouraging. The work is in an early stage, however.

Question: The prospective-real-yield model has significant coefficients, but what is the economic significance of a model that explains about 3 percent of variation in relative returns?

Sims: For investment success, all that is necessary is to have consistently better-than-average ability to rank the countries in the correct order of relative returns. If, for example, the model predicts that Germany and Japan will outperform the others by 3 percent and 2 percent, respectively, and the actual outcome is 23 percent and 22 percent, the model will have given you a low R^2 but good portfolio returns.

Question: Given the controversy in the United States over the current validity of M2, because it includes the flow of money into stock and bond mutual funds, do you foresee updating your model?

Sims: Special reasons are always cited why M2 is no longer valid, particularly since the 1970s. What people miss is that the differentials between countries are highly correlated, even in times of severe shocks to the monetary system, such as occurred with financial deregulation.

Question: Does the prospective-real-yield technique using M2 work better with some country differentials than others and with some maturities than others?

Sims: Yes, in the case of country differentials. Regarding maturities, I have looked at different points on the curve and obtained similar results whether I was using ten-year yields or three month Euro deposit rates. The prospective real short-term rate is better for currencies than the prospective real yield, but the reverse is true for local bond market returns.