

The title of this course may seem to confuse two separate disciplines – finance and macroeconomics. However, it is based on the fact that finance and macroeconomics were integrated, at least in their formative years. It is a natural extension of a line of research that dominated monetary theory in the early part of the 20th century. Economists such as Keynes, Robertson, Hawtrey, Fisher, Hayek and Schumpeter sought to blend the analysis of business cycles with their (often first-hand) experience of money and financial markets. The result was a monetary theory that provided the fertile background to what came to be called macroeconomics. However, in the post-war period the monetary aspects of this theory dropped out of sight in the neo-classical synthesis and hydraulic Keynesianism. PostKeynesians such as Davidson and Minsky have done much to try to restore the monetary aspects of the theory, but the other – more technical– aspects of financial analysis have been ignored. Paradoxically, these aspects now form an integral part of the curriculum of finance and business departments and are the tools of the trade in financial analysis. The course will try to show how these tools of financial analysis were initially part of the early investigations of macroeconomics and how may be used to provide a realistic analysis of the behaviour of modern financial economies.

The characteristic feature of these theories is their concern to provide what may be called an intertemporal theory of prices of real and financial assets that accepts that time is important and that the future outcomes of current decisions are uncertain in the sense that they cannot be predicted on the basis of currently available information. Thus, expectations of unknown future events, as well as current, known, market conditions, will have a direct impact on the formation of current prices. This means that decisions over the disposition of the existing stocks of current assets, as well as decisions on the levels of current production of those assets, will have an impact on prices. In modern terms, prices will be determined not only by current decisions on flow supplies and demands for assets, but by sales and purchases of existing stocks. In the case of financial assets where outstanding stocks usually far exceed current flows, expectations of future asset prices may be the dominant influence on prices.

One response to the recognition that expectations of future prices and conditions will have an impact on current prices is to say that there is no possibility of a formal theory of intertemporal prices and values. This is a route that has been taken by a number of economists in both the Austrian and Post-

Keynesian schools. Examples are Lachmann, Shackle, and at times Davidson. However, it was not the approach that was taken at the beginning of the last century. The initial recognition that markets do attach prices to uncertain future events produce a three-fold response.

- The first was to develop a theory of the behaviour of market participants in the face of uncertainty. Keynes's *Theory of Probability* formed the basis of this approach.
- The second was to provide a theory of valuation of uncertain future events. The theory of the rational valuation of future income streams was necessary to produce current values or fair prices for the assets producing those future income streams. This process, called capitalisation, or the calculation of net present values, shows how capital theory, price theory and income theory are all inter-related. This approach is the basis for both Fisher's "rate of return over cost" and Keynes's theory of the "marginal efficiency of capital". Indeed, Keynes acknowledges Fisher's priority in developing this approach.
- The third is to look at interest rates as the price of money and other financial assets, and to define interest rates in the same way as they are defined by financial markets, as the premium paid for present money over money for forward or future delivery. An interest rate is thus just a spot-forward swap, money today against money tomorrow. If the cost of 100 units of money today is 105 units in one year then there is a \$5 premium on current money and its "price" is 5%. The Spot price is 100, the forward price is 105, the forward premium over spot is 5 and the price is $[F(\text{orward}) - S(\text{pot})]/[S(\text{pot})]$ or $(105 - 100)/100 = 5\%$. This calculation can be applied to money or any other financial *or real* asset that exists in finite time.

These calculations apply to a single period of unspecified finite length, but the future extends for more than one period, so interest rates can also be calculated for each future period and combined to find the price applying to a multi-period asset. Further, if expectations of future conditions are time specific, the interest rates associated with different future periods may differ. For example, the expectation of the forward premium on money that will prevail in one year's time may be different from that which prevails for the current year. There would thus be a separate price for holding one-year money if it is borrowed in one year's time. This can obviously be extended and the conclusion is that

there are as many different "forward" interest rates for forward periods as there are differing expectations over future periods. Thus, there will be interest rates for swaps of present money against money one year from now, two years from now, three years from now, six months from now, etc, as well as interest rates for money one year from now against money repaid two years from now, three years from now and so forth each of these terms starting in one year, i.e. the one-year rate expected to rule in one year, the two-year rate expected to rule in one year. There will also be a one-year rate for money two years from now and so forth, ... ad infinitum. This is the basis of the current methodology for valuing assets based on forward interest rates. It is also the basis of all financial engineering of fixed interest securities. This is one of the most important contributions made by Fisher in his theory of interest.

Since Fisher considered interest theory as a part of price theory, he also noted that spot-forward swaps which were the basis of the theory of interest on money could be applied to any other financial or real asset or commodity. Thus it would be possible to trade wheat or peanuts or bananas today against repayment of wheat or peanuts or bananas in one year. Thus, just as \$100 today could be swapped against \$105 at a future date, 100 bananas today could be swapped against 105 future bananas giving an interest rate of 5% in bananas. Thus, there could be as many interest rates as there were different commodities and as many interest rates for each separate commodity as there were future periods.

This is a lot of interest rates. And it seems obvious to ask the question, what is the relationship between them. Fisher made a distinction between money income and real income. Real income was composed of the "real" physical enjoyments procured by the expenditure of money income. By analogy, real interest was the premium in terms of physical enjoyments of a real spot-forward swap. Thus, interest rates in the money standard and any of the potential real standards would be equivalent if the rates of exchange between money and real goods were stable. That is, money does not depreciate or appreciate in terms of real income. If it does, then the rates of interest in every standard will differ, and most of Fisher's theory concerns methods of bring these standards back into equivalence.

Here is the linkage to the quantity theory. Fisher espoused the Equation of Exchange in his book on *The Purchasing Power of Money*. Since in Fisher's theory interest rates were not determined by the simple comparison of the supply and demand for money, he was concerned to show that an increase in the money supply would not reduce interest rates, but rather increase them since the depreciation of

money would require an adjustment to keep the interest rate on money comparable with that on real income. Thus, he incorporated his quantity theory views into his idea that money interest rates would be adjusted by the appreciation or depreciation of the money standard. A growth of the quantity of money thus produced higher rates of depreciation of the purchasing power of money and required higher interest rates to compensate. This is the start of Keynes's resistance to Fisher's theory.