

On the formulation of monetary theory*

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I. Terminology

§1. *Introduction.* What characterizes Wicksell's formulation of monetary theory is, first, that changes in the general price level are treated in the same way as changes in the prices of individual goods, and above all, second, the introduction of the concept of monetary equilibrium defined as the equality between saving and new investment; the equilibrating rate of interest is designated as normal and is assumed to conform to the real or natural rate, which is equal to the marginal productivity of capital in an economy without money.

Among these notions, the path-breaking concept which left its mark on postwar monetary theory is the lack of equality between saving and new investment as the "cause" of general price move-

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ments. In this respect there is agreement between the two leading participants in the monetary theory debate of the last decade, Cassel and Keynes. A rising price level results from the availability of credit, demanding capital goods, i.e., real investment, in excess of current saving. Falling prices result from the opposite situation. The rate of interest which generates equilibrium in the capital market is called normal.

Such a formulation of the theory directs its attention to the output of and the demand for capital goods, including change in the inventory of consumers' goods. If demand for consumers' goods is added on the demand side and the output of consumers' goods plus or minus inventory change is added on the supply side, then the equilibrium condition will be that aggregate income (spent on consumption plus saved) equals the value of aggregate output (consumers' goods plus capital goods), i.e., that all income is "spent."

The content of this theory obviously depends on the meaning attached to such categories as income, saving, real investment, and the price level.

§2. *Definitions.* What, then, is meant by income? In conventional reasoning the underlying notion is quite vague. Presumably net income generally means the value of the quantity of goods and services made available in a period for consumption and the "expansion" of productive capacity. Such a definition implies that income always equals expenditure and that net saving always equals the value of new investment. The capital-market equilibrium problem just mentioned simply does not arise. If lack of equality between saving and new investment is to be used in a description of changing prices, the terms must be so defined as to make such lack of equality possible. As will be shown below (§3), the necessary definitions will be quite troublesome to work with.

The very notion of an "unchanged" capital stock whose depreciation is always balanced by maintenance and replacement lacks precision, among other things because of the steady technological progress affecting the form of replacement (reinvestment). As a result, the expansion of productive capacity and with it net income will also lack precision. The expansion of the value of productive capacity is obviously no guide, for the value will fluctuate with the rate of interest and with expectations. Such fluctuations of value are best considered capital gains and capital losses of a character quite different from net income.

In the following I hope to show that business accounting may be profitably applied to determine net income and other concepts. Where to draw the line is obviously a bit arbitrary. But that is true of any

procedure and will play merely a modest role in the price analysis to be presented.

The positive or negative net income emerging in business and individual accounting is arrived at by subtracting from gross income, i.e., the sum of all revenue, the expenditure related to products sold in the period in question. Such expenditure may be considered investment of capital in money form to be "freed," i.e., becoming disposable for new demand, when products are sold. To the extent such sums are spent productively—on raw materials, wages, machines—reinvestment is taking place. Part of such reinvestment is short-run, i.e., in goods and wages, often referred to as working capital, as distinguished from reinvestment in durable structures and the like, constituting fixed capital.

Relating expenditure to the products produced or sold in a period is, however, to some extent arbitrary. Many expenditures are related to the activities of several periods. Observe that at the beginning of a period durable capital goods exist and that during the period additional ones are acquired and will remain after the end of the period. Their depreciation is based upon the historical cost of acquisition and rests upon assumptions concerning an uncertain future, for example the useful life of the capital good. Later, when the period is seen in retrospect, it may turn out that certain goods should have been depreciated more rapidly, others less rapidly. Furthermore, depreciating on the basis of the historical cost of acquisition is a strange procedure if at the time of depreciation such structures happen to have entirely different, higher or lower, costs of reproduction. A remedy might be to use the latter as a basis for depreciation and to enter the difference between the remaining historical cost of acquisition and the reproduction cost on a capital-gain-and-loss account. Under falling prices of capital goods depreciation would become smaller and net income larger—or losses smaller—than according to the conventional procedure. But in the real world capital goods are not normally replaced by goods of the same character and having the same useful life as the depreciating ones, consequently the concept of reproduction cost will be very imprecise. Wherever drawn, the boundary line between the two parts of gross revenue, net income and freed capital, is highly arbitrary.

Another capital item is inventory of acquired and produced goods held at the beginning and the ending of the period. Again, it will hardly be profitable to try to improve on the accounting actually used by the business community. Admittedly the borderline between net income and freed capital, i.e., between new investment and reinvestment, may be drawn so as to understate net income in times of falling

prices and overstate it in times of rising prices. But the boundary line is to some extent arbitrary in any event. Above all let us recall that in a study of prices what we are trying to explain by the generation of income among other things, are changes in the supply of and the demand for various goods and services. It will be to our advantage to apply the net income concepts reflected in accounting and therefore possessing a certain reality to the businessmen themselves. At the same time it should be borne in mind that such concepts may occasionally deviate somewhat from accounting data. In any event it is important to realize how the boundary line is drawn. Here, monetary theory would do well to start with gross revenue. Part of the latter is spent on demand for consumers' goods, another part—freed capital plus new saving—goes into reinvestment and new investment, i.e., constitutes investment demand.

What, then, is meant by gross revenue? Notice, first, that it applies to a past period and, second, that it is the sum of sales of all firms in that period. As has already been said, it is divided into two parts, i.e., net income and freed capital. The latter equals the sum of all costs related to the sales of the period and is usually spent as reinvestment in wages, raw materials, and semifinished goods, as well as in durable capital goods considered necessary to maintain productive capacity. To reinvestment also belong the costs of purchasing finished goods incurred by distribution.

Net income is gross revenue minus the costs related to it (the capital freed); many private individuals have no such costs, of course. New saving is the part of such net income not spent for consumption purposes in the period; it is applied to the expansion of productive capacity. "Waiting" (freed capital plus new saving) is the part of gross revenue not spent for consumption purposes in the period. Notice, first, that durable consumers' goods ("consumption capital objects") serve consumption for several periods and, second, that all goods other than retail sales for immediate consumption are purchased with waiting. Durable consumers' goods, for example, are paid for with own or borrowed waiting. Automobiles are often purchased on the instalment plan. The distributor uses his working capital to purchase all kinds of goods wholesale. The part of gross revenue not constituting waiting, then, is the part equaling the flow of nondurable or slightly durable consumers' goods and services ("means of consumption") sold by retailers and consumed in the period.¹

1. Services rendered in a period by durable consumers' goods such as automobiles and furniture are left out of our reasoning to the extent they are not purchased and sold in the period. If they are, they are an item of consumers' goods.

The entire expenditure in a period is, as we have said, always equal to gross revenue. One man's purchase is another's sale. Consumption demand is equal to the flow of consumers' goods to consumers. The flow of all other goods is always equal to the flow of waiting, new and freed—even if the money supply is changing. Within such a system of definitions treating equilibrium in the same way as done by ordinary price theory, the Wicksell-Cassel-Keynes problem of capital market equilibrium does not arise.

Use the following symbols for period x . All magnitudes are flows² in terms of money. Gross revenue $= I_x^b$; gross expenditure $= U_x$; consumption demand $= K_x$ = consumers' goods for consumers; and waiting $= V_x$ = output for investment;³

$$I_x^b = U_x = K_x + V_x.$$

Net income $= N_x^i$; freed capital $= O_x$ = reinvestment (i.e., the sum of the costs of production of all goods sold in the period); new saving $= S_x$ = new investment;

$$I_x^b = N_x^i + O_x; V_x = O_x + S_x; N_x^i = K_x + S_x.$$

Here net income and waiting are computed *net*. The former is the sum of positive individual incomes minus negative ones. Part of the supply of waiting consists of freed capital, another of net saving; the latter is arrived at after gross saving, i.e., the sum of all positive saving items, has been reduced by negative saving items, i.e., negative incomes (usually called "losses") and consumption credit. In the capital market will be supplied the part of freed capital not reinvested by the same firm. In addition, even if net new saving is zero, there will be a supply of new saving absorbed by consumption credit and the financing of negative income in other firms.

Net income may be divided into two parts, (1) nonfirm income constituting costs to the firm (like wages) and income to others; and (2) firm income, "profits," constituting the surplus of the firm over costs. This distinction, to which the English-language literature, e.g., Keynes, attaches decisive significance, is not too clear, however; for firms purchase from one another, and one firm's profit is another's

2. The capital values appearing in balance sheets play a secondary role in monetary theory. They do not represent "actual value" and enter the picture merely by affecting depreciation and other freeing of capital, i.e., the breakdown of I^b into N^i and O . Writing off the value of capital such as plant of obsolescent technical form will affect the breakdown.

3. All these magnitudes are obtained directly from accounts of transactions made, unlike the following magnitudes, which depend on estimates of the costs related to the production of the goods and services sold in the period.

cost. For this reason and for another now to be pointed out, it would be better to include profitability in the following manner.

Profitability notions are of interest to price theory because they motivate human economic action. Such action concerns the future and is only indirectly related to profitability computed *backwards*, i.e., the ratio of net income to capital invested by a firm. An entrepreneur purchasing a machine will do so because he expects the present worth of the discounted future revenues generated by this machine (its subjective capital value) to exceed the present worth of the costs incurred by the machine. In addition, he expects the present worth of the machine to exceed the present worth of any alternative use of the money involved. In other words, his purchase is not only a testimony to his expectation of a positive present net worth but also shows that the latter is deemed larger than that of other or later investments of an alternative character, i.e., excluded by the former investment. Often he may have no definite notion of the size of such present net worths but does consider it likely that the present net worth of one investment will exceed that of the others.⁴

Thus the extent and direction of demand is determined by profitability computed forward in time. The retrospective profitability of a machine now being retired plays no direct role—albeit occasionally an indirect one—in deciding on the expediency of acquiring a new one like it. Indeed, in many cases nobody bothers to compute the retrospective profitability of individual capital goods.

Analogously, expectations determine the direction and size of production, i.e., changes in supply.

But if so, what is the use of reasoning about net income and cost? Is not such reasoning redundant? The answer is No. Depreciation policies and other allocations of expenditure among periods as costs of products sold in each period largely do determine entrepreneurial notions of how gross revenue is divided into net income and freed capital. What is considered net income plays a decisive role in determining the direction and size of consumption demand. Similarly, the size of what is considered freed capital is significant for investment demand.

Along with a description of changes in supply,⁵ a description of the generation of demand for various goods must lie at the heart of

4. The indefiniteness of his expectations should always be kept in mind when referring to subjective capital values.

5. In the present paper I am mainly concerned with the changes on the demand side. A more comprehensive formulation should consider the elasticity of supply to a greater extent than I have done.

every analysis of price changes. For the reasons given, such a demand analysis must be based upon an investigation of the composition of gross revenue, reasoning *backwards* in time, as well as upon an investigation of prevailing notions of profitability computed *forward* in time. That is the only way to explain changes in demand. Quite simply, the task is to record transactions period by period, relating them to one another, thus illuminating why they came into existence.

In the following pages I shall try to demonstrate the usefulness of the simple conceptual system presented above. To some extent it marks a return to an older procedure differing from postwar monetary theory. The waiting of a period has just been defined as identically equal to the real investment of the period. By contrast, as Myrdal points out, "the separation of saving and capital formation is . . . the very essence of modern monetary doctrine."⁶

II. *The Stability of the Price System*

§3. The problem is to describe price changes over time, i.e., during a period or, if you like, from a subperiod at the beginning of the main period to a subperiod at the end of the main period, ignoring changes within the short subperiods. Under which conditions, one may ask, will the system maintain a certain stability characterized by specific relations between the situation at one time and that at a later time? Under which conditions will the price system be moving upward and downward?

The present section will examine the concept of intertemporal stability. To begin with, the term is taken to mean that certain kinds of price changes are excluded for as long as stability prevails. This type of reasoning is applied to the relation between gross revenue and certain expenditure, or between saving and the narrower category of expenditure designated new investment.

Suppose a divergence between revenue and expenditure or between saving and new investment is to be possible, and suppose a multi-period price stability condition is to be formulated accordingly⁷ by relating the revenue of a period to the expenditure of the *same*

6. "Om penningteoretisk jämvikt [On the theory of monetary equilibrium], *Ekonomisk Tidskrift*, 1931 (printed in 1932), §13 [cf. *Monetary Equilibrium*, London, 1939, p. 90].

7. By stability Myrdal means something other than absence of changes in the price system from one period to another. His analysis refers to a *point of time*, has to do with absence of *tendencies* to certain price changes, and does not preclude major actual changes in price levels in periods of "monetary equilibrium." Lack of equality between saving and investment is possible for him, as it is to Lindahl, because both are looking *ahead* in time, i.e., are concerned with *planned* saving and investment.

period. One will then be forced to define revenue and income differently from the way it was defined above. They will have to be defined as referring fully or partially to sales made in the preceding period. For example, income may become fully or partially disposable only in the period subsequent to the period in which services were rendered (back pay); or business income earned in the production of period I may be transferred to period II, giving rise to demand by the firm and its owners in the latter period.⁸ Thus, intertemporal relations are smuggled into the definitions, giving the impression that price stability is conditioned by a relation between revenue and expenditure *within the same period*. It is certainly more transparent to use terms making the stability condition explicit with respect to intertemporal relations. A person's expenditure in a period is then considered financed by his income in *that* period or with his capital freed in that period.

Underlying the notion of monetary stability is the idea that stability precludes specific differentials between later and earlier price results. Which differential? In any case, violent inflation or deflation, i.e., significant changes in prices or incomes. But equilibrium would be compatible with various changes in the direction of production. Monetary stability would exist when the prices and incomes of a period are at some sort of rest, despite steady changes in the conditions of production, in taste, etc., and consequently in the direction of production.

Could this notion of "rest" be given a more precise meaning? Various parts of the price system may shift relatively to one another. This applies to, say, relations between (1) factor prices, (2) rentals of older capital goods, (3) wholesale prices of new capital goods and consumers' goods, and (4) their retail prices. A price system being at rest would imply that some sum or weighted average or relation of prices or price differentials would not be changing. How such weights or relations should be designed is clearly a matter of convention. Prices were inflationary in 1917 and deflationary in 1930, but where to

8. This is the construction used in my recently published work, *Interregional and International Trade*, and in my discussion with Keynes on capital movements in the *Economic Journal*, 1929; Hammar skjöld's method (this journal 1932) appears to be a mixture of that type and that of Lindahl. (Since the present paper had been worked out before the publication of Hammar skjöld's paper, I have been unable to take account of the latter.) Finally one may proceed as Keynes does, by simply excluding part of profits, i.e., "windfalls," from income. Thus one has to distinguish no less than five categories of terminology. Keynes' method has the weakness that it loses sight of price changes offset by changes in factor prices and therefore leaving "windfalls" unaffected.

draw the line between inflation and deflation is a matter of convention. It may be drawn at will. But it should be drawn expediently for the problem under analysis.

Two conceivable stability requirements would be that net income or gross revenue—perhaps calculated per unit of labor—should not be changing rapidly. But intertemporal stability usually refers to a certain price level as measured by a price index. Such an index is often designed to reflect the wholesale or retail purchase prices of an entire basket of goods. The basket may be composed so as to represent (1) current consumption, (2) net income, or (3) gross revenue, i.e., total transactions. The goods and services included may differ, and their weights may differ. Stability required from one point of view may differ from that required from another.

Price stability in some sense is of course possible even when various parts of the price system are so related that, say, large negative incomes are being generated because certain prices are declining far more than are factor prices and contractual obligations, or because sales volumes are declining.

A sharp contraction of output at specific points may indicate a distortion of the price system—by which we mean the collection of prices and quantities entering into the static general-equilibrium scheme. A substantial change in specific prices may do the same. Such distortions may last a long time, and for as long as they last the price system may be stable from many points of view. Whatever is meant by stability clearly does not imply “normal” relations between price and quantity elements of the system. And it is not expedient to designate as “normal” a rate of interest⁹ existing when certain relations are stable in contrast to the rate existing when a different part of the price system is stable or when no specified stability condition is met.

The price stability debate often follows avenues other than those suggested above. It often bears the stamp of the old classical notion that when individual market prices diverge from their stable normal level determined by relative costs, then supply reactions will quickly make them return to that level. No corresponding tendency to return is found in changes of the general price level upwards or downwards, i.e., in shifts of the entire price system. There is the following kernel of truth in this. When prices of individual goods are moving and corresponding cost elements fail to follow because of the nature of the

9. The present paper uses “rate of interest” as a summary expression for the terms of credit supply.

supply reactions affecting them, a tendency to return must result. Thus, among other things, the stability of long-run relative prices depends upon that of relative wages. By contrast, if all prices rise, then current and expected future costs will often be rising too. If so, the supply reactions tending to return prices to their original level will fail to materialize. Whether the degree of price stability is high or low, then, depends upon the relation between certain prices and other, relatively rigid, ones or rather upon the expectations of them.

If by stability one means a price situation prevailing for a long time without major change, then one must examine the presence or absence in such a situation of inherent tendencies toward essential price changes. Such an examination must allow not only for price and cost relations but also for quantity relations (such as labor flowing from one industry to another, unemployment rates, etc.), or rather, one must allow for planned investment and consumption demand as well as for available factor supply, for such plans could indicate pending price changes.¹⁰ The question is to what extent a certain state of the price system carries in it the seed of more or less violent and significant changes to come.

Notice that all states carry in them the seed of some such changes. And notice that a state may continue for some time without major change, even though price and cost relations are such as to make significant changes inevitable. Imagine, for example, a deep depression in which everything is temporarily "frozen." Price instability, then, in the sense used here is not the same as the presence of tendencies toward *immediate* price change.¹¹

III. *The Morphology of the Price System*

§4. *Time-structure classification of the price system.* When describing price changes we apply various kinds of price index numbers. According to their time structure, Table 1 classifies flows of new goods and services on their way through the processes of production and distribution. The table allows for the character of available statistical data. Needless to say, goods may belong to several categories of the table. Changes of the price of leather may well be observed under I.B (automobile leather) as well as under II.B (shoe leather). But one might also classify every good according to its major use.

Demand for goods might expediently be divided into two parts, (1) demand by the distributor and (2) demand by the user (producer and

10. Presumably this is the core of Myrdal's formulation of monetary theory; cf. §11 below on "the driving force" of price movements.

11. On Myrdal's presentation, see further §§11-12.

consumer). Waiting is the source of all demand except the user's demand for consumers' goods (II.A). Waiting is also the source of hiring labor, land, and older capital goods for purposes other than direct and immediate consumption. The use of such factors might be included in Table 1 as I.C and II.C. Goods in the process of distribution as well as categories I.B and II.B in the hands of users for further processing are circulating capital. I.A. in the hands of users is fixed capital.

The term "durability" of a good refers to its useful life. The "storability" of a good, i.e., lending itself to storage, is a different matter. New investment during a period implies an expansion of the aggregate supply of all goods at the end of the period compared to its beginning.

Let us take a closer look at the relations among various parts of the mechanism. In a certain sense all production is aiming at consumption, i.e., at the production of finished consumers' goods. Consequently, in a *static* system (on the *time sequence* of price changes, see §6) the wholesale prices of all other goods and factors will reflect the wholesale prices of consumers' goods, and the wholesale prices of the latter will reflect their retail prices. The relation between prices at one stage of production (yarn) and the next (fabric) is obviously influenced by the necessary processing costs such as the price of the labor

Table 1. Flow of new goods and services

I.	Capital goods
A.	Finished products (= capital instruments)
1.	Means of production
(a)	Structures (ships, roads, canals)
(b)	Equipment (machines, livestock)
2.	Durable consumers' goods (passenger cars, furniture)
B.	Semifinished goods and raw materials
II.	Consumption goods ¹²
A.	Finished products (= means of consumption)
1.	Semidurable goods (shoes, clothes, books)
2.	Nondurable goods (food, tobacco, newspapers and magazines. Services, personal as well as rendered by durable consumers' goods)
B.	Semifinished goods and raw materials
1.	For semidurable goods (shoe leather, fabric)
2.	For nondurable goods (most agricultural products)

12. Notice that durable consumers' goods are not included in consumption goods.

and capital required. Under dynamic conditions these relations are by no means as rigid as under static conditions; production at the various stages has been known to result sometimes in positive, sometimes in negative income.

A closer examination of such matters usually takes its cue from Böhm-Bawerk's capital theory, the doctrine of time-consuming processes of production. Labor and nature are used for a longer or shorter period before finished consumers' goods emerge. The average of such periods is the "period of investment." The longer the latter, the more capital-intensive production will be, i.e., the larger will be the quantity of capital existing per unit of labor and nature. Real capital consists of all capital goods and all consumers' goods not yet ready for consumption, i.e., everything except consumers' goods in the hands of the ultimate consumer.

The length of the period of investment depends, first, on the period of production of goods and, second, on the useful life of durable capital goods (durable producers' as well as consumers' goods).¹³

The period of production is the period elapsing in the production of a raw material, as well as in its march through the process of production leading to ultimate consumption in the hands of the consumer. The length of this period depends upon the time required for conversion, transportation, and storage. Wheat is sown, harvested, transported, stored, ground, baked, and consumed in the form of bread. The period elapsing between the first and the last stage may be guessed to be 6 to 18 months after sowing.¹⁴

The useful life of buildings is perhaps fifty years or more, that of machines often about ten years, whereas their period of production is often not much longer than that of bread. Over the useful life of a durable capital good the original factors of production invested in it will successively "ripen" into consumers' goods.¹⁵

For the use of durable capital goods already existing or built this year, the expectations of interest rate and useful life underlying their construction no longer play any role. What matters is only the remaining useful life. Durable capital goods are a gift of the past to the present. In the economy of the present they have the same importance and place as exhaustible natural resources. By contrast, this

13. The useful life of semidurable consumption goods may be ignored.

14. Exactly where a process of production begins is, of course, highly arbitrary.

15. As already pointed out, in the breakdown of demand into consumption and investment demand a major role is played by previous conceptions underlying the depreciation policy adopted, which, to the extent it is not altered, will determine depreciation policies and with them current conceptions of net income.

year's use of labor, capital, and natural resources as a choice among alternative periods of roundabout production is influenced by current expectations of useful lives of alternative durable capital goods under consideration, as well as by current expectations of future prices, such as interest rates. Because the period of production is so short, the rate of interest is unimportant for the relation between prices of raw materials and finished goods. But the rate of interest is very important for the relation between the present worth of durable natural resources or capital goods, on the one hand, and the prices of finished consumers' goods and services, on the other hand. The present worth of immortal natural resources will tend toward the capitalized difference between product price and processing cost—assuming such a price and cost structure to prevail or assuming the risk of a declining difference between price and cost to be balanced by the chance of an increasing one (cf. waterfalls and electric energy). The lower the rate of interest, the higher the prices of goods at early stages will tend to be relative to finished consumers' goods and expectations of other things as well. That is why a reduced rate of interest will improve the profitability of very durable capital goods, making it profitable to extend the planned average period of investment of factors of production used (labor, capital, and natural resources).¹⁶ For example, more durable goods (machines and durable consumers' goods) are produced than before, and their planned useful lives are longer than before.

The length of the average period of investment adopted at a given time, i.e., the character and expected useful lives of investment goods, will obviously influence future productive capacity, i.e., the supply conditions of later years. This is a phenomenon not to be ignored in an analysis of a price sequence. It does, however, in my opinion play a limited direct role in the short run. The Vienna school, it seems to me, definitely exaggerates its significance. In the following pages this matter will not be discussed. I merely wish to indicate its place in price analysis.

Call the wholesale price level of consumers' goods (finished current consumers' goods) p^k . Take semifinished goods and raw materials for such goods together in one group and call its wholesale price p^{kr} . Call the price level of finished capital goods p^i , and that of corresponding semifinished goods and raw materials p^{ir} .

With waiting V is demanded (1) consumers' goods by the distribu-

16. This concept is applicable under dynamic conditions—unlike the total average period of investment for all capital existing.

tion sector, (2) other goods by "users" (producers and consumers) as well as by the distribution sector. Let V^k be distributors' demand for consumers' goods. If the quantity of such goods is v^k , then $V^k/v^k = p^k$. If V^k is subtracted from V , the remainder may be divided into three parts, i.e., (1) demand for semifinished goods and raw materials for consumers' goods V^{kr} ; if their quantity is v^{kr} , then $V^{kr}/v^{kr} = p^{kr}$; (2) demand for semifinished goods and raw materials for capital goods V^{ir} ; if their quantity is v^{ir} , then $V^{ir}/v^{ir} = p^{ir}$; (3) demand for finished capital goods V^i ; if their quantity is v^i , then $V^i/v^i = p^i$. In addition, V^a and V^p are used to demand factors of production for productive purposes. Call the quantity of labor f^a and the hiring price of labor p^a . Call the quantity of older capital goods and natural resources f^p and their hiring price p^p . Then $V^a = f^a p^a$ and $V^p = f^p p^p$.

Finally, one must consider the demand for consumers' goods K and their retail prices p^d . Call the various interest rates S_1, S_2 , etc., and the change in inventory of finished current consumers' goods v^l . Then:

Investment Demand	Consumption Demand
$V = V^{kr} + V^{ir} + V^i + V^k + V^a + V^p$	K
Price levels . . . $p^{kr}, p^{ir}, p^i, p^k, p^a, p^p$	p^d (retail price)
Quantities . . . $v^{kr}, v^{ir}, v^i, v^k, f^a, f^p$	$v^k + v^i$

The weights used in the computation of price indices represent the actual quantities produced or sold.¹⁷ The question is how these prices and quantities vary with shifts within the price structure. In other words, the latter could be described by accounting for the former.

The majority of such index numbers are available or could be computed, even if not exactly, from available data. But it is regrettable that capital-market data on issues, bank deposits, etc., cannot be used to check the data on various V items available in the transactions index, i.e., the index on the sum of business transactions.

In addition to the various price indices and their corresponding transaction indices, quantity indices (v) should, of course, be computed wherever possible in order to check the computations of V and p . If possible, inventory holdings should be broken down into producers, distributors, and users.

17. Except for consumption goods and certain capital goods, only a small part of such transaction of goods takes place in retail trade. Thus p^k, p^{kr} , and p^{ir} are largely wholesale prices. Any p except p^a and p^p may be replaced by two price indices, i.e., (1) distributor's purchase price and (2) distributor's selling price. In addition the various kinds of V and v could be split in an analogous way and distributor's inventory change included.

For better insight into the process of price movement it will be necessary to study what lies behind the changes of demand items as well as of available quantities of goods. On the demand side the circumstances to watch are the following: (1) the consumption demand depending upon, first, changes in net income appearing in accounting and, second, human expectations (thus it is important to have data illuminating changes in net income N^i and its component parts, e.g., wage income L); and (2) investment demand, which is hardly influenced by net income as recorded in cost accounting. Data on past profitability always deserve some attention, but profitability expectations are certainly more important; the latter may be illuminated by capital-value statistics, especially the trend in stock-market prices.

§5. *Exchange-structure classification of the price system.* A description of a price sequence cannot confine itself to such an analysis of *total* demand and supply at every stage of the production process. Goods at the same stage must be classified by industry, and changes in industry supply and demand must be observed. For example, along with rising output of food may go declining farm gross revenue and demand (cf. the situation in 1928–1929). As distinct from the changes treated above in terms of a conceptual apparatus referring to the time structure of the price system, the changes now to be considered might be called changes in the *exchange structure* of the price system. They have to do with exchange relations among industries. To illustrate them the following data will be required.

- (1) Output volume, capacity utilization, inventory, prices and wages within industries such as agriculture, trade, transportation, raw materials production, fabricating industry, and construction.
- (2) The distribution of net income in each industry among owners of the factors of production, labor on one side and owners of land and capital on the other; furthermore the distribution between active and passive capitalists.
- (3) Costs of living.
- (4) Productivity changes.
- (5) Output volume, capacity utilization, inventory, and prices in monopolized industries relative to other industries.
- (6) The volume, composition, and prices (including exchange rates and tariffs) of international trade.
- (7) International capital movements.

It would be impossible to describe a price sequence such as that of the last four years without treating such exchange relations, as well as

changes in the time structure of the price system. For illumination I refer to the League of Nations report, *The Course and Phases of the World Economic Depression* (Geneva, 1931), ch. 6, A–C.

When trying to describe a sequence, we shall find the *timing* of the various changes to be of obvious significance.

§6. *The time sequence of price changes.* Perhaps it is most expedient to illuminate this matter by some examples.

Imagine that people decide to reduce their saving sharply, so demand for consumers' goods will rise. The primary effect upon goods of which inventories are held will not be rising retail prices (p^d) but rather rising sales at unchanged prices. Retailers will increase their orders with manufacturers. It will depend upon the idle capacity and the unfilled orders of the latter whether factory prices will rise immediately. In any event manufacturers will increase their orders for semifinished goods and raw materials. Thus investment demand will rise. In some markets, pricing is such that a rising demand will immediately lead to rising price. But even if delayed, most wholesale prices will rise before retail prices do. As a result, prices at the "earlier" stages cannot properly be regarded as reflections of changes in retail prices. In this respect reminiscences of a static Böhm-Bawerk formulation have left their mark on, e.g., Lindahl's presentation.¹⁸

The decision to reduce saving may not be accompanied by a tightening of credit. If so, investment demand will at first be allowed to go on as usual, assuming an increasing money supply or an increasing velocity of circulation, and the rising investment demand of the consumers' goods industries will eventually bring about an increase in total investment. Total saving, then, is not reduced but on the contrary increased, despite the fact that consumption is up. What makes this possible is expanding output.

If, on the other hand, the decision to reduce saving results in a *simultaneous* contraction of investment demand and expansion of consumption demand, e.g., because bankers immediately restrict their credits, it is uncertain whether eventually aggregate demand will rise or fall. Among other things, the outcome depends on how much investment demand will rise in consumers' goods industries and fall in capital goods industries as a result of the primary change in demand.

Take another example. In a depression imagine a general wage cut of 10 percent in all industries, immediately reducing labor's consumption demand. If at the same time firms impressed with the improved profitability prospects expand their investment demand by the same

18. *Penningpolitikens medel* [The means of monetary policy], ch. 2.

amount, aggregate demand will not fall. Then average profitability will indeed improve and may indirectly stimulate investment demand. On the other hand, if no immediate tendency to expand firm investment demand arises, the wage cut reduces total consumption demand by as much as the cut in wage costs. Prices will tend downwards, and profitability will deteriorate. The deteriorating profitability in consumers' goods industries is at first balanced by improvement in the capital goods industries, but according to established accounting methods the falling prices will reduce the profitability of investment and eventually tend to reduce investment demand as well.

An unusually large harvest in, say, wheat in a number of producing countries will often depress the price of wheat so much that the value of the harvest is reduced. The investment demand of wheat traders in money terms will then be reduced. Immediately disposing of less money than usual, farmers will reduce their demand. A compensating increase in consumer demand for bread, because bread is now cheaper, will not materialize at once. It may be some time before millers reduce the price of flour and bakers the price of bread; they are carrying earlier inventory purchased at old, higher prices and so far have had no increase in their net incomes. As a result, the reduced demand of farmers is not offset by an increase anywhere else.

Under a sharply reduced food supply such as occurred in Sweden in 1917, food prices will rise more than in proportion to the reduction of supply because of the low elasticity of demand. Consumers will have less money left to purchase other goods, but, anticipating higher future incomes, farmers may simultaneously increase their demand. If so, the rising price will not be offset by falling prices of other goods, hence the general price level has been raised more than in proportion to the reduction of supply.¹⁹

By now it should be sufficiently clear that the effects of a given primary change will differ widely if the secondary reactions occur in one time sequence rather than another. Obviously, different alternatives imply differences in money supply or the velocity of circulation. The changes in the latter will depend upon the time intervals elapsing between one change in the price system and the next. Those time intervals are not primarily determined by money and banking condi-

19. This case and others were discussed in the *Nationalekonomiska klubben* [Economics Club] towards the end of the war. Cf. Davidson, "Valutaproblemets teoretiska innebörd" [The theoretical nature of the exchange-rate problem], esp. p. 123 (*Ekonomisk Tidskrift*, 1920) and Wicksell, "De skandinaviska kronorna" [The Scandinavian Crowns] (*Ekonomisk Tidskrift*, 1925) [translated as an appendix to *Interest and Prices*, London, 1936].

tions, but rather by industrial organization, shifts in the exchange structure, etc., and it is not expedient, therefore, to discuss them in terms of "the velocity of circulation of money." It is an entirely different matter that the responses of the money and banking system, such as an increase in the stock of notes in circulation, may bring about changes in credit policies significantly influencing the later course of events.

Simple quantity-theoretical formulae ignoring the timing of events may serve as an overview. But many problems will completely elude such schematic treatment. In any event it will still remain to treat the development of separate categories of the price system, classified according to its exchange and time structure, and to allow for the time sequence of the changes.

As examples of parts of such an analysis some cases of rising and falling prices will now be examined.

IV. *An Analysis of Some Price Movements*

§7. *A process of rising prices.* A price change implies that demand is changing in a different way from supply. There may be a multitude of reasons why this may happen to a single good. The same applies to a group of goods. From the point of view of monetary policy an interesting case is the autonomous reduction of the rate of interest by the central bank (both the discount rate and the bond rate) in a situation in which (1) various price indices have remained the same for some time and (2) the productive capacity of most industries is not fully utilized. Under such circumstances what are the effects of the reduction of the rate of interest?

Investment in durable capital goods will appear more profitable; demand for such goods V^i will rise, and their prices p^i will tend to rise. As a result output will rise by better utilization of productive capacity. Demand for labor will also rise, i.e., more workers are employed, and productive capacity is better utilized. Furthermore, demand for raw materials and semifinished goods for capital goods (V^{ir}) is growing; prices of such raw materials and semifinished goods tend to rise.

This process implies that not only gross revenue but also net income is growing. For one thing, more labor is employed, raising the total wage bill; for another, business income is up, both because of better utilization of durable capital goods and natural resources and because of the tendency of prices to rise.

The probable effect of higher net income is growing demand (K) for consumers' goods in retail trade. Retailer demand (V^k) will be

growing more or less in proportion—if wholesale prices of consumers' goods (p^k) begin to rise, probably more than in proportion. Output (v^k) will rise and, often somewhat later, a price increase (higher p^k) will materialize. Retail prices (p^d) will rise, usually still later.

The increasing demand for consumers' goods will quickly call forth increasing demand for raw materials and semifinished goods. Demand (V^{kr}) is rising, and so is probably the quantity (v^{kr}): rising prices (p^{kr}) will be the result. The price increase will very likely occur at a time when the increased demand for consumers' goods in retail trade has not yet raised retail prices of goods of which inventory is carried, but has so far merely increased the demand of retailers and manufacturers. Such demand increase is not caused by an anticipation of rising wholesale prices of consumers' goods (p^k) but will of course be magnified to the extent such an anticipation exists. Even without an increase in finished-goods prices, expanding output will improve profitability because overhead costs per unit of output are being reduced by rising sales. Needless to say, what applies to a finished-goods manufacturer with respect to his raw materials will apply to any producer with respect to his earlier stages of production.

As a result of all this, the acquisition of capital goods serving the production of consumers' goods, as well as raw materials and semifinished goods for the latter, will look even more profitable than before. Demand for capital goods and their corresponding raw materials and semifinished goods is growing further, and price movements are further strengthened. The demand for capital goods to produce capital goods and their raw materials and semifinished goods is certainly growing, too.

How profitable the acquisition of new durable capital goods will appear, and how much their prices will be pushed up, are of course highly dependent upon the wage rates generated by the process described. If wage rates are rising by the same percentage in all industries, new machines, etc., will become more profitable in consumers' goods industries than if at the same overall wage increase only an insignificant wage increase has occurred in those industries.

Simple rules about the strength of price movements at various points hardly apply.²⁰ But a valid generalization on timing would perhaps be that during the early part of a period of rising prices every producer and middleman will demand goods in excess of his sales, so demand and price will tend to be growing more rapidly for raw ma-

20. Lindahl gives his reader an impression of a precision not at all corresponding to reality. See *Penningpolitikens medel*, ch. 2.

terials, i.e., goods at earlier stages, than for finished manufactures. The growth of demand will be accelerating "backwards." Notice in particular that, for example, the price of durable capital goods turning raw materials into semifinished goods relative to the price differential between raw materials and semifinished goods will depend not only upon the level of other processing costs but also, among other things, upon expected future price relations. For changes in that relation, then, no simple rule will hold. The capital good is going to serve in future periods, too, and expectations differ in different circumstances. Given present and anticipated cost-price relations, elements of price rigidity may give rise to price differences interpreted as positive or negative present net worth of new plant.

Certainly the market value of existing plant and titles to it (corporate stock) will rise. Business income prospects for the future will be more optimistic, because variable costs usually are rising less rapidly than prices (the wage lag) and because overhead costs per unit produced are falling. Such income prospects for the future are discounted to the present by applying discount rates lowered by the reduction of the rate of interest. The income prospects are a matter of expectations. Such expectations may be very vague, and the present worth of capital goods arrived at by discounting them is therefore rarely quantitatively fixed. All one can say is that, to every stockholder, it will exceed the book value of his stock. For the analysis of the pricing of goods and services in the process of production and distribution all this is of merely indirect significance. But it may be of interest per se because it illuminates other aspects of pricing.

In summary, net income is rising due to (a) increasing output and rising prices of consumers' goods, (b) increasing output (beyond acquisitions for replacement) and rising prices of capital goods, and (c) possibly rising inventory of other goods. Furthermore, income as recorded in accounting is rising because capital goods and inventory enter the balance sheet at higher prices in the closing balance than in the opening one. Such a price difference may not, from certain points of view, be income, but it is treated as such in accounting and hence considered as such by the business community.

If it is generally assumed that the reduced rate of interest has come to stay, i.e., a further reduction is considered as likely as an increase; and if there are no reasons to expect long-run investments to become less profitable than at current price relations, then the prices of capital goods are up relative to those of consumers' goods, i.e., the former prices are rising more rapidly than the latter. This is the result not only of the reduction of the rate of interest but also, often over-

looked, of the better utilization of the capacity of capital goods, which—if not considered temporary—does make long-term investments appear more profitable. Under such assumptions about expectations, the prices of capital goods, and probably also of the raw material and semifinished goods going into them, will have risen relatively more than the prices of consumers' goods over the entire process of rising prices; i.e., the former have run ahead of the latter. The tendency to increasing output of capital goods will generate increasing income in the capital-goods industries, which, in turn, will increase the demand for consumers' goods, as well as the income generated in the consumers' goods industries. Real investment will then appear even more profitable, and demand for capital goods will rise even further, etc. The price system is spiraling upwards. Notice that the process does not imply any actual *relative* enlargement of real investment, i.e., a different direction of production. Lindahl's conclusion to the contrary—emphasized by Myrdal—follows from his very special assumption that businessmen expect current prices of consumers' goods and capital goods to continue. Under such expectations no income increase could occur in capital goods industries unless the direction of production changed.²¹

Under plausible assumptions, the rising prices of capital goods imply that the prices of the semifinished goods and raw materials in the capital goods industries will be rising more rapidly than those of the consumers' goods industries, unless the elasticities of supply are very different and special. If the rising prices continue for so long that virtually all labor is employed, labor may possibly migrate from consumers' goods industries to capital goods industries. If, on the other hand, after prices have been rising for a while, the price relations so favorable to long-term investment are no longer expected to last, demand for capital goods may be rising less rapidly than demand for consumers' goods, and labor may migrate in the opposite direction. No price relation between different industries common to all cases of rising prices will be found to exist. At the risk of some repetition we shall illuminate this by discussing a case different from the autonomous reduction of the rate of interest.

Rising prices in general²² imply that the demand for goods and

21. See *Penningpolitikens medel*, p. 35.

22. Meaning a rising price level as measured by a general price index for sales of new goods and services in a period, i.e., an average of the price index numbers mentioned in §4; weights are in accordance with quantities sold. In the following pages, wherever the term "price level" appears without qualifications it should be understood in this sense.

services is rising more rapidly than the quantities supplied. *One* possibility is that so many entrepreneurs find immediate real investment profitable that investment is growing (to such entrepreneurs the difference between the subjective capital value and the estimated cost of real investment is positive and not expected to become larger in the future). Another possibility is that demand for consumers' goods is rising. The necessary and sufficient condition for a process of rising prices is that the sum of those two kinds of demand is rising relative to output.

The present section will assume output to expand in response to growing demand. Even without growing demand for investment purposes, rising prices are possible if demand for consumption purposes is growing. This assumes that improving profitability prospects will fail to raise many more subjective capital values over the rising cost of real investment than before.²³ Such an assumption may be satisfied if many entrepreneurs considering long-term investments expect profitability to deteriorate in the future, for example, because they expect the price rise to be interrupted or expect costs to rise rapidly. In other words, demand for long-term investment purposes may conceivably be falling in the face of rising consumers' goods prices. By contrast, unless the business community is expecting immediately falling prices, there will usually be a growing demand for short-term investment purposes like purchases by retailers or purchases by manufacturers of semifinished goods.

Admittedly a general price index may be rising in the face of falling or stationary investment demand only for a shorter period—for example, during several months of doubt in the business community bringing price increases of durable goods to a halt, while prices of less durable goods keep rising. In most cases the expansion of demand will apply both to consumers' goods and to short-term and long-term investment, but the prices of long-term investment may very well be rising *less rapidly* than those of consumers' goods. In other words, prices may well keep rising even though the prices of consumers' goods are ahead, while the prices of producers' goods are lagging behind. The assumption must be the entrepreneurial expectations mentioned above. What generates the upward movement of prices may, for example, be the sharp reduction of the intention to save discussed above (§6). Demand for consumers' goods will then rise, and their prices rise, thus expanding employment and perhaps raising

23. More precisely, the condition is that the sum of investments whose present net worth is positive and cannot be raised by delaying the investment is not growing.

the wages of the workers producing consumers' goods at various stages. In such industries the incomes of both labor and entrepreneurs will rise, and the demand for consumers' goods will further expand. In this situation demand will rise for durable capital goods and indirectly for other capital goods, their prices will tend to rise, capacity will be better utilized, and incomes shoot upwards. This will, in turn, generate expanded consumption demand, which feeds new investment demand, etc. If wages are flexible (for example, indexed), if entrepreneurs are realizing that the improved profitability manifesting itself in their accounting is to some extent "fictitious," merely depending on closing-balance values being expressed in money of less purchasing power than opening-balance values, and if, finally, entrepreneurs expect rising prices to be of limited duration, being followed by falling ones, then the structure of price movements just discussed is by no means unlikely.²⁴ A price rise of this type need not at all be less rapid than that of the other type.

Admittedly, at certain phases the prices of long-run investment (new durable capital goods) are usually rising more rapidly than are the prices of consumers' goods. But at certain phases prices of raw materials and semifinished goods going into capital goods will be rising most rapidly of all, not because purchases of such goods constitute a *longer-term* investment (in the Austrian sense) but because of the phenomenon pointed out above, i.e., that the growth of demand will be accelerating backwards. For the same reason prices of short-run investments (raw materials for consumers' goods, e.g., cotton, wool, wheat, hides) will sometimes rise very rapidly. To offer simple rules for the relative magnitude of price movements is impossible. A study of the conditions for the generation of investment demand should also allow for the profitability prospects of short-run investment, e.g., in inventory, and should not confine itself solely to the relation between cost and subjective value of durable capital goods, which, as shown above has a rather elastic tie to the rate of interest and the prices of consumers' goods. One should not, by the way, forget that the elasticity of supply responses differs for different goods, but this is not to be explored in the present paper.

As already pointed out, price changes of older capital goods have an indirect significance for the demand for newly produced goods and

24. The reasons why Wickseil and his followers concluded that producers' goods must lead the cumulative price movement were that (1) they concentrated their attention on the special case of an autonomous reduction of the rate of interest (see, e.g., Myrdal, "Om penningteoretisk jämvikt," §43), (2) they assumed wages, and with them consumption demand, to be rigid.

services flowing into and out of the process of production. In certain cases, houses for example, the tie between the values of older and newer units is close. But in other cases, older units are not priced separately, but enter as component parts of an entire firm; this is true of machines, for example. The pricing of entire firms materializes in the market value of corporate stock plus liabilities adjusted for changes on the asset side of the balance sheet. In times of generally rising prices such values of firms usually rise, but rarely more rapidly than the prices of consumers' goods.²⁵ Among other things, wage trends and expectations are decisive; the value of a firm represents a capitalization of nonlabor income. Continually rising prices of goods are not incompatible with upward and downward fluctuations of the value of a firm.

Clearly, variations in the values of firms have only a very indirect tie to investment demand. New firms acquiring their entire equipment are not in all respects comparable to old firms; and the major part of real investment does not consist of the formation of new firms, but rather of investment in replacement and expansion by old firms.

Everything taken into account, it seems clear that the development of price relations is far more varied than is claimed by neo-Wicksellian theory (Lindahl's, as well as Hayek's), resting on a rather one-sided consideration of the tendency of a reduction of the rate of interest to raise certain capital values. The same is presumably true of the development of price relations under assumptions not treated above.

Finally, a word should be added on the so-called "forced saving," supposedly generated by rising prices. Generally rising prices probably in most cases imply that the output of real capital is larger than it would have been under price stability. From the point of view of saving, the larger real capital formation is primarily caused by the fact that persons whose incomes are growing, first, for a while may be underestimating the growth of their incomes (stockholders do not know the profits of the current year) and, second, may wish to save a larger share of their profits than before. In certain cases they are almost forced to do so, because firms may be concealing part of their profits. On the other hand, the saving of persons whose incomes are not growing is reduced because of rising costs of living, but it is easy to imagine that the tendency to reduce saving is weaker than the

25. Considering changes on the supply side, an approximately exact measure of the value of firms is not within reach. It is doubtful whether even in 1918 values of firms were rising more rapidly than prices of consumers' goods.

tendency to raise it. It is somewhat misleading to describe saving under rising prices as "forced saving."

An essential distinction holds between the case in which investment is growing because, to begin with, individuals decide to save a larger share of their income and that share is then invested and, on the other hand, the case in which investment demand grows, under an unchanged intention to save. Here, credit expansion, a higher velocity of circulation, and rising prices will follow. Hand in hand with these things, saving will be rising. Differences in the timing of investment decisions and saving decisions will result in different price movements. But to me things are not clarified by saying that in case 2 investment exceeds saving.

§8. *A process of falling prices.* A process of rising prices must come to a halt either because of declining demand for some group of goods or because of some rapid expansion of supply, for example, the dumping of inventory into the market.

In many cases the shock originates in a reduction of V^i , quickly pulling a reduction of V^{ir} with it. The circumstances underlying such a reduction of V^i are a major problem of business-cycle theory, but will not be discussed in the present essentially formal analysis. Profitability may deteriorate and subjective capital values fall for a thousand and one reasons without anyone knowing exactly by how much they have fallen.²⁶

The reduced output and declining price of capital goods and the raw materials and semifinished goods going into them will reduce net income and with it consumption demand (K), but not necessarily in the same proportion. The result is a reduced output of consumers' goods and a tendency to falling prices, rapidly spreading to several raw materials and semifinished goods. Under these circumstances the profitability of real investment is reduced, and V^i and V^{ir} will fall further.

A detailed analysis of different processes of falling prices would be redundant, since the earlier reasoning applies *mutatis mutandis*. Only one aspect, capital consumption, will have to be considered.

If the price fall is sharp and protracted, the output of capital goods

26. It would hardly be practical to force an analysis of all such circumstances into an analysis of a discrepancy between some natural rate or profit rate and the money rate of interest. Declining "confidence" in the future cannot be put into a calculating machine grinding out how much the natural rate of interest has been reduced. To try to fix quantitatively the present net worth of a planned investment serves no good purpose. It will suffice to observe quantitative changes in demand. See Part VII, below.

may fall short of what is considered to be depreciation of fixed capital. In addition, inventory may be falling. In such cases capital is wearing down. Even though depressed, consumption is in excess of net income.

Looking at the behavior of individuals and firms, we observe, first, that many firms have negative profits. Second, some individuals have no income or very small income and hence are consciously eating up past savings. Third, owners may have no clear conception of the decline of their share of profits. By eating up corporate dividends paid out of last year's profits but exceeding this year's, stockholders are, in effect, eating up past savings.

In practice the reduction of real investment implies an equally large reduction of new investment; since depreciation of fixed capital is hardly reduced, prevailing accounting principles consider reinvestment to be almost as large as before. The reduction of new investment equals the reduction of net new saving. The latter is the sum of all new saving (gross saving) minus consumption credits and negative incomes. Partly, the latter are generated by the decline of real investment. In addition, individual incomes and with them gross saving are declining. The decline of net new saving is the result of both tendencies.²⁷

Growing negative incomes and declining individual incomes are two sides of the same process, i.e., declining net income. How much of the latter is to be classified as declining individual income and how much as growing negative income depends on, among other things, industrial organization, e.g., wage flexibility. In a study of a process of deflation both matters deserve attention.

Had purchases been larger, losses would have been smaller and the sum of individual incomes larger. A definite opportunity for an expansion of demand restoring monetary equilibrium, as claimed to exist by Wicksellian theory, will not be found. The more demand is rising, the more positive incomes will rise and negative incomes fall.

27. A process of deflation is characterized not only by the fact that part of gross saving is offset by negative incomes but fully as much by a declining gross saving.—The idea expressed in Wicksellian theory by saying that investment is falling short of saving in my own terminology by no means implies an investment demand so low that negative incomes are generated, reducing net saving below gross saving. Notice that negative incomes occur even under rising prices; consequently, investment *always* falls short of gross saving.—In a discussion [Carl] Iversen has claimed that my “gross saving” is identical to what Scandinavian economists used to mean by “saving,” when discussing lack of equality between saving and investment. But that cannot be true, for investment supposedly may *exceed* saving. In Wicksell and others it must surely be some kind of *net saving* which in periods of falling prices is falling short of new investment.

Output and prices are rising simultaneously, the former up to a certain point.

When prices have been falling for a while, investment demand and consumption demand may stop falling and the price fall come to an end. The reason may be that consumption demand cannot easily contract beyond a certain point, and its resilience will check the tendency to declining investment demand. But if the resilient consumption demand is caused by wage rigidity, thus jeopardizing profitability prospects, investment demand may well fall more than it would have done had consumption demand contracted further. To analyze alternative cases of this type is one of the most urgent tasks of business-cycle theory.

Neo-Wicksellian theory habitually expresses as follows the conditions for an interruption of the price decline. Since investment is too low relative to saving, either more must be invested or less saved. But such reasoning is conclusive only if income is thought of as given and independent of what is happening within the period.²⁸ In that case, the alternatives laid down simply imply an increase of either investment demand or consumption demand. But if income is falling, aggregate demand and prices may fall. A correct formulation would quite simply be that the price fall will tend to be ending whenever aggregate demand is growing relative to supply.

What is the effect of a higher intention to save, i.e., a reduction of the fraction of income spent on consumption?

Keynes' theory attaches great weight to the fact that even if the increased saving is fully invested, i.e., if there is a reduction of consumption demand and an increase of investment demand, prices of consumers' goods will surely fall, but those of capital goods will not necessarily rise. Presumably the latter are determined quite differently from the former.

Such a paradoxical conclusion arises because the term "fully invested" is taken to include purchases of *non-newly produced* capital goods even when the sellers of these goods fail to spend their sales proceeds on investment. The term thus includes both true investment and an "investment transfer." Applying my own terminology, it is clear that from the point of view of pricing of the flow of newly

28. Behind such an implicit assumption we find the hidden idea that the income disposable for demand in a period partly depends upon the production of the preceding period. This was the idea underlying Scandinavian postwar discussion of monetary theory. Hammarskjöld's analysis and extension of that idea thus represents a smaller deviation from Wicksell than do the formulations by Keynes, Lindahl, Myrdal, and myself. Cf. §3 above.

produced capital goods, a reduction of investment demand has occurred; part of gross waiting has given rise to no true investment demand at all but merely to an investment transfer. Negative incomes are being generated, and the net supply of waiting is reduced relative to the gross supply.

Price formation of capital goods is influenced, then, not only by the subjective capital values of those who demand and own newly produced units of capital goods but also by the subjective capital values of owners of older units of capital goods. Whenever the latter fall below market prices, the older units will be sold. Such supply of older units will affect the pricing of new ones by influencing the demand for the latter via the size of gross waiting and the share of it constituting net waiting.

To a lesser extent the same is true of the pricing of other kinds of goods of which inventory is carried and may be dumped on the market.

Such questions are thus easily treated without changing the formal monetary theory scheme offered above.²⁹

A much disputed question is what happens in a process of falling prices if the intention to save is reduced and consumption demand (K) increased. Wholesale prices of consumers' goods (p^k) and of raw materials and semifinished goods related to them (p^{kr}) will tend to rise. But what happens to the demand for capital goods and to their prices? The answer must, of course, depend upon expectations, i.e., views on profitability prospects held by entrepreneurs and potential buyers of durable consumers' goods. Profitability prospects are very likely judged to be improving, and investment demand is higher than it would otherwise have been. If the tendency toward increasing demand is strong enough to more than offset existing downward tendencies, i.e., if investment demand is increasing, then the prices of capital goods as well as consumers' goods must go up.

Rising consumption demand does not at all mean falling net saving, which equals new real investment. On the contrary. Aggregate demand and gross income will be rising *more* rapidly than consumption demand. Consequently, gross saving will be rising while negative incomes are falling. Net saving, then, will be rising for a twofold reason.

It appears that measures which will expand or reduce demand at

29. Anyone who wishes to do so may think through the opposite process in which holders of bank deposits exchange the latter for capital goods, thus raising the prices of old and new units of such goods. From the point of view of the market for new units, this implies a rising investment demand.

one point in the price system, if not offset by changing demand at other points, will tend to push the entire price system upward or downward. Only a closer examination can clarify the conditions under which, say, expanding demand at one point (i.e., expanding one of the V 's) will induce decreased demand at a different point and thus set off a counteracting force. In other words, relations among changes of various kinds of demand (V and K) are important, not just changes in aggregate demand. Certain kinds of expanding demand, influencing the direction of production, probably carry in them the seeds of a reversal, e.g., a reduction of investment demand. A case-by-case study is called for, allowing for, among other things, situations differing with respect to unused capacity and higher or lower degrees of price rigidity. Such a study should not overlook the significance of various economic policy measures, monetary policy as well as fiscal and other policies. A study of such phenomena is a primary task for a business-cycle theory studying both "monetary" and "real economic" forces and integrating them into a unified theory.

V. *The Rate of Interest*

§9. The conclusions emerging from the preceding analysis have far-reaching implications for the theory of interest, and they deserve emphasis. According to the static theory of distribution the rate of interest is determined by the supply of and the demand for saving. By Wicksell and later by Cassel such a rate of interest was identified with the rate guaranteeing monetary equilibrium, i.e., keeping the price level constant. This very integration of distribution theory with monetary theory has been considered one of Wicksell's most valuable accomplishments.

If, as we did above, we apply an equilibrium concept similar to that of conventional price theory, we shall always have equilibrium in the capital market, i.e., between waiting and investment, regardless of how the central bank fixes the money rate of interest. In contrast to legislation fixing a ceiling rate of interest and similar interference in pricing having the same effect as ceiling prices of goods, the central bank interferes by affecting not merely price but also supply of and demand for credit.

If under otherwise equal circumstances the central bank fixes an essentially higher interest structure in one case than in another, price developments will certainly differ. Consequently, income, saving, and investment will differ. Per se, one interest structure is no more normal than the other. As we have said, any rate of interest indicates equilibrium in the capital market simply because net saving and in-

vestment always adjust so as to be equal.

Assume that different interest rates are quoted in the capital market for different kinds of loan transactions and that those rates alone regulate supply and demand. How are their levels determined? What is being supplied and demanded are rights to dispose of sums of money. A supplier is anybody who wishes to lend money he has received in one of two ways, (1) by selling older capital goods, securities, titles, and the like, or (2) by selling goods and services on their way in the flow of the production process. The latter source of supply equals the part of gross revenue not financing current consumption. Certainly part of this waiting is demanded for reinvestment by those supplying it, and to that extent no lending transaction is taking place.

At first sight, transactions listed under item (1) might seem unable to affect the level of the interest rates. Each transaction generates as much demand for capital disposal as supply of it or, more correctly expressed, supply is transferred from one person to another. This, however, may shift supply curves of various kinds of capital disposal—long-term and short-term, for example—and with them the rates of interest. Even if there were only a single rate of interest, it could be affected, for the holder of money always has the choice between supplying it and hoarding it. (Cf. what was said above on the pricing of capital goods.)

The reason why every interest rate is an equilibrium rate is that the more the credit demand and lending are expanding, the more the sources of waiting listed under item (2) are growing (except to the extent that new means of payment are borrowed for hoarding). The question is merely how prices and quantities transacted will develop under alternative interest policies, given the assumptions on the intention to save and the like.

That the rate of interest plays a major role in determining the demand for investment was uncovered by Wicksell's analysis founded on that of Böhm-Bawerk. Already the Classicists realized the fact but did not examine the nature of the relationship. Such a fact finds its place just as well in the present formulation of monetary theory and has nothing at all to do with the concept of a "normal" rate of interest.

If it is desired to call one particular price development more "stable" than others, then the interest policy generating it will of course appear more "normal" than a policy leading to sharply rising or sharply falling prices. In other words, if a deflation such as that of 1931 is considered "unnatural," then the accompanying interest pol-

icy will also be unnatural; measures designed to lower interest rates and to counteract deflation will not be "artificial," but on the contrary make interest policy more natural. Which interest rate is natural can—from the point of departure mentioned—be judged only by the resulting price development.

The philosophy of science offers no reason why price movements or anything else should be singled out for special attention. What matters is simply what one finds it practical to mean by "stable" and "normal" in economic life (see §3 above). An analysis of dynamic processes based upon the conceptual apparatus of the monetary theory described above is not tied down by the introduction of notions of monetary equilibrium and a corresponding interest policy. Such notions are dangerous, among other things because they let alternative interest policies appear artificial. What is a natural or an artificial policy can only be judged by examining to what extent the policy will bring within reach economic results which for one reason or another are considered desirable.

VI. Conclusion

§10. In order to test the applicability of the formulation of monetary theory just described we ought now to examine the functioning of alternative monetary mechanisms (money and banking systems) under alternative assumptions and under alternative price movements. But that will have to wait for another time.

The purpose of the present attempt at a formulation of the theory different from the neo-Wicksellian one has been to construct a simpler and more practical conceptual apparatus.³⁰ Among other things, I have tried:

- (1) To get away from the income concept, inapplicable in any statistical analysis, employed by Lindahl and Myrdal.³¹
- (2) To hint at a more generally valid but also, if it were to be elaborated further, a more case-by-case-oriented description of price movements than Lindahl's analysis, based on far too special assumptions, of a Wicksellian so-called cumulative

30. We have tried to suggest how the more profound understanding of the nature of price movements gained from Wicksellian theory could be presented, more completely and correctly, in a form easier to handle and lending itself to an analysis of statistical data available, among other places, in business accounting. Those who have become accustomed to Wicksellian terminology will find the latter the simpler one, of course. But a study of the extensions of Wicksellian theory by Hammar skjöld, Lindahl, Keynes, and Myrdal will weaken the belief in its ease of handling.

31. See §12 below.

process. As it turned out, such a process is possible without any redirection of production from consumers' goods to capital goods or vice versa. It also turned out that the former goods could lead the development of price just as well as the latter ones.

- (3) To show how the accomplishments of Austrian capital theory concerning the time structure of pricing could be incorporated, more completely than Wicksell did, by an expedient classification of commodity flows enabling us to judge the price trends of the latter by already available or easily computed index numbers. In this way it would become possible to consider within a unified theory the significance of so-called monetary as well as so-called real factors in the business cycle. This would be an attempt to work out one of Wicksell's ideas in a different way than Hayek did.
- (4) To make clear that the exchange structure and above all the time sequence of price movements, now attracting so much attention in recent discussion of the present depression, lie at the heart of monetary theory—just like the time-structure analysis of interest, capital values, etc.³²
- (5) To show that the notion of a normal or equilibrium rate of interest found in static price theory is misleading in the analysis of dynamic processes.³³

For a fully satisfactory solution of these problems, as we have already said, a complete monetary theory would have to be worked out, and its value would have to be tested by a case-by-case analysis using statistical data.

VII. *Appendix: A Critique of Neo-Wicksellian Monetary Theory*

§11. *The driving force of a price movement.* The question of the driving force behind price movements has been much discussed in monetary theory. Wicksell, Cassel, and Keynes alike appear to find it in a lack of equilibrium in the capital market, and postwar discussions

32. It might seem redundant to make such a point. But the fact is that these points of view have been almost entirely ignored in the standard works on monetary theory.

33. Despite the essential dissimilarities between Lindahl's formulation and my own—and their results—there can be no doubt that his *Penningpolitikens medel* has heavily influenced my exposition above, especially with respect to item (5). To some extent the same is true of Myrdal's *Prisbildningsproblemet och föränderligheten* [The Problem of Price Formation and Changeability] and to a large extent of numerous oral discussions with him. Sven Brisman's critical examination of galley proofs has clarified a number of points.

have generally accepted this point of view. Let us look a little closer at the meaning of this conception of a driving force.

A wholesale price index of the usual kind will be rising because the demand for goods in wholesale trade is rising relative to supply. For simplicity's sake assume the latter to remain largely unchanged for a period. Then prices are rising because the sum of the demand for capital goods and consumers' goods is rising. Alternative cases are conceivable: (1) both categories of demand are rising; (2) one category is rising while the other is unchanged; (3) one category is rising more than the other is falling.

What are the circumstances influencing investment demand? A great many, of course. A businessman purchasing a machine or building a structure expects it to bring him more than it costs. Its subjective capital value, determined by his expectations, exceeds its cost. Thus he is counting on a positive present net worth. This is certainly a necessary but not a sufficient condition for the purchase to materialize. He may, for example, anticipate a future reduction of the cost (price) of the good, but no corresponding fall in its subjective value. In that case he will postpone his purchase. The same is true if he expects the subjective capital value of a later time to be larger without a corresponding increase in cost. For example, even when unable to fully utilize this capacity, an entrepreneur may wish to take advantage of current low prices to expand his capital equipment. But he will postpone his purchase if he expects the subjective capital value to be rising (because an expansion now would not generate revenue until later) while expecting no offsetting increase in cost.

As for demand for consumers' goods in retail trade, it will depend, among other things, upon individual conceptions of current and future income. But it will also be affected by individual conceptions of the status of assets. Finally notice that consumption demand depends upon expected prices; for example, an anticipated price fall may have a restraining effect on purchases.

Furthermore, it must be emphasized that, in order to purchase, one must either dispose of money or purchase on credit. Many individuals wishing to purchase for investment or consumption purposes do not satisfy these conditions. An individual wishing to borrow for consumption or investment may be unable to put up adequate collateral and hence is unable to purchase. The reason why aggregate demand is growing in a period is that all such factors, psychological and others, are making it grow.

To say with Cassel and Wicksell that prices are rising because lending is exceeding saving and hence aggregate demand is growing,

is a far from satisfactory formulation—as Myrdal has shown. In my own terminology the underlying idea may be expressed as follows. Economic conditions like credit terms and expectations are making demand grow relative to supply. No explanation of why this is happening is offered by referring to the relative amount of credit. An explanation must include an account of the factors influencing various components of the demand for goods. It is debatable whether, when treating certain problems such as questions of discount policy, it may be said that demand is rising because credit policy is satisfying the condition that demand is rising; that is what Wicksell and Cassel are saying. To say so may be expedient in certain cases, because credit policy is something that can readily be modified. But certainly no new element of an explanation has been provided by such a statement. One merely succeeds in calling attention to the particular fact that a change in credit policy may produce a change in demand and price movements. On the other hand, in other cases this may be a disadvantage. Which terminology is the better may in the present context be left open. The main point is that even when revised, completed, and complicated in Myrdal's way, the talk about lack of equilibrium in the capital market as the cause of rising prices, i.e., as the "driving force," explains nothing more than saying that demand for investment purposes or for consumption or both is growing relative to the flow of production of goods and services. No matter which terminology is used, special cases will equally require further illumination. When one is providing such illumination, it serves no good purpose to press the analysis of several kinds of demand changes into the straitjacket of seeing everything in terms of the relation between a "normal" rate and the actual money rate. Such a terminological straitjacket would seem impractical if, for example, any form of credit rationing were applied or if loans were refused because bankers were taking a pessimistic view of the quality of collateral offered.

§12. *Is statistical observation of Myrdal's monetary equilibrium possible?* For a judgment of the most practical terminology, available opportunities for statistical observation may be relevant. As Myrdal himself points out, theory should pose the questions that might be answered by the data.

How do three alternative ways of formulating a modified Wicksellian monetary equilibrium condition stand up, i.e. (1) equality between the supply of and the demand for waiting, (2) equality between the normal rate and the money rate of interest, (3) a price level satisfying certain conditions?

Let me start with the last formulation. An analysis of the first two

conditions has led Myrdal to the conclusion that they will be satisfied if the stable price level is of a special kind: "According to the two equilibrium conditions analyzed earlier, the 'price level' to be stabilized in order to maintain monetary equilibrium under the impact of primary changes in the conditions of price formation would be the expression of general price movements to be found from an index computation weighing individual prices by, first, their relative importance in entrepreneurial profitability estimates and, second, their specific inverse speeds of reaction."³⁴ The complete impossibility of computing such an index is apparent. Consequently, from a study of actual price trends one would never be able to find their relation to monetary equilibrium as defined above. For that reason Myrdal falls back on an alternative expression of monetary equilibrium, i.e., "equality between capital values and the cost of reproduction of real capital." This expression is derived from the required equality between the normal rate and the money rate of interest—magnitudes that cannot be captured statistically. Index numbers would, then, have to be computed for both items of the alternative expression. Should "these index series run parallel, monetary equilibrium would prevail. Divergence between them would reflect a divergence between money rate and natural rate."³⁵ The question arises: "How does one handle the case, regularly encountered, in which *the profitability divergence differs among firms* or is even positive in one firm and negative in another? What principle may be offered for weighing divergences between our indices in different industries?"³⁶ "The weighing . . . should be done in accordance with *the effects, estimated in money terms, of the divergence upon the magnitude of real investment*. The weights would vary from one industry to another and would also vary with the sign, width, and trend of the divergence. The correct way to get at such *elasticity coefficients of real investment with respect to profitability changes* would be a statistical study of industry behavior over the business cycle."³⁷

Evidently such coefficients would refer solely to the situation at a certain time. The weights would have to be done over every time one had observed how real investment had developed in the immediate past and one would be trying to estimate how the profitability divergences would now be affecting investment plans. In other words,

34. Myrdal, "Om penningteoretisk jämvikt," §26 [cf. *Monetary Equilibrium*, 1939, pp. 136–137; in this, §§39–41 have been omitted].

35. *Ibid.*, §39.

36. *Ibid.*, §40.

37. *Ibid.*

from observed changes in investment one would draw inferences about changes in a divergence index defying statistical observation. What purpose is then served by the construction of such an index? It conveys nothing more than a summing of investment plans. A certain value of it would not at all indicate that some cumulative process was on its way.

Presumably the idea pursued in such language is that as long as a divergence index has a certain value, e.g., as long as planned saving is falling short of planned new investment, a price movement will continue. It would be simpler to say that as long as the sum of planned investment demand and consumption demand exceeded planned supply, the price level would be rising. But such a statement amounts to referring to a point of time that which might more simply, and more amenably to statistical analysis, be referred to a period of time; i.e., as long as aggregate demand is rising relative to aggregate supply, the price level will be rising.

Myrdal seems to be aware of the impossibility of computing a divergence index, for he proceeds to discuss the possibility of statistically observing waiting and real investment, i.e., the relation between them. Notice that in his terminology these terms refer to human plans for the future; waiting is the part of expected future gross revenue not to be spent on current consumption. For his equilibrium criteria not to become practically useless Myrdal must adopt the optimistic position that "beyond question, relatively simple observations could make available statistical data capable of illuminating how the important relation between the magnitudes real investment and free waiting is developing."³⁸ I for one have difficulty seeing how such magnitudes, existing only in the human mind, could possibly lend themselves to statistical observation. The conclusion must be that in any actual situation, such as now, no one can establish whether or not monetary equilibrium in Myrdal's sense is prevailing. Myrdal's reconstruction of Wicksellian theory does not, it seems to me, satisfy his own requirement of all theory, i.e., that theory should provide the questions answered by the data. However, we should be grateful for his mapping of the paths and the results to which a consistent extension of one variety of Wicksellian thought would lead. In my view the result is such as to urge us to explore alternative paths that we could follow without losing the large domains won by Wicksell's formulation.

38. *Ibid.*, §41.