

# Marshall's Version of the Cumulative Process Used a Natural Rate Concept

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references

Marshall described a "cumulative process of expansion of credit, rise of prices, profits and wages" (Eshag 1963, p. 79). As part of his discussion of the "cumulative process" (CP), Marshall, like Wicksell used a "2-rate differential" interest mechanism to describe disequilibrium, but the literature has two different interpretations of how Marshall's interest mechanism compares to Wicksell's. For Wicksell, "monetary equilibrium" (See Myrdal 1939) would be described by the "natural" ( $i_N$ ) equal to the "loan" interest rate ( $i_L$ ), and a positive 2-rate differential (2RD), with ( $i_N - i_L > 0$ ) would cause an inflationary disequilibrium for the macro economy. For Marshall, macro disequilibrium was somehow related to business speculation. As Laidler has pointed out, Marshall followed "the mainstream classical tradition, epitomized by Mill, of stressing the speculative element in business behavior during the upswing [...] grounding the analysis of speculation in the distinction between the nominal and real rates of interest" (Laidler 1991, p. 90; emphasis mine). This was part of the "classical monetary approach to cycle theory" (*ibid.*, p. 89).

Wolfe, in describing the short run theory of the cycle, in reference to his discussion in *Money, Credit and Commerce*, also described how Marshall used the "real rate of interest as an element in his trade cycle theory" (1956, p. 94). The discussion on this page makes it clear that Wolfe was referring to the real rate as simply the deflated version of the nominal rate, not the  $i_N$  of Wicksell. Wolfe quoted Marshall from the *Principles* (Marshall 1920, pp. 594-595), where he clearly was discussing speculation by businesses and individuals in a highly inflationary environment: "For when prices are likely to rise, people rush to borrow money and buy goods [...] business is inflated and is managed recklessly and wastefully". It will be shown below that although this was part of Marshall's analysis of inflation, he also analyzed, and even emphasized in his description of cycles, a situation when expected business profits would rise with moderate inflation and this would be more akin to Wicksell's 2RD analysis where such inflationary speculation was not so important. However, this theoretical description was left out of the *Principles*.

The "distinction" between the nominal and real rates emphasized as part of Marshall's analysis of expansion and inflation by Laidler and Wolfe, was not the same as Wicksell's positive 2-rate differential, although both led to a CP for different reasons. The chief difference between Laidler's and Wolfe's nominal/real description of the 2RD and Wicksell's was related to how Wicksell interpreted the "natural rate", the rate which was "approximately equal to the real profit of business enterprise" (Marget 1938, p. 202)(1). It was Wicksell's intention to interpret both the natural and the "money" or loan rate (the rate at which banks lend in the current period) in real terms. Only then could the 2-rate differential ( $i_N - i_L$ ) be calculated directly. In Wicksell's theory of cycles (See Gootzeit 1993), if this differential were positive, it would imply a positive expected net

profit rate and provide an incentive for businesses to increase investment. For Marshall, however, although the "distinction" between the nominal/real loan rates also provided an incentive for "speculative price rises" (2) because borrowers would have to pay back less in real terms over time than they borrowed when the rate of inflation was positive and the nominal was greater than the real rate, his analysis on this point also seemed to be related to the simple fact that money was not a good "standard of value". It seems not to have been related, as was Wicksell's analysis of the 2-rate differential, to the real nature of the business investment process.

Although Laidler and Wolfe have interpreted Marshall's 2-rate differential concept as a difference between a nominal and real rate, à la Fisher, other writers have interpreted it as the difference between the "natural" and "loan" rates, à la Wicksell, which he regarded as a measure of the net profit rate. For example, (Marget 1938, p. 173) regarded Marshall's treatment of the cycle to focus on "the rate of interest as the link by which changes in  $M'$ , and therefore in prices are brought about. No one familiar with the discussion of the effect of variations in bank-rate upon the amount of bank borrowing, from Thornton and Ricardo through the Currency and Banking School controversy down to Marshall, could have argued that emphasis upon these variations as the crucial step in the mechanism of price-change should be regarded as a novelty". According to Marget, Marshall did express both parts of the 2-rate differential in real terms and their difference, as in Wicksell, as a net profit rate: "Marshall emphasized [...] the importance of the relation between the rate of discount and what he called 'the profitableness of business'" [the natural rate] (*ibid.*, p. 184, n. 74)(3) when he described how a rise in prices would be set in motion during a cyclic upswing. Rist was even clearer that Marshall's version of the 2-rate differential was similar to Wicksell's and that the latter's idea was a later step in its evolution: "A rise in prices may be initiated, he [Wicksell] says, by a wide enough gap between the bank's discount rate and what he calls the 'normal' or 'natural' or 'real' long term rate of interest. He [Wicksell] does not consider that this rate is identical with Marshall's 'equilibrium' rate, but the two conceptions are very close to one another" (Rist 1940, p. 298). This passage suggests that Wicksell's description of how a 2-rate differential would cause a CP was a direct descendant of Marshall's ideas, not only in its description of cyclic expansion, but also in its use of an identical interest mechanism as the main causal factor.

The problem in understanding Marshall's cyclic analysis as a version of what has been called the CP (4) is that he employed a definition of what Wicksell called the "natural rate" without formally defining it or even using the name in his 1887-88 parliamentary testimony to the Gold and Silver commission, although it appears to be absent in the *Principles* (5). In this testimony, Marshall chose as a proxy for the natural rate: "the average level of interest". As in Wicksell, this rate was determined by the expected "profitableness of business": "The average rate of discount permanently is defined by the profitableness of business [...]. The average rate of discount is determined by the average level of interest [...] and that is determined exclusively by the profitableness of business" (Marshall 1926, p. 41, question 9651)(6). In long run equilibrium ("permanently"), "the average rate of discount", what Wicksell called the "loan rate", will adjust itself, so that it would be equal to "the average level of interest" (the natural rate) which was determined by the "profitableness of business". But, what of disequilibrium when the natural became greater than the loan rate and an upward cycle would occur? Here, Marshall used the mechanism of the CP to show how at least a partly real expansion may take place in the relatively short period, while Wicksell confined his analysis of a real CP to the longer period; in the short period inflation predominated. Hence, Marshall's version of the upward CP is more relevant to the cycles prevalent in modern economies.

## Appendix: Wicksell's Natural Rate

The concept of the "natural" interest rate ( $i_N$ ) in Wicksell is probably the single most

complicated and confusing aspect of his ideas on macro-economics. I can find at least four definitions of  $i_N$  which seem different enough to be listed separately:

1. The rate determined by partial equilibrium in the capital market. "[...] if capital were lent in kind, there would undoubtedly develop, through the supply of and demand for the available capital, a certain rate of interest on the lending market, which would be the natural rate of interest on capital in the strictest sense" (Wicksell 1898a, p. 84).

2. The average long run profit rate on capital: "According to the general opinion among economists, the interest on money is regulated in the long run by the profit on capital" (Wicksell 1907, p. 214). This opinion among economists was handed down from the "Ricardian tradition" of classical economics (Wicksell 1928, p. 190). Wicksell subsequently used this definition in the same article to describe his theory of price changes: "[...] what becomes of the connecting link between interest and profit? In my opinion there is no such link, except precisely the effect on prices, which would be caused by their difference" (Wicksell 1907, p. 215).

3.  $i_N$  is determined by the marginal product of capital. The profit rate on capital "[...] is determined by the productivity and relative abundance of real capital or [...] by its marginal productivity" (*ibid.*, p. 214). Patinkin (1965) calls this conception of  $i_N$  the "marginal efficiency of capital" (p. 589) and thus likens it to the ideas of Keynes. Ohlin found Wicksell's ideas on  $i_N$  to emanate from his study of Bohm-Bawerk. He interpreted Wicksell's ideas on  $i_N$  this way: "Must not the 'natural' rate of interest, governed by the marginal productivity of capital, i.e. of the roundabout methods of production which would exist if money were not used, have some connection with the rate of interest as it actually appears on the capital market?" (Ohlin 1936, p. VIII). "An increase in productivity when the supply of real capital is unaltered must necessarily mean a rise in the real rate of interest" (*ibid.*, p. XII). Ohlin is quoting Wicksell from a 1909 untranslated *Ekonomisk Tidskrift* entitled: "Money Rate of Interest and Commodity Prices". The implication of these quotations is that if the MP curve of capital shifts upward in the long period, costs would decline and the average profit rate would rise, causing an increase in  $i_N$ . Definitions 2 and 3 thus are directly related to one another.

4. The so-called "normal" rate of interest where savings and investment would be equilibrated in the long period: "Besides the somewhat too vague and abstract concept natural rate of interest I have defined the more concrete concept normal rate of interest, i.e. the rate at which the demand for new capital is exactly covered by simultaneous saving" (Ohlin 1936, p. XIII). Ohlin was translating from Wicksell's comments in the preface to the first Swedish edition of Lectures (2), 1906. Ohlin goes on to say, "The relation between saving and investment, and the idea that there is some normal rate of interest [...] which brings about equilibrium between them, has played a dominating part in post-war monetary discussion". This definition of  $i_N$  is similar to definition 1. Yet, it appears to have more of an equilibrium basis than the other three definitions. Any of these three definitions might allow changes in  $i_N$  in the short period. This would hold even if disequilibrium in the credit market were created by  $i_N$  varying ( $i_N$  may temporarily differ from the loan rate,  $i_L$ ). For the "normal" rate definition of  $i_N$ , however, equilibrium must prevail in the capital market and prices must be stable. "At any moment and in any economic situation there is always a certain rate of interest, at which the exchange value of money and the general level of commodity prices have no tendency to change. This can be called the normal rate of interest" (Wicksell 1898a, p. 82; Wicksell's emphasis). Wicksell seems to be saying that disequilibrium ( $[i_N - i_L]$  unequal to zero) would be a temporary condition which would be corrected in long period equilibrium.  $i_N$  would therefore be the long run equilibrium rate for the economy.

## Notes

1. Marget gave 6 definitions, closely related to this definition on (ibid., pp. 202-203), all from Wicksell (1898). For this one, see Wicksell (1898, p. XXV). Also, see appendix, for more definitions of the natural rate in Wicksell.

2. Inflation in Marshall, caused by *speculation* based on the difference between the nominal and real interest rates, has a high priority for Professor Laidler. See Marshall (1887), quoted in Laidler (1991, p. 90), which Laidler called "the first appearance in the writings of Marshall (and indeed in the literature of neoclassical economics)" of a "theoretical insight which was to become central to the analysis of monetary elements in cycle theory". That inflation in Marshall could also be caused by an increase in the expected net profit differential, rather than speculation, will be an argument put forth below.

3. Marget refers here to Marshall (1926), answers to questions 9651, 9675, 9676, 9678-9686, pp. 41, 48ff. See also Eshag (1963, p. 53), for a similar reference.

4. The term "cumulative" was initially used by Wicksell to refer to continuous price increases caused by a positive differential between the economy's natural and loan rate in the presence of an increased volume of credit (Wicksell 1898, pp. 94-97). Wicksell did not actually use the term "cumulative process", however. This term's use in the modern literature came from Shackle's (1954) and Patinkin's (1952; 1965) writings. Shackle's version of the CP seems to be more comprehensive or sophisticated than Patinkin's because he hinted that the upward movement of the economy would be subject to a real business expansion, not simply to an inflation caused by an attempted, but failed, increase in net capital formation: "[...] the peculiar properties of bank-created money can work through the interest rate and the inducement to expand an enterprise to generate a self-propelling cumulative process" (Shackle 1954, p. 12).

5. The term "natural rate" is impossible to find, at least in the index to the 9th (variorum) edition of Marshall's *Principles*.

6. Emphasis mine. See also (Marget 1938, p. 184, n. 74) which is drawn from the answer to this question. The terms "average" and "permanent" indicated that Marshall still couched his essentially short run analysis of cycles in long run terminology. This was similar to what Wicksell did when he described the CP. See Gootzeit (1993) on this point.

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