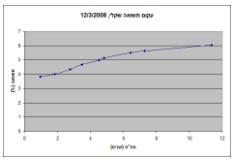
ADDITIONAL DETAIL ON INTEREST RATES

THE YIELD CURVE

In finance the yield curve is a curve showing several yields or interest rates across different contract lengths (two month, two year, 20 year, etc...) for a similar debt contract. The curve shows the relation between the (level of) interest rate (cost of borrowing) and the time to maturity, known as the "term," of the debt for a given borrower in a given currency. Based on the shape of the yield curve, we have normal yield curves, steep yield curves, flat or humped yield curves, and inverted yield curves .



Israel Shekel yield curve

This graph is an example of a yield curve on Israeli Non-Linked Fixed Rate government bonds. The yield curve is normal meaning that yields rise as maturity lengthens (i.e., the slope of the yield curve is positive). This positive slope reflects investor expectations for the economy to grow in the future and, importantly, for this growth to be associated with a greater expectation that inflation will rise in the future rather than fall. This expectation of higher inflation leads to expectations that the central bank will tighten monetary policy by raising short term interest rates in the future to slow economic growth and dampen inflationary pressure.

Shapes of Curves

Sometimes, treasury bond yield averages higher than that of treasury bills (e.g. 20-year Treasury yield rises higher than the three-month Treasury yield). In situations when this gap increases, the economy is expected to improve quickly in the future. This type of steep yield curve can be seen at the beginning of an economic expansion (or after the end of a recession). Here, economic stagnation will have depressed short-term interest rates. However, rates begin to rise once the demand for capital is re-established by growing economic activity.

A flat yield curve is observed when all maturities have similar yields, whereas a humped curve results when short-term and long-term yields are equal and medium-term yields are higher than those of the short-term and long-term. A flat curve sends signals of uncertainty in the economy.

An inverted yield curve occurs when long-term yields fall below short-term yields. Why this would happen is that when lenders are seeking long-term debt contracts more aggressively than short-term debt contracts. The yield curve "inverts," with interest rates (yields) being lower and lower for each longer periods of repayment so that lenders can attract long-term borrowing .

Theories

There are three main economic theories attempting to explain different term structures of interest rates. Two of the theories are extreme positions, while the third attempts to find a middle ground between the former two.

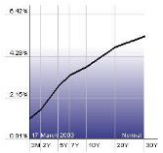
The expectation hypothesis of the term structure of interest rates is the proposition that the long-term rate is determined by the market's expectation for the short-term rate plus a constant risk premium. Shortcomings of expectations theory is that it neglects the risks inherent in investing in bonds, namely interest rate risk and reinvestment rate risk.

The liquidity premium theory asserts that long-term interest rates not only reflect investors' assumptions about future interest rates, but also include a premium for holding long-term bonds (investors prefer short term bonds to long term bonds), called the term premium or the liquidity premium. This premium compensates investors for the added risk of having their money tied up for a longer period, including the greater price uncertainty. Because of the term premium, long-term bond

yields tend to be higher than short-term yields, and the yield curve slopes upward. Long term yields are also higher not just because of the liquidity premium, but also because of the risk premium added by the risk of default from holding a security over the long term.
In the segmented market hypothesis, financial instruments of different terms are not substitutable. As a result, the supply and demand in the markets for short-term and long-term instruments is determined largely independently. Prospective investors decide in advance whether they need short-term or long-term instruments. If investors prefer their portfolio to be liquid, they will prefer short-term instruments to long-term instruments. Therefore, the market for short-term instruments will receive a higher demand. Higher demand for the instrument implies higher prices and lower yield. This explains the stylized fact that short-term yields are usually lower than long-term yields. This theory explains the predominance of the normal yield curve shape. However, because the supply and demand of the two markets are independent, this theory fails to explain the observed fact that yields tend to move together (i.e., upward and downward shifts in the curve).

USING THE YIELD CURVE TO ESTIMATE INTEREST RATES IN THE FUTURE

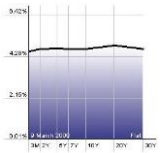
A yield is the return an investor will receive by holding a bond to maturity. The yield curve is a simple financial chart or graph. The shape of the yield curve indicates the cumulative priorities of all lenders relative to a particular borrower (such as the US Treasury or the Treasury of Japan). The line on a yield curve chart plots the interest rate of bonds at set times and gives the relation between the interest rate to be paid to the bond holder and the time to the maturity of the bond. Sometimes these curves are referred to as the term structure of interest rates.
The yield curve is normal, meaning that yields rise as maturity lengthens (i.e., the slope of the yield curve is positive). This positive slope reflects investor expectations for the economy to grow in the future and, importantly, for this growth to be associated with a greater expectation that inflation will rise in the future rather than fall. This expectation of higher inflation leads to expectations that the central bank will tighten monetary policy by raising short term interest rates in the future to slow economic growth and dampen inflationary pressure. It also creates a need for a risk premium associated with the uncertainty about the future rate of inflation and the risk this poses to the future value of cash flows. Investors price these risks into the yield curve by demanding higher yields for maturities further into the future.
The yield curve can tell us a lot about investors' expectations for interest rates and whether they believe the economy is going to be expanding or contracting. Yield curves come in three standard types: the normal yield curve, the flat yield curve and the inverted yield curve.
A normal yield curve tells us that investors believe the Federal Reserve is going to raise interest rates in the future. Typically, the Federal Reserve only has to raise interest rates when the economy is expanding and the Fed is worried about inflation. Therefore, a normal yield curve often precedes an economic upturn.



Normal Yield Curve

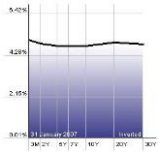
A normal yield curve tells us that investors believe the Federal Reserve is going to raise interest rates in the future.

A flat yield curve shows that investors believe the Federal Reserve is going to cut interest rates. Interest rates tend to make cuts when the economy is contracting and the Fed is trying to stimulate growth. As a result, a flat yield curve is often a sign of an economic slowdown.



Flat Yield Curve

A flat yield tells us that investors believe the Federal Reserve is going to cut interest rates. An inverted yield curve demonstrates that investors believe the Federal Reserve is going to dramatically cut interest rates. Typically, the Federal Reserve has to cut interest rates during a recession. An inverted yield curve indicates that the economy is in, or is headed for, a recession.



Inverted Yield Curve

An inverted yield curve tells us that investors believe the Federal Reserve is going to dramatically cut interest rates.

Sometimes, treasury bonds yield averages higher than treasury bills (e.g. 20-year treasury yield rises higher than the three-month treasury yield). In situations when this gap increases, the economy is expected to improve quickly in the future. This type of steep yield curve can be seen at the beginning of an economic expansion (or after the end of a recession). Here, economic stagnation will have depressed short-term interest rates; however, rates begin to rise once the demand for capital is re-established by growing economic activity. When the yield curve is steep, we can expect a great increase in interest rates in the future

MACROECONOMIC FACTORS INFLUENCING THE INTEREST RATE

An interest rate is the rate at which interest is paid by a borrower for the use of money that they borrow from a lender in the market. The interest rates are influenced by macroeconomic factors. In economics, a Taylor rule is a monetary-policy rule that stipulates how much the Central Bank should change the nominal interest rate in response to changes in inflation, output, or other economic conditions. In particular, the rule stipulates that for each 1% increase in inflation, the Central Bank should raise the nominal interest rate by more than one percentage point.

Interest Rates in Turkey

Overnight rates in Turkey are estimated to fall in 2013, indicating a loosened monetary policy.

According to Taylor's original version of the rule, the nominal interest rate should respond to divergences of actual inflation rates from *target* inflation rates and of actual Gross Domestic Product (GDP) from potential GDP:

$i_t = \pi_t + r^*_t + \alpha_\pi(\pi_t - \pi^*_t) + \alpha_y(y_t - y^*_t)$

In this equation, i_t is the target short-term nominal interest rate (e.g., the federal fund rates in the United States), π_t is the rate of inflation as measured by the GDP deflator, π^*_t is the desired rate of inflation, r^*_t is the assumed equilibrium real interest rate, y_t is the logarithm of real GDP, and y^*_t is the logarithm of potential output, as determined by a linear trend.

In other words, $(\pi_t - \pi^*_t)$is inflation expectations that influence interest rates. Most economies generally exhibit inflation, meaning a given amount of money buys fewer goods in the future than it

will now. The borrower needs to compensate the lender for this. If the inflationary expectation goes up, then so does the market interest rate and vice versa.

Output Gap

The GDP gap or the output gap is $(y_t - y^*_t)$. If this calculation yields a positive number, it is called an "inflationary gap" and indicates the growth of aggregate demand is outpacing the growth of aggregate supply (or high level of employment), possibly creating inflation, signaling an increase in interest rates made by the Central Bank; if the calculation yields a negative number it is called a "recessionary gap," which is accompanied by a low employment rate, possibly signifying deflation and a reduction in interest rates.

In this equation, both α_π and α_y should be positive (as a rough rule of thumb, Taylor's 1993 paper proposed setting $\alpha_\pi = \alpha_y = 0.5$). That is, the rule "recommends" a relatively high interest rate (a "tight" monetary policy) when inflation is above its target or when output is above its full-employment level, in order to reduce inflationary pressure. It recommends a relatively low interest rate ("easy" monetary policy) in the opposite situation to stimulate output.

Taylor explained the rule in simple terms using three variables: inflation rate, GDP growth, and the equilibrium real interest rate.