



## ROY FORBES HARROD

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**R. F. Harrod – a world renowned economist best known for his economic growth model. It is a less known fact that this versatile and incredibly productive scientist also concerned himself with the money theo-**



**ry. His theoretical interpretation of the role of money bears traces of John Maynard Keynes, who had introduced him to the secrets of economic science and strongly influenced his professional career.**

Roy Forbes Harrod was born in February 1900 in London. His father, Henrich Dawes Harrod, was a businessman and the author of two historical monographs. His mother, Frances, was a writer. He was given the opportunity to study by obtaining a scholarship at St. Paul's School in 1911, as well as a royal scholarship for history at New College in Oxford, where his father had studied earlier.

In 1919, he majored in classic literature, ancient history and philosophy at Oxford. After graduation, he first took up academic philosophy. His scientific path took a sharp turn when a philosophy lecturer at New College showed dislike for Harrod's essays. After that, he focused his scientific research on economic problems.

The road of Roy F. Harrod to economics began when he accepted a teaching job at Oxford University, where he was supposed to teach a then unusual subject – economics – which was a part of Oxford's new acclaimed "School of Politics, Philosophy and Economics." To duly prepare for lecturing economics, he was advised to spend two semesters in continental Europe, but instead chose to go to Cambridge University first. His time at Cambridge and the lectures of J. M. Keynes have turned out to have a great influence on his scientific direction. Although R. F. Harrod is well known in the broad economic community for his contribution to the macroeconomic theory, his work on the microeconomic theory was significant as well. In his original debut "Notes on Supply" (1929), he was the first twentieth-century economist to derive the marginal revenue curve. In 1934, he caused a stir by his important paper on "Doctrines of Imperfect Competition" in which he summarised the essentials of new theories formulated by Edward Chamberlin and Joan Robinson.

In the 1920s, Harrod often met with Keynes and worked his way to a group of brilliant young economists, such as Richard Kahn and Joan Robins. The scientific research done by these young economists has driven the rise of a new theory, which eventually resulted in Keynes' "General Theory." Harrod wrote a number of important and influential articles advocating a new approach to state economic policy. These papers, complemented by Kahn's multiplier of employment in international trade, form the contents of his first book "International Economics" (1933).

Shortly after the "General Theory" by Keynes had been published, Harrod published "The Trade Cycle" (1936), where he laid out some of the dynamic elements of a new theory of effective demand. Although several other prominent authors (Smith,

Malthus, Ricardo, and the like) had sought to define the conditions, under which total output of an economy would rise, neo-classic economists did not deal with the long-term effects of abrupt changes in specific economic variables. Harrod walked the extra mile and showed what might happen if savings were permanently high and how this would impact long-term investment prospects. In 1948, Harrod completed his growth theory in the book "Towards a Dynamic Economics" (1948), followed by other important papers such as "Second Essay in Dynamic Theory" (1960) and "Are Monetary and Fiscal Policies Enough?" (1964).

Harrod's valuable addition to economic theory, in particular his elaboration of the growth theory in the 1930s, also received recognition from Assar Lindbeck, the chairman of the Nobel Prize Committee, who said Harrod was on a list of economists who would have been awarded the Nobel Prize had they lived a little longer. The essence of Harrod's original contribution is in the gradual evolution of his theory of economic growth over the period from 1939 to 1964. He summed up the technical characteristics of his growth model in a separate paper entitled "The Harrod-Domar Growth Model" (1964).

Harrod's manifold interests are also documented by his invitation to join the Statistical Department of the Admiralty set up by Churchill during the Second World War. It was around that time that Harrod developed a keen interest in international financial institutions – the International Monetary Fund and the World Bank – which had to be established after the allies had won the war. In the post-war period, he worked on national economy problems which he publicly discussed. In 1959, Harrod was awarded the title of knight for his public engagement and academic achievements in the years before and after WWII. In 1945, he replaced J. M. Keynes as the editor of the "Economic Journal" and stayed in the position till 1966.

After WWII, Harrod picked up a strong interest in current developments of the British economy, publishing seven books and a series of papers on the economic course of his country. In this respect, he argued that there was no need for economic interventions at full employment, since the jobless rate was less than 2% in the 1950s and 1960s. In late 1950s, Harrod was firmly convinced that the elimination of import barriers would result in growing problems for the British economy, which then pursued the Keynesian economic policy. Interestingly enough, Harrod was also a fervent opponent to Great Britain's entry to a com-

mon European market. Unlike other renowned Keynesians, he insisted on the need to keep inflation low, supporting his point by statistics published in "Towards a New Economic Policy" (1967) where he showed that in Great Britain inflation tended to rise during periods of economic recession, rather than at times of boom. That is why he was convinced it was important to keep control of cost inflation, which he considered the critical inflation component in Great Britain. He also believed that a deflation policy cannot be an effective way to control the rate of cost in-

flation. Towards the end of his life, he publicly disputed the government's efforts to cut public spending at a time of undesirably high unemployment.

R. F. Harrod also wrote a biography of J. M. Keynes entitled "The Official Life of Keynes" published in 1951.

He retired from teaching at Oxford in 1967 after reaching the legal retirement age, but continued his academic career as a guest lecturer at several reputable North American universities. He died in 1978 in Norfolk.

### Harrod's Contribution to Economic Theory

R. F. Harrod's scientific work peaked in his contributions in three fields of economic science in the post-WWII era. His first accomplishment was the elaboration and development of pre-war works on dynamic theory, second was his extensive work on the theory of the firm, and third his contribution to the international monetary theory which he developed in particular during the WWII, as well as to the money theory.

Harrod belonged to an Oxford club of economic scientists who would regularly meet British business people. In their discussions, they tried to identify the reasons behind entrepreneurs' market decisions. These conversations gave rise to the book "Oxford Studies in the Price Mechanism" (1951), which concluded that entrepreneurial decisions on future investments are not determined by the interest rate to any material degree, and seek the added margin considered adequate for their average or total production costs, rather than maximum profits. In his important articles "Price and Cost in Entrepreneurs Policy" (1939) and "Theories of Imperfect Competition Revised" (1952), Harrod brought up a theory of how enterprises go about their pricing. He found that business market decisions on the level of investments are driven by other reasons than those suggested in the said Oxford study. Harrod's articles explain that the key objective pursued by entrepreneurs is to seize the largest possible market share and set their prices low enough to deter competition. He arrived at the conclusion that firms are trying to maximise profits in the long run and avoid over-capacity, which Chamberlin and Robinson considered the inevitable consequence of imperfect competition.

### Harrod's Growth Theory

As the above implies, Harrod had an in-depth knowledge of the basics and the advanced aspects of the Keynesian economy. He takes credit for explaining the relationship between the new Keynesian theory of interest rate and the then valid neo-classic theory of interest, which is based on the interaction of ex ante savings and investment decisions. In 1935, in his letters to Keynes, Harrod explained how he perceived the necessity of the "General Theory" by pointing out its new features and its fundamentals:

- Volume of investments influenced by:
  - marginal utility

- capital plan
- interest rate
- Interest rate influenced by:
  - liquidity preference
  - time plan
  - money supply
- Employment influenced by:
  - volume of investments
- Multiplier value depending on:
  - the propensity to save.

After publishing the general theory, Harrod made some significant progress in the next fifteen months and, on 3 August 1938, sent Keynes his draft concept for an "Essay in Dynamic Theory." In an accompanying letter, he wrote: "My view of the dynamic theory... I believe is a huge improvement to my book... in many places, I have suggested the possibility of formulating a simple law of growth, and it is an assertion I want to prove. To a large degree, it is based on the ideas of the general theory of employment, but I think it takes us one step further."

Harrod's main innovation was in the definition of a variable path of equilibrium growth, which he described as the "warranted" rate of growth. Before writing "The Trade Cycle", Harrod realised some basic controversies between the assumptions prevailing in the microeconomic theory of the firm, to which he himself contributed greatly, and the new Keynesian macroeconomics. In the theory of the firm, long-term investments equal zero because firms are not motivated to make additional investments if they already reached maximum growth and, thus, a long-term equilibrium. But the new Keynesian macroeconomic theory assumed that net corporate or government investments will exist as long as there are net savings in an economy. A theory compatible with both macro- and microeconomic equilibrium therefore required businesses to invest on an ongoing basis to be able to gradually absorb all net savings. Harrod's unique discovery, the warranted growth rate, was an attempt at finding the equilibrium growth path which industrial and commercial investments would have to follow to achieve and maintain economic equilibrium in an economy.

Harrod's idea of a variable equilibrium growth path was based on the premise that savings (expressed as  $s$  percent of national income) will be continuously absorbed by investments. In this respect, the question he asked was: what is the growth



rate at which firms will invest  $s$  percent of national income all the time to reach equilibrium growth? In search for an answer, he applied the acceleration principle, or "relation" as he called it, which states that firms need  $Cr$  units of additional capital to produce an additional unit of output. The warranted output growth rate would then be  $s/Cr$  percent per year. Since each output increment by one unit prompts investments of  $Cr$  units, for output to gain  $s/Cr$  percent of national income a year, equilibrium investments of  $Cr$  times  $s$  percent of national income would be required. In his calculations, Harrod suggested a typical  $s$  of 10% of national income and a  $Cr$  at 4 to ensure a warranted growth rate of 2.5%.

This concept devised by Harrod, namely that if an economy produces savings on a continuous basis, then an equilibrium state will result in a continuous geometric output growth, came as a fair surprise to Keynes and his followers. However, as Harrod was quick to explain in 1937: "A static system allows us to analyse what happens in an economy with no output growth, which results (as in Joan Robinson's long-run analysis) in zero savings. Now we can hope to determine an economic growth rate which can be sustained in the long run."

The warranted growth rate and its instability were Harrod's major discoveries. Since 1939, he compared the warranted growth rate to the natural growth rate (a growth rate facilitating population growth and technological progress). Harrod defined the rate of technological progress as the growth of productivity of labour which, with the interest rate staying constant, will not affect the capital ratio value. This relation was later named Harrod's neutral technological progress. It is this progress, combined with growing workforce, that determines the natural growth rate. It is a rate at which output can increase on a long-term basis. Harrod's thread of thought runs to the conclusion that economic growth depends on the growth rate of employment and technological progress in the long run.

The warranted growth rate cannot be higher than the natural growth rate. In that case, it would be impossible to reach equilibrium growth, as an economy cannot keep growing faster than the natural rate. The natural growth rate is the highest possible growth rate at which all available resources in an economy are used in full. The warranted growth rate is determined by existing savings and the capital ratio. This time, investments absorb all savings, and entrepreneurs are content because everything that is produced is actually used and returns expected profits.

Harrod figured out that even though the actual growth rate may depart from both the warranted and natural growth rate, it cannot outstrip the natural rate.

He also found that same if Keynes insisted on the equilibrium condition  $I = S$ , it turned out necessary to explain a situation where savings do not equal investments. In this context, we might use Myrdall's term "ex ante", or speak of planned investments and savings which may be off balance. But Harrod, for his part, preferred Keynesian concepts, because they tend to refer to things going on now, rather than

past decisions which he believed were insignificant. Another benefit of this approach is that it allows for the distinction between personal and corporate savings on one side and corporate savings, or negative savings, on the other side, in relation to a level resulting from inflation or deflation. Harrod finds that this dichotomy in savings is lost in the "General Theory", but says it is crucial to understand many phenomena in the "Cycle Theory" and "Growth Theory."

### Harrod's Contribution to the Money Theory

In his book "Money" (1969), Harrod describes his view on the role of money in a market economy, and analyses individual monetary theories. He spends a fair amount of time explaining the role of gold in the monetary system, breaking the monetary theory, as part of the general economic theory, down into microtheory, macrotheory, and growth theory. He argues that ever since money took over as the means of exchange, one can assume that the monetary theory might not work in microcategories only. As money enters exchange relations with most or all valuables, it shows that the macrotheory and the growth theory are connected to the monetary theory. According to Harrod, back when gold and/or silver were the principal, if not the sole form of money, their marginal production costs were important on the supply side, as they determined the value of the money they embodied. However, they differed from other commodities in that their current stock was large compared to the production volume. This means that the ratio of demand for precious metals to the current stock had a larger impact on their value than was the case with other commodities. If the production volume had any impact (sometimes considerable), marginal costs would equal a value determined by the relation between demand and current stock assuming reasonable production regulation. Although this can be applied, to a certain degree, to all commodities, it holds better for precious metals.

In "Money", Harrod also looks at the problem of using precious metals for non-monetary purposes. He also addresses the issue of circulation of lesser-value money, in particular their supply generation. He ponders on "controlling" money supply through convertibility against one precious metal on the demand side, as well as the more recent attempts at money supply regulation using minimum required reserves. Harrod argues that that by severing the bond between the volume of paper money and the volume of precious metals, the determination of the volume of money in circulation has become a job for the central bank. Harrod finds that, from the microeconomic theory perspective, money supply is thus influenced by decisions made by authorities. Although the authorities may have certain criteria by which to determine money supply, such criteria may be incomprehensible and vague.

As regards the application of money as a means of cross-border exchange, that is what Harrod considered a more complicated problem due in particular to different currencies used by individual countries. He notes that not all money can be used for outgoing foreign payments. Harrod also explores the

factors influencing the world supply of funds available for international settlements and the demand for such funds, mainly the global demand generated by central banks. He concludes that this corner of the monetary theory is still unexplored territory.

In formulating his thesis on the role of money, he relied on Keynes' "General Theory." As he points out, however, the fact that Keynes' theory prefers money demand does not mean that Keynes denies the impact money supply has on price level. In Harrod's opinion, Keynes rather believed that some interactions suggested in the quantitative theory could be disputed.

Harrod says that no one necessarily becomes a "quantitative theoretician" alone by identifying with the quantitative theory. The extreme form of quantitative theory, which no one actually subscribes to, would say that  $V$  (velocity of turnover of a money unit) and  $T$  (number of market transactions) are always constant, so that the price level can change directly in proportion to the money supply. According to Harrod, this correlation expressed in the equation may depend in particular on the cost of production of gold or, in the modern world, the actions of the central bank which employs certain regulated relationships with commercial banks to steer money supply. One scenario giving the equation a better chance of acceptance would be that  $V$  and  $T$  are exogenous variables, because their behaviour depends on existing patterns in the average time span between income and expenditures, as well as on the type of services provided by banks, and factors such as the size of population and the rate of productivity. We could therefore say that the price level depends on money supply, along with exogenous changes in  $V$  and  $T$ , and could also suggest that a given increase in money supply would prompt a proportional increase in the price level compared to where it would be under normal circumstances.

Harrod describes Keynes as a staunch advocate of the importance of money and a proponent of monetary reform, noting that he was also actively involved in the Bretton-Woods Agreements in order to improve the international monetary system.

Harrod goes on to explain the need to distinguish between cost and demand inflation. He sees cost inflation as the ratio of the increase of wages to the increase of labour productivi-

ty, whereas demand inflation is pulled by aggregate demand which tends to raise prices if investments outrun savings, and lower prices if savings outrun investments. In an economy, cost inflation may occur even at times when there is no demand inflation. Sometimes this can be due to an earlier demand inflation bringing about growth in the cost of living, or the absence of demand inflation for a long period of time. So if an economy experiences both demand inflation and cost inflation at the same time, and if the earlier type of inflation is the reason causing the later type of inflation, Harrod claims the inflation problem can be tackled by eliminating demand inflation. He also believes it is not advisable to pursue a deflation policy if there is no demand inflation, or if the cost inflation is a consequence of an earlier demand inflation.

### Harrod's Contribution to the Theory of International Monetary Relations

Harrod's contribution to the issue of international monetary relations aroused the interest of the professional community in the aftermath of the Second World War. At that time, he was busy trying to justify the need to establish special institutions which would, in one way or another, co-ordinate the development of the world financial system. Together with J. M. Keynes, he stood at the birth of the idea of creating the Bretton-Woods system and establishing the International Monetary Fund and the World Bank. He also contributed greatly to the inflation theory and the money theory. One thing the professional public is less familiar with is that Harrod arrived at the conclusion that there is room for increasing inflation in the world, which was successfully implementing the Keynesian economic policy in the post-war era. He pointed out that, in a situation like this, the liquidity basis of the world's financial system tends to become inadequate, because the price of gold cannot keep up with growth in other prices. He believed that the basic global liquidity, based on gold, must start growing hand-in-hand with international money demand. He considered the price of gold the key problem, and in his book "Reforming the World's Money" (1965) concluded that a major increase in the price of gold would be necessary to avert a possible international monetary crisis.

#### The most important works of R. F. Harrod:

- International Economics, 1933, Cambridge: Cambridge University Press
- The Trade Cycle, 1936, Oxford: Oxford University Press
- Towards a Dynamic Economics, 1948, London and New York: Macmillan
- The Life of John Maynard Keynes, 1951, London and New York: Macmillan
- Economics Essays, 1952, London and New York: Macmillan
- The Pound Sterling, 1952, Princeton: Princeton University Press
- The Dollar, 1953, London and New York: Macmillan
- Policy against Inflation, 1958, London and New York: Macmillan
- The British Economy, 1963, New York: McGraw Hill
- Plan to Increase International Monetary Liquidity, 1964, Brussels and London: European League for Economic Co-operation
- Reforming the World's Money, 1965, London: Macmillan
- Towards a New Economic Policy, 1967, Manchester: Manchester University Press
- Money, 1969, London: Macmillan
- Economic Dynamics, 1973, London: Macmillan