

## **Mr Mboweni addresses the topic “signals from the markets: does the yield curve contain useful information for the Reserve Bank?”**

Address by Mr Tito Mboweni, Governor of the South African Reserve Bank, at the Annual Convention of the Actuarial Society of South Africa, held in Midrand on 2 November 1999.

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### **Introduction**

Federal Reserve chairman Alan Greenspan once famously told a congressman that if what he had said was clear, the congressman must have misunderstood him. Central bankers are always looking into an uncertain future; that is why they are sometimes less direct than the public might want them to be.

As the Governor of the Reserve Bank, it is my job to worry about the future even while things are going well in the present. It is the same for central bankers all over the world; the Bank of England and the United States Federal Reserve recently reminded us of the need for pre-emptive action by tightening policy before the actual inflation numbers started to gain momentum.

It is this preoccupation with an uncertain future which explains why the word “signal” crops up so often in the language of monetary policy. One only has to read the financial papers to be struck by how often the word is used in the context of central banking. Monetary policymakers are constantly watching for early-warning signals on the economy, and from time to time we, in turn, give signals to the markets and the public on monetary policy.

What, then, are the signals that the Reserve Bank watches for from the markets and the economy? The answer to that question would fill quite a few dissertations, and, therefore, cannot be spelled out in detail. Central bankers cannot be too direct, as I have already said. We also have to bear in mind that, because the South African Reserve Bank is still in the process of establishing an inflation-targeting framework, the importance attached to various signals is under serious review.

The inflation-targeting framework will not really simplify the range of variables and events deemed to be relevant that much. In the new framework, we would be able to analyse variables and events incorporated in the inflation-targeting models as well as variables and events not explicitly incorporated in the inflation-targeting models, such as bad debts in the banking industry, but which are also important for the maintenance of financial stability. In this regard, we have been watching the effects of the liquidation of Macmed with interest.

For today, given that my audience is concerned with long-term investment portfolios, I shall discuss an issue which appears to be something of a favourite topic among South Africa’s investment analysts - the term structure of interest rates, or the yield curve.

The market determines different yields on investments of different maturities; of considerable importance is the gap between interest rates on short-dated investments and those with longer maturities. If these interest rates are plotted against unexpired maturity, the result is the yield curve, and of importance is its slope.

Does the slope of the yield curve provide the Reserve Bank and the investment community with useful information?

Before discussing the issue, it is worth noting that there are many good reasons to take into account signals from the financial markets in reaching monetary policy decisions. For one thing, market prices are up to date, and policymakers therefore do not face the problem that they do with other economic data. Information on the real economy only becomes available after a time lag, and it is possible that by the time enough information has been acquired on, say, trends in capacity utilisation or unit labour costs to make it clear what course of action is necessary, it might be very late in the day. In addition, it

seems that some indicators that are relatively current, such as the monetary aggregates, are not sufficient by themselves as early-warning signals of inflation.

The most obvious way in which the yield curve can assist the Reserve Bank is in providing information on inflation expectations. But, as I shall argue, the message from the yield curve is not unambiguous in this respect. I shall discuss the issue in general terms first, before mentioning recent developments in the South African capital market and the issues raised by some of the local investment analysts.

### **The yield curve and inflation expectations**

One of the greatest difficulties which all central banks face is getting a reliable measure of inflation expectations. Difficult though it is, it is nonetheless important to try to monitor inflation expectations, as they play an important role in price and wage setting behaviour. One way of monitoring inflationary expectations is to conduct a survey among the public (which the Reserve Bank intends to do); another way would be to monitor the behaviour of market-determined interest rates, or the yield curve.

As you know, the yield curve is upward sloping, or positive, when nominal interest rates on longer-dated bonds are higher than those on shorter-dated securities. It can also be downward sloping, or inverted, if the short-term interest rates exceed the rates on bonds with long-dated maturities.

To begin our discussion of the yield curve, it is worth revisiting the Fisher equation, named after American economist Irving Fisher. The textbook equation states that nominal interest rates are equal to the required real rate of return on the funds invested, plus the expected inflation rate over the period of the investment. So it is clear that expected inflation plays an important role.

The Fisher equation can be modified to include a risk margin in the calculation of the nominal interest rate. The risk margin can reflect variability in the inflation rate; it will in practice also take account of factors such as political and exchange rate risk.

What will happen to capital market interest rates if investors decide they have to revise their expectations of future inflation upwards? Investors in long-term assets who believe future inflation will be higher than initially expected will want to protect their real returns. As a result, they will demand higher nominal interest rates on longer-term bonds. In such a situation, one would expect the yield curve to steepen.

Can we say that if the yield curve steepens, it should necessarily be taken as a sign that the expected inflation rate in the future has risen? The answer to that is clearly no; expected inflation is only one factor determining nominal interest rates. An increase in expected inflation should lead to a steepening in the yield curve, but - and this is a crucial point - a steeper yield curve does not necessarily signal a rise in expected inflation.

### **The effect on the yield curve of factors other than expected inflation**

The yield curve is normally positively sloped; in other words, the longer the duration of the investment, the higher the yields. The positive slope is explained, among others, by the premium on long-term bonds which is required to compensate for the greater risk in keeping paper with longer maturities. So, a positively sloping yield curve does not in itself tell us anything about inflation expectations or the economy.

A crucial point in an analysis of the shape of the yield curve is that long bond yields are entirely market-determined while short-term interest rates are influenced by the monetary policy decisions of the central bank - which should, of course, also respect market forces.

It follows that a steepening in the yield curve can be caused by monetary easing. Such a steepening will happen when a reduction in short-term interest rates is not accompanied by a commensurate decline in long bond yields.

Why would long bond yields not follow short-term interest rates lower to the same extent?

The answer to that question is the key to our dilemma in interpreting signals from the markets. It could be that investors in long bonds are looking ahead to an economic upswing and that they are already beginning to anticipate the point in time when the monetary authorities will begin tightening policy again. In such a scenario, it makes sense for longer-term yields to remain relatively high and not to match the declines in short-term interest rates. Then the steepening in the yield curve signals that an economic acceleration is on the cards.

Although heightened economic activity obviously increases the risk of inflation, investors who expect the central bank to act pre-emptively will not necessarily modify their inflation expectations. They will, however, expect short-term interest rates to rise in future to nip inflation in the bud. As long-term interest rates can be viewed as reflecting expectations of future short-term interest rates, a steepening in the yield curve can be seen as a sign that short-term interest rates are expected to play catch-up once the economy is in danger of overheating.

If the central bank's policy is in danger of erring on the side of being too loose, the slope of the curve could become abnormally steep. Long bond yields could rise even as short-term interest rates are falling. But an abnormally steep yield curve is not necessarily conclusive evidence of loose monetary policy. It could be a sign of an increased risk premium, which is also part of the calculation of market-determined yields.

The risk premium takes into account the danger that inflation expectations might turn out to be wrong. Perhaps more importantly, the risk premium catches all uncertainties; it also relates to exchange rate concerns and even political uncertainty. If the risk premium rises during a period of monetary easing and declining short-term interest rates, it follows that the yield curve will tend to steepen.

As I have already mentioned, heightened economic activity increases the risk of inflation. As a result, investors might demand a higher risk premium as economic activity starts gaining momentum, especially if there is any uncertainty over policy. Obviously, policy uncertainty might be entirely misplaced, in which case the market should correct when participants realise their fears over policy are unfounded.

I have mentioned that a steepening in the yield curve is probably a sign that economic activity is set to accelerate. Obviously, the argument also works the other way round - an inverted yield curve can be seen as a sign of an impending slowdown in the economy, which could be accompanied by disinflation.

The shape of the yield curve can also be affected by financial factors that are not directly related to expectations about inflation or the real economy. One such factor is the relative supplies of different financial assets. If there is an oversupply of long-dated maturities, the result could be higher yields at the longer end of the curve. Known as the market segmentation theory, this approach suggests there is not much movement by investors between different maturity segments in the capital market.

The difficulty in reading messages on inflation from the shape of the yield curve was mentioned in a speech to the New Zealand Society of Actuaries in 1995 by the Governor of the Reserve Bank of New Zealand, Donald Brash:

“Many central banks monitor the yields on long-term conventional bonds in an attempt to get a reading on inflationary expectations. But there are significant problems in interpreting these yields: how much of the increase ... reflected an increase in concerns about future inflation and how much an increase in real interest rates, a response to the increased demand for capital as the world economy emerged from recession?”

In that speech, Mr Brash noted one possible solution to the problem of interpreting the behaviour of long bond yields - the introduction of inflation-adjusted bonds. These securities provide investors with a guaranteed real return on their investments.

The South African Department of Finance has said it is seriously considering the introduction of inflation-linked bonds, and it is worth our reflecting on whether their introduction in this country could help the Reserve Bank in its efforts to gauge inflationary expectations.

## **Inflation-linked government bonds**

Inflation-adjusted bonds, also known as index-linked bonds, systematically compensate investors for the loss of purchasing power as a result of inflation. In a typical inflation-linked bond, both capital and interest, or coupon, payments rise with inflation. In most countries, the consumer price index forms the basis for such indexation.

Inflation-linked government bonds used to be associated with financially unstable countries experiencing hyperinflation. However, in recent years, financially stable countries have issued inflation-linked government bonds, including Canada, the United States, the United Kingdom and France.

The idea of indexation is most relevant for bonds with longer maturities, as there is more uncertainty with respect to inflation, rather than for shorter-dated securities. There are arguments for and against introducing index-linked bonds.

It could be argued that the mere existence of inflation-linked securities is testimony to the fact that the monetary authorities cannot deliver complete price stability. Their introduction could also signify government's acceptance of inflation as a fact of life which merely needs symptomatic treatment. By guaranteeing investors protection against inflation, government is, in effect, making it easier to live with inflation.

But there are many counter-arguments. The taxpayer can save on interest costs if inflation is as low as government expects it to be, because these bonds do not have an inflation risk premium built into their pricing. In addition, these bonds eliminate the incentive for the state to inflate, as its borrowing costs would increase.

Other arguments in favour of issuing index-linked bonds include the following: they can protect the purchasing power of accumulated savings; other financial assets do not provide as good a hedge against inflation; they encourage savings; they expand the range of investment opportunities; and they could enable the monetary authorities to obtain useful information on real interest rates and inflation expectations.

How can inflation-indexed bonds help the central bank? This new form of bond will, like conventional bonds, also trade in the secondary market. The yield at which it trades is a real yield, as investors are guaranteed compensation for inflation. Therefore the difference between the real yield on the inflation-indexed bond of a certain maturity, and the nominal yield of a conventional bond of the same maturity, can be viewed as the expected inflation rate over the period. In other words, if the nominal yield on a 10-year bond is 15% and the real yield on an inflation-linked 10-year bond is 4%, the expected annual inflation rate over the period is 11%.

But this is only true at first glance. Remember, there is a risk premium element in the calculation of the nominal yield on a conventional bond. The risk premium - and not expected inflation - could account for part of the difference between the real yield on the inflation-linked bond and the nominal yield on a conventional bond of the same maturity. It might be difficult to distinguish between the expected inflation component and the risk premium element.

Another factor is that indexed bonds, at least initially, might not be traded frequently in the secondary market. There could be an illiquidity premium built into the yield of the index-linked bond.

Nevertheless, the fact remains that the introduction of inflation-linked bonds could improve the Reserve Bank's information on inflation expectations.

## **Recent changes in the shape of the South African yield curve**

Over a period of about 18 months, the shape of the South African yield curve has been subject to fairly significant changes.

From mid-April to August last year, when South Africa was affected by the global emerging markets crisis, the slope of the yield curve was negative; it changed from a slight to a fairly steep inversion.

Tight monetary conditions caused yields on short-dated bonds to rise more than yields on long-dated bonds. The overall level of the curve rose, reflecting heightened uncertainties about the future direction of financial policies, nervousness about investment in emerging markets and an upward adjustment of expectations about future inflation.

The financial markets settled down gradually in the last three months of 1998 and yields declined when monetary conditions became easier as the exchange rate of the rand improved. From March this year, short-term yields declined to levels below those of long-term yields and the yield curve assumed a positive slope which subsequently steepened.

As I have indicated above, it is difficult to read unambiguous signals from these changes in the shape of the yield curve. Nevertheless, these shifts have been noted by the Reserve Bank, as have the frequent comments on the topic of the yield curve by the South African investment community.

Last year, when the slope of the yield curve was inverted, some analysts argued that the curve was signalling a sharp slowdown in economic activity. Now that the yield curve is positive and steep, some economists are predicting a significant acceleration in economic activity.

### **Conclusion**

Empirical studies have found that the yield curve is a good predictor of growth in non-agricultural gross domestic product. So, the recent shifts in the shape of the yield curve appear to confirm what we all sense - the economy has been in a downswing, but the turning point seems to have been reached with the recovery set to gain momentum.

The Reserve Bank does not release its forecasts on the economy, but I can mention that forecasts that we have seen of economic growth of the order of magnitude of 3% or so in the millenium year are not out of line.

It would be difficult to read more into the signals coming from the financial markets at the moment. As a general rule, we also have to bear in mind that financial markets are not always right, and that rapid adjustments sometimes have to take place when expectations turn out to be wrong.

Be that as it may, the signals from the financial markets form part of the mix of factors to which the central bank pays regular attention. But not only does the Reserve Bank look to the markets for signals and for an assessment of monetary policy; the markets also look to the Bank for signals. This two-way communication is an essential element in meeting the Bank's main objective, which is the maintenance of financial stability.