

# What Can Posterity Learn from Irving Fisher?\*

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*This essay draws attention to some of the important aspects of, and learnings from, Irving Fisher's work. Fisher was the first economist to subject big volumes of data to analysis. He was one of the founders and first president of the Econometric Society. His name is associated with the quantity theory of money. He researched the purchasing power of money, index numbers, created the so-called Fisher index, wrote about the theory of interest rates, economic cycles, dwelled upon debt deflation and the theory of the Great Depression. He was one of the first advocates of abandoning the gold standard. He also drew attention to the psychological motives of the behaviours of economic actors, so the theories of Thalerian behavioural economics can regard him as their predecessor. His insight was used in managing the financial crisis of 2008. The steps towards reforming bank regulation can specifically be regarded as such measures, while Modern Monetary Theory stretched back as far as his thoughts on the regulation of the creation of money, i.e. the Chicago plan.*

**Journal of Economic Literature (JEL) codes:** E31, E32, B31, C58, D91, G28, E12, B52

**Keywords:** history of theory, crisis theory, deflation, behavioural economics, financial markets, regulation policy, modern monetary theory

## 1. Introduction

All economics students are familiar with one of the outcomes of Irving Fisher's work, since undergraduate students of economics usually receive thorough training in statistics. Price indices form an important part of this course material. And the Fisher index (that is, the geometric average or mean of the Laspeyres index and the Paasche index) is part of that. His significance in statistics is unquestionable. The importance of his work is also marked by the fact that BIS, the bank of central banks, established a committee named the Irving Fisher Committee on Central Bank Statistics (IFC), which is a forum of economists and statisticians at central banks, and its aim is to discuss statistical issues concerning central banks.<sup>1</sup>

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\* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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The Hungarian manuscript was received on 2 December 2021.

DOI: <https://doi.org/10.33893/FER.21.2.175>

<sup>1</sup> In the IFC Reports, IFC Bulletins and IFC Working Papers, the Irving Fisher Committee shares various analyses and recommendations with central banks (<https://www.bis.org/ifc/publications.htm>).

He was the first to rely on macroeconomic data to prove his theories. Financial professionals encounter his work in relation to the quantity theory of money. However, his work is much richer than that. Several modern economic trends also identify Irving Fisher as an early pioneer of their theories<sup>2</sup>.

## 2. Professional career

In 1891, Fisher received his PhD in economics at Yale. His thesis, in which he outlined the development of the theory of general equilibrium, was praised. (Léon Walras arrived at similar findings at the same time.) He became a professor at Yale in 1898, and after 1935 he remained at his university as professor emeritus. He edited the *Yale Review* for fifteen years at the turn of the 20<sup>th</sup> century, and was active in many learned societies. He was president of the American Economic Association in 1918. The American Mathematical Society selected him as its Gibbs Lecturer for 1929, which is the highest accolade of the Society intended for mathematicians and others who apply mathematics. In 1930, with Ragnar Frisch and Charles F. Roos, he founded the Econometric Society, also being its first president.

His major works include *The Nature of Capital and Income*, published in 1906, *The Purchasing Power of Money* from 1911, *The Making of Index Numbers* from 1922, and the *Theory of Interest* from 1930, as well as his work entitled *The Debt-Deflation Theory of Great Depressions*, published in 1933.

His inventions had made him a wealthy man by the late 1920s. However, he lost everything he had in the Great Depression between 1929 and 1933. Until the end of his life, he believed that markets would recover based on their own principles, and the economy would overcome the Great Depression. He did not live to see the economic recovery, which came after World War II, though not in the way he had expected: the normalisation was a result of the state's actions based on Keynesian policy, and not the monetary policy which he had advocated. In fact, the effect of the war on the economy played a significant role in that context. He died in 1947.

In the late 1930s, many of Fisher's – otherwise correct – insights were largely ignored in academia in favour of Keynesian economics and the liquidity preference theory. His real values were only recognised by some decades later. For example, in 1973, the *Journal of Political Economy* reprinted his article (written almost 50 years earlier, in 1926!) about the relation between inflation and unemployment. The journal retitled it as '*I Discovered the Phillips Curve...*' (Fisher 1973). After the crisis in 2008, his views were quoted with great appreciation by many.<sup>3</sup>

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<sup>2</sup> For example, see the article on behavioural economics by *Richard Thaler* (1997).

<sup>3</sup> In Hungarian literature, *Szentmihályi – Világi* (2015) were among those who referred to Irving Fisher and the Phillips curve.

In this essay I have examined some of his original works, but my findings are primarily based on reference papers analysing Fisher's work. We could also say that my writing concerns what economists thought about this – in no way ordinary – economist.

### 3. The quantity theory of money and the money illusion

Fisher was an important representative of the quantity theory of money. The quantity theory of money states that, just like other commodities, the price (exchange value) of money is also determined by the relation between demand and supply. (This is included in all textbooks on economics and finance today.) If there is relatively a lot of money, it means a high demand for goods and causes an increase in prices. In his work published in 1911, Fisher formulated his theory, according to which the increase in the quantity of money raises prices in a direct proportion. This equation is also called the *Fisher equation*:

$$P = MV/T,$$

where  $P$  is prices,  $M$  is the quantity of money,  $V$  is the velocity of money, and  $T$  is the total amount of goods, which is most often captured by the GDP.

Naturally, this equality is barely a logical theorem, of which Fisher was well aware. It is true only *ceteris paribus*, that is, if other things remain unchanged, when velocity and the amount of goods are constant. Yet this not the case in real life, therefore the equation is only partly valid in practice. The effect exerted by the changes in factors, which can be enormous nowadays due to modern technology, must be added to the effect brought about by the changes in the quantity of money (*Humphrey 1997*).

Fisher believed that people were afflicted by *money illusion*. They cannot see the amount of goods they can buy in the future for their money. Money illusion can be captured very well by a quotation – the words of an Israeli diplomat (based on the above-referred work by Thaler), “That dollar is an extremely unstable currency; one month it is worth 100 Israeli pounds the next month 200...” (*Thaler 1997:440*). Therefore, he was thinking about creating a “stable” currency that retains its value, its purchasing power, compared to a certain basket of goods. We should not forget that the monetary system of the time was the gold standard. According to his proposal, *the gold content of the currency should have been modified in order to mirror the price changes on a basket of goods*. This was a revolutionary idea. However, the world of finance firmly insisted on a fixed weight in gold of the currency. Bankers believed that Fisher's proposal might cause a loss of confidence in the dollar. They worried about the stability of the banking system. For many decades, financial governments resisted abandoning the gold standard, despite the fact that the convertibility of currencies into gold had practically ceased to

exist domestically in every country after World War I, and remained present only in international settlements (*Antalóczy – Botos 1990*). Then the devaluation competition of the 1930s made it utterly formal. Finally, in 1944, the Bretton Woods Agreement brought about the fall of the gold standard: the convertibility of currencies to gold ended, only the dollar remained pegged to gold, and only for central banks. (Later it had to be abandoned too, since at the beginning of the 1970s the French tried to exchange their dollar reserves for gold at the Fed at the level of central banks. The USA, however, did not want to lose its gold reserves.) Under the Jamaica Accords, theoretically no currency has been pegged to gold since 1976. The monetary policies of central banks are obliged to provide the value and purchasing power of the money created. In recent decades, combating inflation has been the main task of central banks.

On monetary policy, *Knut Wicksell (2010)* was Fisher's major theoretical rival. They are usually contrasted, as Fisher placed the emphasis on changes in the quantity of money and its influence in the relationship between money and prices, while Wicksell began with the real economy. However – as explained by an American central banking expert, *Humphrey (1997)* – their models may not have been as dissimilar as often thought. Humphrey highlights that both of them *regarded an increase in the quantity of money indispensable* for price level changes. And this is their common ground. To put it in another way, demand must be “monetised” by all means.

The main point of Fisher's *theory of interest* is that since real and nominal interest rates are different, the real interest rate equals the nominal interest rate minus the expected inflation rate, provided the latter is not too high. According to Fisher's concept, the notion of a natural (neutral) rate is important in inflation-adjusted schemes. In inflation expectations, efforts must be made to keep the real interest rates stable in order to promote savings and investments. His theory constitutes the basis for regarding the management of inflation expectations as the main – although not exclusive – goal of monetary policy. However, some opinions argue that – in the light of Schumpeter's and Keynes' works based on a monetary approach (*Ábel – Lehmann 2020*) – this idea based on real analysis must be treated with reservations. Analysts (such as *Tymoigne 2006*) point out that this perception of the real rate is irrelevant when resolving current macroeconomic and microeconomic problems as market players are much more motivated by nominal factors including financial power, liquidity and solvency than by purchasing power in their decision-making.

#### 4. 'Debt deflation'

Fisher was right to see that inflation was not the only risk. Deflation is just as dangerous as inflation. In his theory of "debt deflation" he explained that *recessions and depressions are due to the overall level of debt rising in real value because of deflation*. In that case, people default on their debts, mortgages, and consumer loans. They are struggling in the endless rat-race of the debt trap. Bank assets fall because of bankruptcies, and the value of their collateral decreases. There is a *reduction in lending* as well as in spending, thus demand also declines. The economy sinks into depression.

*Fisher focused on the phenomenon of the crash of financial markets and how devastating the effect of contracting markets and the ensuing downward spiral is. This is because neither households nor businesses resort to lending, and thus activity in the economy as a whole declines.*

In recent decades, Fisher's ideas have enjoyed a resurgence among economists, both in mainstream economics and in the heterodox school. Special mention must be made here of the work of *Hyman Minsky*<sup>4</sup> and *Ben Bernanke*<sup>5</sup>, who drew from Fisher's ideas.

*Hyman Minsky (1986) held that, over a prolonged period of prosperity, investors take on more and more risk until lending exceeds what borrowers can pay off from their incoming revenues. At that point, they are forced to sell even their non-speculative positions. A severe demand for cash is created, a spiral process starts, which leads to an event that has come to be known as a "Minsky moment", when the volatile economy is heading for a crisis. This is a process leading to bubbles, and Fisher also presented how they burst. This is why Minsky emphasised the necessity of state intervention and regulation, as well as the strengthening of the Federal Reserve System's role as a lender of last resort. But he did so in the 1980s, in the era of deregulation! So he suffered a similar fate as Fisher did in his time: his proposal was not timely, and nobody listened to him. Minsky's truth was only acknowledged afterwards, following the crisis of 2008.*

When he was an academic researcher, *Ben Bernanke* wrote an article in 1983 on the explanation of the Great Depression. In this article, he created the missing link between Fisher's theory of *debt deflation* and the dramatic drop in nominal income revenues, i.e. the crisis. The explanation is the *credit crunch*, a sudden decline in lending activities. Theoretically, a drop in prices channels funds to lenders; but

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<sup>4</sup> For more details on Minsky, see *Desmond et al. (2010)*

<sup>5</sup> *Deflation: Making Sure "It" Doesn't Happen Here*. Before the National Economists Club, Washington, D.C., 21 November 2002. <https://www.federalreserve.gov/boarddocs/speeches/2002/20021121/default.htm>. Downloaded: 15 November 2021.

instead of benefiting from it, this process harms lenders, i.e. banks. Bankruptcies erode the value of receivables in banks' balance sheets; the riskiness of collateral reduces the willingness to lend, and a credit crunch – a cash crunch – emerges. This leads to a contraction of aggregate demand, and the reduction of consumption and investments.

Later, as Chair of the Federal Reserve, Ben Bernanke took this theory into account when managing the 2008 crisis. He has most definitely used Fisher's theses in practice.

## 5. The Chicago plan

Fisher was one of the first and most significant advocates of *a banking system based on the so-called 100 per cent reserve plan*. This was the so-called *Chicago plan*. Under the plan, creating money through commercial banks would be impossible as it would require 100 per cent reserves on deposits at the central bank (Allen 1993). Today, the Modern Monetary Theory is also based on this idea (Botos 2020).

The truth, however, is that this practice “had already been invented”. After World War II, in socialist planned economies (including Hungary) *only the central bank was allowed to create money*. The central bank did actually create money, showing the amounts required by the plan of the people's economy simultaneously on the asset side and on the liability side of its balance sheet. It was not a 100 per cent reserve of course, since commercial banks did not even exist. A two-level banking system was not established in former socialist countries until the regime change. (In Hungary, it was established a bit earlier, in 1987.) After the regime change, former socialist countries adopted the western model as part of the market economy transition, and after 1990, they restored the two-level banking system, in which money is created by commercial banks through credit (which is followed – if necessary – by the creation of high-powered money by central banks.) In countries where there are developed financial and capital markets, banks always acquire the necessary central bank money. (The better rating a bank's assets have, and the better capitalised a bank is relatively speaking, the cheaper it is for it to raise funds from the financial market if necessary.)

The fundamental argument for money creation by commercial banks was that banks could provide a flexible supply of money for the economy due to their interest alignment frameworks. They have an interest in creating money for reasonable projects that turn out to be profitable. So money does not get stuck in circulation, there will not be more of it than the required amount, and it does not trigger inflation, since created money is withdrawn from circulation when credit is repaid. However, central banks were supposed to *be able to regulate* the amount of money that can be created.

Unfortunately, the global financial crisis of 2008 proved worldwide that this was not the case. The decision-making mechanism of banks is not a perfect guarantee that reasonable decisions are made at all times and the amount of money actually required is created. Banks have given money to finance a lot of speculative transactions as well. Central banks were unable to effectively limit the amount of the money created (Turner 2015). Excess money inflated the real estate bubble, i.e. asset prices.

Finally, a massive recession emerged in 2008, similar to the great Depression of 1929–1933. When the real estate bubble burst, “debt deflation” occurred, a contraction of demand to such an extent that the USA could only prevent its crisis-generating effect via rampant money creation by the Fed (and with heavy fiscal assistance). This focused attention on Fisher’s work again.

## 6. Fisher’s relevance

After the crisis of 2008, the number of references to Fisher and the articles dwelling upon his theories increased<sup>6</sup>. *M. H. Wolfson*, who teaches economics at the University of Notre Dame, Indiana and was formerly an economist at the Federal Reserve Board, wrote an article on the current relevance of Fisher’s theory even earlier, in 1996 (Wolfson 1996). (His comprehensive work on the history of crises was published two years before writing the article, in 1994.) He indicated how dangerous debt deflation was as early as the mid-1990s). It means that the prices of real estate (apartments, houses) serving as collateral for credit also fall when there is a general decrease in the price level. If this is prolonged, after a while the collateral will not be sufficient to cover the outstanding loan amount and borrowers will become unable to repay their debt. They go bankrupt, so banks start to sell the real estate serving as collateral. This further reduces prices in the housing market. The economic consequences of this self-reinforcing process can lead to a crisis. Even as early as the 1990s (during the bailout of Savings and Loan banks) only state intervention could prevent the signs of the crisis deepening, which had appeared according to Wolfson.

In 2013, *A. O. Nakamura (2013)*, a Professor at the University of Alberta, said Irving Fisher’s 1911 book can help us understand *the leading up to the crash*, especially on the supply side. In the 1960s and 1970s, when Fannie Mae and Freddie Mac, two enormous, federally backed home mortgage companies, could not unload their long-term fixed mortgages on investors, government officials created mortgage-backed securities (CDOs) with financial innovation. These led to CDSs, which ultimately had a disastrous effect on the financial markets. *The root of the problem*

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<sup>6</sup> Google Scholar found only a few citations in 2002, while in 2013 there were almost 330 referring to Fisher (Quiviger 2019).

was that the system of financial institutions had become less and less transparent for supervisory bodies. The issuances of securities admittedly had to comply with the requirements of rating companies recognised by the state but – since formal requirements were met – the permission was ultimately always granted by the large rating institutions.

Actually, this latter fact, i.e. a certain laxity of supervision, can be seen on a wide scale. For example, *Brooksley Born*, the head of the Commodity Futures Trading Commission (CFTC), fought an epic battle pushing for the regulation of the derivatives market (*Carney 2009*), but former Fed Chairman *Alan Greenspan*, did not stand by her, saying there was adequate regulation in place. Born was repeatedly shut down by policymakers in her struggle with financial lobbyists, and she resigned from office in 1999. A couple of years later, the financial crash, foreseen in due time by Born (together with prominent financial economist and scientist *Raghuram Rajan*<sup>7</sup>), ensued. Thus, Nakamura is right.

*R. Shiller (2011)*, a Nobel laureate economist, has also referred recently to Fisher's significance, particularly, in his findings about the purchasing power of money. Fisher advocated indexing so market players could avoid the *money illusion*. Shiller (and others) pointed out that not only *explicitly deflation*, i.e. falling prices, leads to the emergence of a crisis – as explained by Fisher –, but *disinflation*, i.e. the *slowing pace* of inflation also has similar consequences. And that is what happened in the crisis of 2008 too.

What conclusions can we draw from the works of Fisher and his analysts for today's crisis-stricken age?

The most comprehensive analysis of Fisher's legacy and how it can be used in interpreting crises today was written by *Enrique Mendoza*. He began his article on the topic with a Fisher quote<sup>8</sup>. In that, Fisher referred to the fact that all factors causing a crisis, i.e. overproduction, overconsumption, excess capacities, price distortions, overconfidence, overinvestment and over saving are of *secondary significance* compared to the *initial excessive level of indebtedness* and post-crisis *deflation*. *Mendoza (2009)* considered it important that the economy had incurred massive debts *before* the emergence of the crisis.

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<sup>7</sup> *When Raghuram Rajan proved giant Alan Greenspan wrong*. The Economic Times, 18 September 2018. <https://economictimes.indiatimes.com/news/international/business/when-raghuram-rajan-proved-giant-alan-greenspan-wrong/articleshow/65821471.cms?from=mdr>. Downloaded: 15 November 2021.

<sup>8</sup> *"In the great booms and depressions, each of the above named factors (over production, over capacity, price dislocation, over confidence, over investment, over saving, etc.) has played a subordinate role as compared with two dominant factors, namely, over indebtedness to start with and deflation following soon after; ... where any of the other factors do become conspicuous, they are often merely effects or symptoms of these two." (Irving Fisher 1933:341)*



*Gauti Eggertsson* also introduced an interesting notion into crisis analysis. In 2009, when the impact of the financial crisis that erupted in the USA began to be felt, the Fed – learning from the experience of the Great Depression of 1929–1933 – tried to help the economy recover by reducing the interest rate. At that point, Eggertsson came up with the notion of the *paradox of toil*). This wording is similar to the well-known Keynesian notion, the *paradox of thrift*. In fact, we are talking about the case of the Masurian Lakes, that is, the more you struggle, the deeper you sink into the swamp. The more we save, the less we thrive. (That is why Keynes said that the traditional wisdom to save became harmful in the Great Depression.) The more we toil and try to find work *at any cost*, the higher the unemployment rate will be. This view is based on the fact that *what is true of the part is not true of the whole*. (If someone stands up in a stadium, they have a better view. But what if everybody stands up?) Thus, the structure, the composition of phenomena is important (*Eggertsson – Krugman 2010*).

Keynes's crisis management was based on the increase of aggregate demand even at the price of the government becoming indebted. Many refer to the fact that the government's overspending cannot be a key to success in tackling a crisis, because how could a crisis stemming from indebtedness be remedied by even higher indebtedness? Krugman, however, points out that different groups of debtors are in different situations and cannot be handled equally. Namely, it is possible that some must save while others must overspend. He believes that a crisis starting from private-sector debts can be halted by a deficit-financed government (*Eggertsson – Krugman 2010*).

Nonetheless, fiscal policy may only be a band-aid. It is more important to identify the causes leading to the crisis, and to manage them via regulation, as Fisher – and later, referring to him, Minsky – also said.

Immediately after the outbreak of the 2008 crisis, *Mendoza (2009)* drew attention to the fact that state bailouts alone are not at all sufficient! No one should think that a trillion dollars of fiscal stimulus means back to business as usual. He said, '*trade protection and other similarly "brilliant" ideas floating around need to be opposed*', and '*spending will not stimulate anything, and it has nothing to do with the causes of the crisis or with putting an end to it*'. He pointed out that neglecting regulation had led to the current situation. Changes should not mean general stringency but the unique inspection of specific, innovative financial products. Mendoza referred to the fact that had the wisdom of Mrs. Brooksley Born prevailed, catastrophic CDSs would not have emerged and the crisis of 2008 would not have arisen. In his opinion, the second huge mistake the government made was instituting and enlarging the implicit government guarantee backing the fast expansion of mortgage giants Fannie Mae and Freddie Mac. This made low-quality sub-prime mortgages

a mass phenomenon without transparency, eventually resulting in a disaster. It led to casino-like lending and, as a result, a global financial crisis.

After the crisis of 2008, it was considered that a protracted recession must be prevented by all means. The Dodd–Frank Act, passed into U.S. law in 2010, introduced specific regulatory changes and restrictions to protect consumers and the economy from the consequences of the risky activities of banks and insurance companies, partly by imposing higher capital adequacy requirements and liquidity norms, and partly by authorising the government to take over failing financial institutions, to avoid panic. However, banks received a lot of criticism in the USA for “sitting” on the money granted by the state. In fact, since demand for credit had stagnated in the economy, it was difficult to lend the money provided by the state. Nonetheless, fiscal stimulus and guarantees of the federal deposit insurance corporation (FDIC) constituted the most important measures preventing the deepening of the crisis. The regulatory response to 2008 may be open to criticism, but it did in the end forestall a meltdown of the global financial system, albeit at a considerable and unequally distributed cost (*Schenk 2021*).

The question as to what will be implemented of Fisher’s ideas about the banking system – restricting money creation – in the future is still open today. The strengthening regulation of money creation through supervisory methods, however, proves that in this respect his thoughts were forward-looking and feasible. In a lecture in 2009, *Janet Yellen* (referring to Minsky, but indirectly also to Fisher), said, ‘*It seems plain that supervisory and regulatory policies could help prevent the kinds of problems we now face*’<sup>9</sup>. Today the *limit to the quantity of money* that can be created by banks is not constituted by traditional central banking methods but mostly by micro- and macro-prudential regulations.<sup>10</sup>

## 7. Thaler’s opinion

Nowadays *Fisher* is cited not only because of crisis management but also because of other re-discovered theorems of his diverse work. For example, *Richard Thaler*<sup>11</sup> (1997) – who was already referred to in the introduction – considered Fisher one of the pioneers of behavioural economics. He pointed out that in his book *Theory of Interest*, published in 1930, Fisher dwelled upon intertemporal decisions. Decisions made in the present affect our future opportunities, since reducing consumption today may increase our consumption in the future. He deduced his theory from *time preference*, i.e. the category of *impatience*. (He used these two

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<sup>9</sup> Yellen, J. (2009): *A Minsky Meltdown: Lesson for Central Bankers*. <https://www.frbsf.org/our-district/press/presidents-speeches/yellen-speeches/2009/april/yellen-minsky-meltdown-central-bankers/>. Downloaded: 15 November 2021.

<sup>10</sup> Exactly the same conclusion was drawn also by *Ábel et al.* (2019).

<sup>11</sup> *Neszveda* (2018) was also deeply involved in Thaler’s work.

terms synonymously.) Fisher outlined a life-cycle model, in which he presented the role of borrowing and lending in “smoothing” consumption. With this, however, Thaler thinks he also anticipated a critique of this model. The savings rate indeed grows as incomes increase. Yet Fisher thinks that the decisions of individuals are also influenced by certain special personal factors. Individuals’ impatience greatly depends on the size, time shape, composition and foreseeable risks of the income stream. In direct contrast to the permanent-income theories of savings, Fisher highlights that the poor tend to trust the luck of the future if the all-engrossing need of the present necessities can be satisfied. The smaller the income, the higher the impatience, and the more “a bird in the hand” is preferred to “two in the bush”.

Of the so-called personal factors, foresight and self-control are the ones that influence the degree of impatience. Other personal factors include habits, fashion, life expectations, concern for the lives of other persons (i.e. bequest motive). Foresight has to do with thinking and reason, but self-control depends on willing.

Fisher’s model can be interpreted as is taught by the introductory materials of Economics; that is, a person might borrow heavily until his marginal rate of time preference is equal to the interest rate, but Fisher always stressed that his theory was based on the assumption of *perfect foresight*, which, as we have also mentioned, is not typical of the world we live in. Besides foresight, there are many irrational elements in decisions, e.g. laziness or procrastination. The influence of fashion is particularly irrational. Therefore, his theory is normative, and not a description of facts. In fact, Fisher’s *findings match the principles of the school of behavioural economics*. That is why Thaler referred to him. When learning about Fisher, one should not get bogged down in his equations but go back and read the surrounding text...

## 8. Summary

Irving Fisher was definitely one of the economists who helped introduce mathematics and statistics to economics and applied them (e.g. Edgeworth, Pareto). His diagrams and graphs helped understand economic rationale, but the explanatory text is also very important, as it reveals that elements of behavioural economics do have a major role in economic decisions. Thus Fisher was also a pioneer of the behaviourist trend, and his “debt deflation” theory gives a clear explanation of the 2008 crisis, and also forms a basis for crisis management, i.e. micro- and macro-prudential regulation through tools of banking supervision. Modern monetary theory argues that the activity of central banks should be based on his principles. It is very doubtful whether the total restriction of commercial banks’ money creation and returning to lending by commercial banks with 100 per cent reserves can become reality. Nonetheless, the development of money theory and changing central banking policies have become a remarkable phenomenon of our age.

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