

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

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of
Committee on Thesis

The undersigned, acting as a Committee of the Graduate School, have read the accompanying thesis submitted by Marian Rubins for the degree of Master of Arts. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts.

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Date June 13 1922

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report
of
Committee on Examination

This is to certify that we the
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Master of Arts

We recommend that the degree of
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A STUDY IN INTEREST RATES
1908-1921

A THESIS
SUBMITTED TO THE FACULTY
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GRADUATE SCHOOL
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BY
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IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS
FOR THE DEGREE
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Ed. U. J. M.

CHAPTER I
MODERN INTEREST THEORIES

CHAPTER I

MODERN INTEREST THEORIES

Modern writers on the theory of interest have put forward a number of explanations whose pertinence and completeness can be fully established only after a study of actual operations in the loan market. Science deals, necessarily, with a simplified universe, but its end is interpretation of the real and complicated universe, and the relevance and value of its statements are tested by reference to the actual phenomena which they attempt to explain.

Among the theories developed in a century and more of scientific inquiry into the nature and causes of interest, two stand out prominently today as explanations of the normal rate of interest. Other theories have been largely refuted, neglected or absorbed. The *agio* and productivity theories may be said to hold the field. One of them states that the rate of interest is determined chiefly by the marginal productivity of capital; the other finds time-preference to be the controlling factor. Adherence to one theory does not, necessarily, preclude acceptance of the other; several writers have incorporated both productivity and *agio* ideas in their explanations. But for the most part the discussion has been of a highly controversial nature, the *agio* theorists endeavoring to show that the statements of the productivity theorists are question-begging, the productivity theorists maintaining that time-preference, alone, is an insufficient basis for a theory of interest. The controversy, as such, is of little importance to us here. We

1. The interest theories of Taussig, Marshall and Carver furnish examples of this dualism.

are concerned with it only as it has served to bring out the characteristic features of the two theories. Our purpose is to present the theories and to ascertain what conclusions as to their validity, can be drawn from a study of actual interest rates.

One caution must be observed; neither *agio* nor productivity theory attempts to explain the minor fluctuations in the interest rate. It is to be expected that the course of market rates will reveal the influence of many other factors than those invoked in explanation of the normal rate of interest. It may be that time-preference does little more than set a lower limit beneath which the interest rate will not fall, and that only in the long run is the influence of productivity felt. But although changes in the rate due to changes in time-preference and productivity may be obscured by the action of less fundamental forces, we hope to find evidence of such changes underlying the short-time market fluctuations.

Professor J. B. Clark is probably the most uncompromising of productivity theorists. Capital, for him, is a value fund embodied in concrete capital goods. ¹ Goods wear out in the course of time. They must be repaired and renewed. But capital itself persists indefinitely in varying forms of capital goods, and while a sacrifice attends the creation of new capital, the maintenance of capital involves no effort. In a static and freely competitive state the existing fund of capital is distributed among the various industries in such a way that the productivity of the marginal increment is the same in them all. The amount of the final product

1. The Distribution of Wealth. 119.

that is attributable to capital constitutes the income on capital. It can be expressed as a ratio of the value of the income to the value of the capital, and so expressed, it is the rate of interest. Criticism of the theory has pointed out the unreality of its assumptions, and questions whether capital would be maintained without cost even in the static state.

Carver's theory, which undertakes to combine the ideas of productivity and "sacrifice", is at once more compromising than Clark's and more representative. According to this theory, "capital consists primarily of tools and materials of production," and interest is the net income from capital after deduction has been made from gross income to provide for maintenance. The productivity of a capital instrument is determined by the productivity of the marginal increment of capital, and the operation of diminishing returns causes this marginal productivity to be less with each addition to the total amount of capital employed in production. Nevertheless, until marginal productivity sinks to zero, the employment of additional capital results in additional product. Were capital costless, it would be used in production in such amounts that it would have no marginal productivity whatever. This does not occur, and Carver is led to an analysis of the supply of capital.

1. The Distribution of Wealth. Ch. IX, XI.

2. Ibid. 256.

3. Ibid. 216. See also p. 120. Carver recognizes the existence of capital in the form of durable consumer's goods, but such capital is only a "small share", he thinks, and he devotes his analysis to that part of capital which is made up of instruments of production. p. 218.

The supply of capital is limited, he says, for two reasons. In the first place, the production of the tools and machines of which it consists is a costly process,¹ and accordingly the supply is checked at the point where marginal productivity covers the cost of production of capital goods.² There is still no surplus, however, no interest. But the production of capital is further limited by the necessity of waiting for income from capital and the unwillingness of men to wait. Men are not alike in this respect. Some of them would wait for income even if they received no payment for doing so; still others would be willing to pay "negative interest", if necessary, in order to secure safe custody for their wealth. However, the costless savings of such men as these will never be sufficient to meet the requirements of industry. As long as capitalistic production is sufficiently profitable, and costless waiting sufficiently limited, the employment of more capital than is saved without effort will afford a surplus, at the margin, over the cost of producing capital, costly waiting will be called forth, and all waiting must be paid for.³ The surplus, the payment for waiting, is interest.

The theory contains a clear marginal analysis of the cost of waiting, and it makes an attempt to explain the relation between the profitableness of capitalistic production and the premium which producers are willing to pay for the means of engaging in such

1. The Distribution of Wealth. 225.
2. This is not precisely the same thing as maintenance of capital but Carver does not seem to have distinguished between the two.
3. The Distribution of Wealth. 235 ff.

production. But critics who hold the agio theory would say that Carver has failed to provide a measure of the value of capital. How, they would ask, is the quantity income from capital goods translated into a rate of interest? Is the rate of interest itself necessarily involved in any such translation, and if so, how does the theory guard itself against the charge of circular reasoning?

Boehm-Bawerk's theory of interest is based on the proposition that present goods are worth more than future goods of like kind and number.¹ He gives three reasons for this agio or preference for present goods. In the first place, the circumstances of want in the present and future may differ. Immediate necessity or the prospect of larger income in the future will cause a man to value more highly goods that are available at the present time. To the objection that the situation is sometimes reversed, that in many cases the present is comparatively well provided for and the anticipated future income is very meager, Boehm-Bawerk replies that present goods, unless they are perishable, need not be consumed today. They afford their owner the choice between present and future use, and accordingly, in almost every case, they are at least equal in value to future goods. They are more valuable than future goods in those cases where present needs are greater than future or where the future promises to be more richly supplied than is the present.²

Secondly, the agio exists because men "systematically

1. The Positive Theory of Capital. Translated by Smart. 1891. p. 237.

2. Ibid. Bk. V. Ch. II.

underestimate future wants, and the goods which are to satisfy them." We are able to picture to ourselves the future and its needs but we do not do so completely, nor have we the will to act always in accordance with our estimate of the relative importance of present and future wants. Furthermore human life is both short and uncertain; one is never sure that he will live to enjoy a future good whose value he is computing, and accordingly he makes a deduction from that value to allow for the uncertainty.¹

The third reason for the agio lies in the technical superiority of present goods. It is a matter of experience that roundabout methods of production yield a larger quantity of product for the same quantity of productive instruments. Production is not prolonged indefinitely into the future simply because the relatively liberal endowment of the future reduces the marginal utility of future product, and because the systematic underestimation of the future causes that marginal utility to diminish in perspective. It is in comparing the yields of productive instruments available at the present, with the yields of instruments not available until some future time, that the technical superiority of present goods appears. The maximum yield (quantity, in terms of marginal utility, seen in perspective) of a month's labor available this year is greater than the maximum yield of the same quantity of labor available next year, and this is, in turn, greater than the maximum yield of the following year's labor. Therefore present means of production are preferred to future means of production.²

1. The Positive Theory of Capital. Bk. V. Ch. III.

2. Ibid. Bk. V. Ch. IV.

The three factors, difference in want and provision for want, underestimation of the future and technical superiority of present goods, cause "the overwhelming majority of men" to give a higher subjective value to present than to future goods. This higher subjective value of the many is reflected in a universally higher exchange value, which influences even those few whose personal circumstances might lead them to attach relatively less importance to present goods.¹

Here, then, is the agio. It is the "source and origin" of all interest, says Boehm-Bawerk.² In the case of a loan it appears in its simplest form. The loan is a "mutual transfer of property", by which present goods are exchanged for future goods. Since present goods have the greater value, the person who receives them must pay directly the premium or agio, which is interest.³ So the reasoning goes if the loan is made for the purpose of immediate consumption. The problem of interest where means of production are concerned is a more complicated one. Productive instruments are, essentially, future goods, or rather they are to be compared with future consumption goods, since they derive their present values from the discounted values of their future products. As tomorrow becomes today the products are completed and the entrepreneur sells them at their full value as present goods. He sells them for more, that is, than was paid for the instruments that

1. The Positive Theory of Capital. Bk. V. Ch. V. especially p. 281.
2. Ibid. 185.
3. Ibid. Bk. VI. Ch. I.

produced them. This difference is interest. Advances to those who engage in capitalistic production are made from the general subsistence fund which is the sum of social wealth, excluding land, and in return future goods are paid to those who transfer to producers their claims upon the fund.¹ The subsistence fund is limited. It never is great enough to satisfy the demand of entrepreneurs who wish to extend their production periods and need present goods in order to do so. Because of the bidding of entrepreneurs, because of differences in want and provision for want, and because the future, as such, is underestimated, the agio appears² and checks the indefinite extension of the production period. The agio is found in the form of interest on loans; it appears also in the price of labor, of land and of concrete capital goods.³ It is used to determine the value of durable goods.⁴ It is the rate of interest.

Boehm-Bawerk's is an agio theory.⁵ It is based upon the preference for present over future goods; but it recognizes the importance of the productiveness of capital. Because it asserts that the value of a capital instrument is the sum of the discounted

1. The Positive Theory of Capital. 358.

2. Ibid. 335.

3. Ibid. 336, 337.

4. Ibid. Bk. IV. Ch. VII.

5. Fetter, to be sure, classed Boehm-Bawerk with those who hold to the old, that is the productivity theory. But he also called Fisher a productivity theorist. Interest Theories, Old and New.

⁴ Amer. Econ. Rev. 69, note 2.

future values of its products, it is forced to a new and somewhat indirect explanation of the influence of the profitableness of round-about production upon the price which men will pay for the present goods which make that production possible.

Professor Fisher follows Boehm-Bawerk in criticizing the productivity theorists for confusing physical productivity and value return, and for assuming in their argument the rate of interest which they are endeavoring to determine.¹ In his criticism of Boehm-Bawerk he accepts the *agio* as the proper basis for a theory of interest, rejecting only the argument concerning the technical superiority of present goods. He states that the proof of this superiority is dependent upon the assumption of an underestimated and overendowed future. With the effect of perspective eliminated, Boehm-Bawerk's figures still indicate an advantage inherent in present production goods. But Fisher points out that one can demonstrate the independent existence of the technical superiority of present goods only by removing both factors.²

The "central fact" in Fisher's own theory is time-preference. He defines it as the preference for early enjoyable income over late enjoyable income.³ An individual's rate of time-preference depends upon the prospective endowment of his future, or, in Fisher's words, it depends upon the size of his income-stream, upon

1. The Rate of Interest. Ch. II.

2. Ibid. Ch. IV. Boehm-Bawerk's reply was that while there could be no interest without time-preference, it is also true that without the technical superiority of present goods, interest would not appear. Alvin S. Johnson. Review of the 3rd ed. of the Positive Theory of Capital. 4 Amer. Econ. Rev. 114, 115.

3. The Rate of Interest. 88, 89, 90.

its time-shape, its composition and its probability. If a man's prospective income is small, his time-preference will be high. The poor neglect the future because they are harassed by the imperative needs of the present. Time-shape of the income-stream influences the individual's preference for present goods in various ways. If income is expected to increase in the future, the rate of time-preference is higher than it would otherwise be, for the owner will be willing to sacrifice a fairly large amount of future income for the sake of a small increase of income in the relatively needy present. On the other hand, if the income-stream is decreasing, time-preference will be relatively low, since the present is better provided for than the future will be. Fisher concludes that the composition of the income-stream is a negligible factor in determining the rate of interest. The probability of the income-stream, that is the uncertainty attending the accrual of future income, is a matter of importance, however. If the risk is greater in the more remote future, the rate of time-preference will be lowered; if the greater risk attaches to the immediate future, the rate will be raised; and if there is simply increased uncertainty extending throughout near and remote future alike, the effect will be similar to that produced by a reduction of income. Personal differences in foresight, self-control, habits of spending, prospect of long life and interest in making provision for others affect time-preference. But the time-preference of any individual depends¹ "in a definite manner" upon the character of his income-stream.

From the preceding analysis one might conclude that individual

1. The Rate of Interest. Ch. VI

rates of time-preference would differ widely. But this is not the case. Individual rates actually tend to conform to a single common rate of interest. They conform to it perfectly, under the assumption of rigid and certain incomes. If a given rate of interest is established in the loan market, and the individual's rate of time-preference is higher than that rate, he will barter away some of his future income for present income until the rates are equal. Conversely, if he has a low rate of time-preference, he will exchange a portion of his present income for future income.¹

Changes in income-streams are effected also by changes in the use to which capital is put. If two optional employments offer incomes that differ in size only, the choice falls invariably upon the employment yielding the largest^r income.² But when choice between employments involves a difference in the time-shape of the income-stream, the rate of interest helps determine the choice, for the individual, whatever time-shape he may desire, will choose that use for his capital that will give him the largest income, measuring income in terms of present value by discounting future income at the market rate. Having made his choice on this basis, he will alter the time-shape of his income-stream by buying, selling, borrowing or lending, until his individual rate of preference accords with the market rate. This reasoning is not circular, Fisher maintains, because there are as many independent determining conditions as there are unknown quantities. The choice among optional employments of capital depends upon the market rate, and

1. The Rate of Interest. 139.

2. Ibid. Ch. VIII.

the market rate depends upon individual rates of time-preference and they in turn upon the time-shapes of income-streams which are fixed by the choice among optional employments of capital. But for a given market rate the choice among options is fixed and consequently the individual differences between the resulting time-shapes and the time-shapes necessary to bring rates of time-preference into conformity with the market rate, will be fixed. The market rate of interest that finally emerges will be such that after the choices among options, the individual differences will cancel one another.¹ We find the productivity of capital entering into the determination of the interest rate at this point, for it is upon technical possibilities of production that the range of choice among employments must depend.²

The third step in Fisher's theory is to remove the assumption of certainty. By allowing for risk he makes the situation more real but he does not invalidate his previous conclusions. The only important difference is that now the rates of individual time-preference merely tend to become equal to the rate of interest,³ while before they conformed to it perfectly.

Professor Fisher finds his analysis applicable to various types of loan. He believes that it explains the interest rate realized when a loan is issued, and also the rate realized when the loan is transferred in the market by the sale of securities.⁴

1. The Rate of Interest. 149.
2. Ibid. 164 ff.
3. Ibid. Ch. IX. especially p. 221.
4. Ibid. Ch. XII.

But his theory, like the others we have reviewed, is essentially a theory of normal interest, although it can be used more readily and convincingly than they in explaining the motives behind actual loan transactions.

For a theory of short-time fluctuations we must turn from the agio and productivity writers to a man who has analyzed the forces more immediately governing the course of market rates. Davenport was by no means the first to state that interest is a price fixed¹ by the adjustment of demand and supply in the market for loans. His contribution lies in the point and emphasis which he gives to the concept of capital as a loan fund.² Interest "in the actual competitive organization of society" is the "premium which general purchasing power, expressed in terms of money, commands over future purchasing power similarly expressed."³ The capital that is loaned and borrowed is not durable goods nor any other form of social wealth, but a fund of purchasing power, of claims to goods and services, of rights of direction over them. It is made up of money and credit. Of the two credit is the more important to the interest problem since it constitutes the greater portion of the loan fund and since changes in the volume of credit are more frequent, more considerable, and more significant as market influences

1. Fisher speaks of interest as a market price. The concept is at least as old as the writings of Sir Dudley North. It has been held by many persons and has been emphasized by Turgot and Say, and in more recent years by Gustav Cassel. For the views of earlier writers as well as for Cassel's own theory, see his *Nature and Necessity of Interest*.

2. Davenport says that the loan-fund idea is not new with him. It was at least implied in the writings of Ricardo, Bagehot and Cairnes. *Economics of Enterprise*. 344, 345, 346.

3. *Ibid.* 332.

than are changes in the volume of money.¹ The amount of the loan fund bears no fixed relation to the amount of concrete wealth in a community. Bank credits "expand and contract in conformity with the volume of forthcoming product rather than with the volume of existing wealth."²

Since banks have the power to increase the supply of the loan fund at any time by the extension of credit, the exercise of this banking function is an important factor in determining the market rate of interest. The abstinence doctrine, obviously, does not apply to this part of the loan fund. The creation of bank credit involves no cost of waiting nor any refraining from present consumption. In making use of the credit the entrepreneur bids for commodities and services to be directed to the production of future rather than present goods, but this affects the supply of the loan fund only indirectly. The factors immediately governing the supply are the cost of assuming the risk involved in guaranteeing loans, the routine expenses of banking and the gain promised by the current rate of interest. In connection with that part of the loan fund that becomes available through the savings of individuals, the situation is somewhat different. Davenport's reasoning here is strikingly like Fisher's. The choice of an individual between spending and investing depends to some extent upon prospective changes in income, upon uncertainty, upon changing needs and upon probable changes in personal earning power. But the supply of funds at any time from individual savings, as from bank loans, is to be

1. Economics of Enterprise. Ch. XVIII.

2. Ibid. p. 349.

described only with reference to a given rate of interest.¹

The premium which borrowers will pay for the present use of loanable funds depends directly upon the competitive pecuniary gain to be derived from that use and only indirectly and partially upon the productivity of "technological capital or social capital or equipment goods."² Preference for present over future consumable goods is, in itself, sufficient to account for the existence of an interest rate. Similarly, interest would result from the technical properties of production goods, or from the mere existence of durable consumption goods, or from the opportunities for gainful adventure in activities that are purely exploitative. In actual life we have all four factors influencing the premium which borrowers will offer.

Interest rates are fixed by market adjustments between the rates of borrowers and the rates of lenders.³ But in no case is there an equating of gain and sacrifice even between the marginal borrowers and lenders. Preference for present over future goods and technical productivity govern only partially the trend of market rates. Innumerable other forces help to determine how much loan fund will be available at a given rate of interest and how much will be demanded.

A review of the points made by modern theoretical discussion of the interest problem would not be complete if it neglected Fisher's statement that appreciation and depreciation of the

1. Economics of Enterprise. Ch. XIX.

2. Ibid. p. 380.

3. Ibid. Ch. XIX.

monetary standard affect the rate of interest. The rate of interest is usually expressed in terms of money but a loan really involves the sacrifice of present for future goods. If a general rise in prices is foreseen, the interest rate will be high to compensate for that rise, and conversely if men foresee a fall in prices, the rate will be low, but since it usually happens that appreciation and depreciation are not entirely foreseen, there will be only a partial adjustment¹ of the interest rate to ~~expected~~^{future} changes in the monetary standard.

1. The Rate of Interest. Ch. V.

CHAPTER I I
METHODS OF INVESTIGATING

C H A P T E R I I
METHOD OF INVESTIGATING

What are the forces that determine the interest charge that borrowers must pay for the use of loanable funds? How do these forces act? If time-preference is one of them, and one can hardly doubt that it is, does its influence predominate in the market? What is the role of productivity? It was in the hope of finding answers to such questions as these, that the present study was undertaken. The general plan was to secure quotations of the market rate, to trace its course through a series of years and to attempt to explain its fluctuations.

To such an inquiry limits must be set, and one of the first things to be considered was the matter of time. The choice of the period 1908-1921 was partly but not wholly an arbitrary one. It has the merit of giving us at least one complete major business cycle to study as well as minor periods of depression and prosperity. The period is of convenient length, and it covers the last eight years of Mitchell's investigation, ¹ making possible a comparison of results and the utilization of some of his data without, however, involving a serious duplication.

The inquiry was further limited by the decision to study New York rates only. The quotations for New York are far more satisfactory than quotations for other centers. For the greater part of the period rates on time and demand loans in other cities are

1. The results of which are embodied in his Business Cycles and in articles in the Journal of Political Economy, 18: 345, 513; 19: 269; 21: 500; 24: 126.

not available.¹ In the case of investment rates as represented by bond yields the situation seems at first sight more promising since there are several organized stock exchanges outside of New York and price records of the sales at the more important of these exchanges are to be found in such weekly publications as the Commercial and Financial Chronicle. But the transactions are comparatively few and slight and the listings consist largely of local or obscure issues. We are forced to rely upon New York quotations for our index of the rate of interest and we are justified in doing so by the fact that New York is the dominating market for funds and rates there are of significance to the whole country.² To say that New York rates exert a profound influence

1. Since July, 1918, the Federal Reserve Bulletin has given rates on various types of bank loans in each of the Federal Reserve and Federal Reserve branch cities. The quotations are high, low, and customary for the thirty days preceding the fifteenth of each month.

2. Mitchell takes his statistics from that one market. He says that it is "by far the most important in the country. Moreover, it has such close connections with all the lesser financial centers that its rates both affect and are affected by changes occurring elsewhere. Loan funds are so fluid a commodity that outside banks and capitalists can lend, and outside business enterprises of large size can borrow in New York. The objections to relying on statistics from this one market as indicative of fluctuations in the rate of interest are therefore less serious than would be the objections to a similar procedure with reference to retail prices or wages. It is true that the farmers and most business men of the interior have practically no access to the metropolitan market. Such borrowers must pay the rates of interest charged by local banks and capitalists, and these rates are usually higher than those charged in New York. But these interior rates, particularly in the larger towns of the northeastern and north central states, probably rise and fall in rough conformity with rates in New York, and our interest is in the fluctuations rather than in the actual magnitude of the rates." Business Cycles, 140.

In regard to the significance of New York rates obtained from price quotations of stock exchange transactions, S. S. Pratt states that while only about one-third of the stocks and bonds outstanding in the United States are listed on the New York Stock Exchange (his figures are for 1910 and 1911), and while there are many local markets for local securities, and organized markets in twelve

upon other rates throughout the country is not, of course, to say that the United States is a single loan market, the trend of whose rates is necessarily and infallibly indicated by New York quotations. Without a more extensive study than is possible here, it would be impossible to say with certainty how nearly the country as a whole approaches the conditions of a single market according to the usual criteria of information and accessibility. What seems probable is that for certain types of loans the country is a single market and is becoming more and more unified, but that for other types it is rather an aggregation of only partially interdependent markets.

Still another general limitation was necessary. If it seems likely, as we have just indicated, that there are geographically distinct markets for loans, there is no room for doubt that there are distinct markets for different types of loans and, corresponding to them, distinct rates of interest. The fact that financial publications quote a variety of rates indicates that to their

cities beside New York (namely Boston, Philadelphia, Baltimore, Chicago, St. Louis, Pittsburg, Denver, Kansas City, San Francisco, Los Angeles, Seattle and New Orleans), New York is the "main market for all important securities". The Work of Wall Street. 51, 52.

If one is safe in inferring anything from the somewhat ambiguous language of the Hughes Commission and from their limited investigation of this point, transactions on the New York Exchange are actually almost as representative of buyers and sellers in the country at large as of those in the metropolis itself. "We have taken pains to ascertain what proportion of the business transacted on the Exchange is furnished by New York City. The only reliable sources of information are the books of the commission houses. An investigation was made of the transactions on the Exchange for a given day, when the sales were 1,500,000 shares. The returns showed that on that day 52 per cent of the total transactions on the Exchange apparently originated in New York City, and 48 per cent in other localities." Hughes Commission Report on Speculation in Securities and Commodities, June 7, 1909, p. 11.

readers at least the differences are significant. Professor W. A. Scott, in compiling figures for money rates in New York for the years 1896 to 1906, recognized separate rates on call and demand loans and on no less than seven classes of time loans ranging from thirty days up to seven months.¹ Mitchell in his discussion of the price of loans considered first the price of long-time investment loans represented by the yield on high grade bonds, and secondly the price of short-time loans of three types: call loans, loans on double-name 60-to-90 day commercial paper and on single-name paper running four to six months. His investigation showed that, while the various rates were influenced to some extent by the same forces, they had different long-time averages and reacted differently to seasonal and cyclical changes.² Friday, though he did not make use of the point in his analysis, has stated clearly that there are a number of investment markets.³

It is difficult to say how common is the shifting of loanable funds from one of these markets to another in response to differences in interest rate. The dominant position of the commercial bank in most of the markets leads one to believe that

1. Rates on the New York Money Market. 16 Jour. Pol. Econ. 273.

2. Business Cycles. 140 ff.

3. "In discussing the rate of interest we have used the term as though there were a single rate which prevailed throughout the whole money market. What we actually have is a number of different capital markets, such as the call loan market, the commercial paper market, the market for short-time notes running from one to five years, the market for long-time bonds, the farm mortgage loan market. The conditions which govern the supply of capital, as well as those which govern the demand, are different on these various markets. Each of these has its own rate of interest. These rates are often widely different, and for limited periods at least the course of interest movements on one market may be in a different direction from those on others." Profits, Wages, and Prices. 93, 94.

the communication is close but it must be remembered that the nature of a bank's liabilities prevents it from concentrating its resources upon a single type of loan. On the demand side differences in the term of the loan correspond to differences in nature of the purchases to be made with the proceeds, so that the borrower, too, is prevented from shifting freely from one market to another, though undoubtedly he will shift wherever possible when it is to his advantage to do so. As one would expect, the rates of interest in the different markets vary considerably and fluctuate in somewhat different ways. Of these various rates, distinct and yet interdependent, influencing one another in ways that have been guessed at rather than accurately determined, we have chosen for the purposes of this study the long-time investment rate as indicated by the yield on high grade bonds.

It may be asked whether there is, even here, a single rate. There are several factors that might be expected to cause appreciable variations in the yield on high grade issues. In the first place it is impossible that the security behind the issues of different corporations should be identical, and still more impossible that the buying public should think it so. The financial good fortune or bad fortune of a company and the record in the stock market of the public's guess as to that good or bad fortune may be expected to affect the price at which the company's bonds will sell. Then, too, there are differences in the terms of

1. Fashion, prejudice, rumor concerning the character of the security, are important market influences. See Hartley Withers, *Stocks and Shares*. 318, 319.

payment of a bond, some of which, like the promise to pay in gold, are of little practical significance, while others, like the callable feature, are of real importance. Differences in maturity date that are hardly noticed when rates are fairly steady become matters of moment when a marked rise or fall is expected. For example, when yields are high and there is strong probability of a lower interest rate in the future, the bonds having long terms to run are the more desirable. In the case of an issue that falls due in less than a year, the mere fact that the return to the investor is to consist almost entirely of the payment of the principal brings the price near to par, whatever the coupon rate and whatever the market yield on securities of the same general type. The denomination of a bond is a matter of importance to some investors. A new market among small investors has been opened up by the issuing of long-time bonds in \$100 as well as \$500 and \$1000 pieces. As income tax rates have soared, the large buyer has found more and more alluring the privilege of tax exemption.

These features all affect the desirability of the issues to which they attach. They may be thought of as special utilities or disutilities, each of which has its price or cost, which price or cost is added to the pure interest rate or subtracted from it by the "higgling of the market". How great are these additions and subtractions it is impossible to determine. In seeking the pure interest rate, then, it is best to eliminate as far as possible the special features that call them into being. The selection of bonds whose security is practically unquestioned may be expected to reduce to a minimum variations from the true rate

due to differences in the purchaser's risk. Similarly the problem of differences in yield due to different maturity dates is met by taking bonds whose terms, if not equal in length, have at least some twenty years to run. This, it may reasonably be supposed, answers the purpose, since a buyer will hardly make calculations on the interest rate for more than a generation in advance.

With these general principles in mind, the problem is to select a list of bonds whose yields shall be a fair indication of the market rate. The Commercial and Financial Chronicle quotes prices on the New York Exchange for United States government issues, for municipal and state bonds, for a great number of railroad and a smaller number of street railway, manufacturing, industrial, and other bonds. The bonds of the federal government do not serve the purpose of this study because the issues outstanding during the whole period are all available as security for national bank notes and this acts upon their prices in incalculable ways.¹ Another objection lies in the fact that trading in these bonds has been so irregular that for many months there are no

1. The issues are:

<u>Name</u>	<u>Amount Outstanding June 30, 1920.</u>
cons gold 2s of 1930	\$599,724,050
gold 4s of 1925	118,489,900
Panama Canal 2s of 1936	48,954,180
Panama Canal 2s of 1938	25,947,400

Report of the Treasurer. 1920, p. 1360. And see Moody's Analysis of Investments. 1921. Part IV. 338.

In regard to the effect of the circulation privilege Mitchell says: "National bonds while quoted every month, are prevented from reflecting accurately general market conditions by the requirements of the National Banking Act." Business Cycles. 140.

quotations. The Panama Canal 3s of 1961, issued in 1911, do not carry the circulation privilege, but here, too, quotations are scanty.¹ With the appearance of the Liberty loans the situation is changed, of course. These bonds are not used as security for notes, they far outweigh in volume all previous issues, and quotations representing a considerable number of transactions are available every month. But an index based upon Liberty bond prices would cover only the last four and one-half years of the period.

The trade on the Exchange in state and municipal bonds is slight. New issues are usually marketed through bond-houses and the bond departments of banks and trust companies, and once absorbed they find their way onto the open exchange in small lots only. Accordingly, though quotations are available,² little reliance can be placed upon them. A study of some twelve or fifteen issues from the quotations published in the State and City section of the Chronicle, 1914-1920, led to the conclusion that only in the case of New York city and state and Boston and Massachusetts bonds was there a sufficient volume of active trading to make the yield figures significant. But there are two serious objections even to an index constructed from quotations of selected bonds of these states and municipalities. In the first place the index would probably give undue weight to the influence

1. Until June 15, 1917, the date of the First Liberty Loan, the only other United States bond issue was a small one (3s of 1946) in which there was practically no trading on the exchange. Report of the Treasurer, and Moody's Analysis of Investments.

2. Mitchell did not hesitate to bar out state and municipal bonds on the ground that quotations are unsatisfactory. Business Cycles. 140.

of political situations in the issuing communities, particularly if those situations had any bearing upon public debt policy, and, secondly, the fact that municipal and state bonds are exempt from federal taxation ¹ has made it possible to sell them at disproportionately low yields during the years of high and advancing income tax rates.

Of the three important groups that remain ² - railroads, industrials and public utilities - railroads have long been considered the most stable and the most secure. It is true that opinion has changed somewhat in recent years. It has been stated that railroads have lost and the other two groups have gained in favor. ³ The reputation of the railroads has suffered, it is thought, from government regulation, from the refusals of the Interstate Commerce Commission to grant rate advances, from reports of low earnings, mismanagement and over-capitalization. ⁴

1. The Constitution has given the United States no power to tax state securities. Such securities are, however, subject to the federal inheritance tax, which is held to be a tax, not upon property, but upon the right of inheritance. Judson, F. N. A Treatise on the Power of Taxation. 668, 671.

2. Foreign government bonds have been omitted from the list of possibilities because the number of these securities available for the earlier years is small and because values on the European loans of the war and post-war years are undoubtedly disturbed by the foreign exchange situation.

3. A writer in the Commercial and Financial Chronicle, January 28, 1922, p. 355, in discussing the 1921 corporation bond market in Chicago, says that "public utility bonds ruled as the market favorite", taking precedence over industrials, "the favorite of a former day".

4. J. M. Clark, in an article published in April, 1920, said: "The railroads of the country are at present seriously overbonded. Before the war the net capitalization in the hands of the public was some three-fifths bonds, and with the added debt to the government, the proportion will apparently be about two-thirds when the roads go back to their private owners. This is too much funded debt: it leaves too narrow and uncertain a margin of income above

Doubtless there is truth in the claim that railroad investments are not as well secured as they have been in the past, and it is even probable that industrials and public utilities have enjoyed a relative gain. But if advantage in the yield basis upon which securities can be marketed be taken as an indication of their re-¹pute, the railroads are still in the lead.

the fixed charges. Under such conditions as these, both bonds and stocks are found to be unduly speculative and cannot command as good prices as they could if there were fewer bonds." 28 Jour. Pol. Econ. 279.

1. An investigation was made of the yields on ten industrial and public utility issues for three sample months: January 1919, June 1921, and December 1921. The results were compared with similar figures for the ten railroad bonds finally chosen as an index. If one considers the data representative, he must conclude that, even in the case of high grade issues, public utilities and industrials sell on a higher yield basis than railroads and are less stable in price. The yields on these bonds, computed from quotations given in the Financial Review for 1920 and in the Commercial and Financial Chronicle for January 7, 1922, with the arithmetic means for each of the two groups, are given in the following table:

	Jan. 1919	June 1921	Dec. 1921
Amer. Agr. Chem. 1st 5s of 1928	5.20	6.60	5.62
Amer. Sm. and Ref. 1st 5s of 1947	5.59	6.99	5.92
Armour and Co. 1st r.e. 4½s of 1939	5.51	6.68	5.70
Baldwin Locomotive 1st 5s of 1940	4.91	5.67	5.19
Corn Products 1st 5s of 1934	5.01	6.19	5.32
General Electric deb 5s of 1952	5.01	6.10	5.29
Wilson and Co. 6s of 1941	6.19	7.61	6.40
N.Y. Gen. El. L.H. and P. 5s of 1948	5.50	6.41	5.59
Northern States Power 5s of 1941	5.81	7.02	5.92
Pac. Gas and El.- Cal.G.and E. 5s of 1937	5.39	6.60	5.60
Arithmetic mean of industrial and public utility issues -	5.41	6.59	5.66
At. Top. and S. Fe 1st 4s of 1995	4.76	5.41	4.70
Atl. Coast L. 1st 4s of 1952	4.95	5.77	4.99
Cent. of N. J. gen 5s of 1987	4.82	5.35	4.84
C.B. and Q. Ill. div. 4s of 1949	4.93	5.48	4.86
N.Y.C. 3½s of 1997	4.91	5.51	4.73
N. P. prior lien 4s of 1997	4.74	5.44	4.78
Penn. 4s of 1948	4.82	5.54	4.92
Reading gen 4s of 1997	4.67	5.49	4.92
S. P. - Cent. P. 4s of 1949	5.22	6.17	5.25
U. P. 4s of 1947	4.77	5.54	4.86
Arithmetic mean of railroad issues -	4.86	5.57	4.89

Certain criteria were set up for determining the choice of the ten railroad bonds that were to serve as the basis of this study. It was desirable in the first place, that the issues be quoted on the New York Stock Exchange every month of the fourteen years, and also that these quotations represent a considerable volume of active trading. The amount of an issue outstanding is a rough indication of the probable volume of transactions, and therefore an attempt was made to choose large issues.¹ Of more importance was the requirement that the bond be of high grade and established security. Moody's ratings were given serious consideration in this connection, no bonds being selected that were not listed Aaa or ~~Aa~~² with a high factor of safety. The nature of the lien which the bondholder possesses is a matter of first importance in determining the security of his investment, and hence, as far as possible, issues were chosen that carried a first lien on valuable mileage. The income-producing power of a road is only less important to the bondholder than to the stockholder, and since this income-producing power is at times affected by local conditions, a wide geographical distribution of roads was sought. Because differences in yield often result from differences in maturity date, no bonds were chosen whose maturity date was within

1. In many cases it is far from being a reliable indication, for a small speculative issue may be represented on the exchange by a far greater volume of sales than a large issue that is bought almost entirely for investment purposes, but, other things being equal, the greater the volume of bonds outstanding, the greater the probable volume of transactions.

2. Moody places bond issues in eleven categories according to their security, Aaa and ~~Aa~~ being the highest. His factor of safety is "the percentage or proportion of available income remaining after the payment of the interest on the issue (and on other issues having an equal claim) has been taken care of." Moody's Analyses of Investments - Steam Railroads, 1921, p. 29.

twenty-five years of the last year of the period under investigation. Not every criterion, however, could be followed so implicitly. In many cases rigid adherence to one criterion would have eliminated an issue that was particularly desirable from another point of view, and in the end there was not a wide range of choice. The final list is given on the following page.

Price quotations on these bonds were taken from the Commercial and Financial Chronicle's annual reviews, where high and low prices for the month are given. For August, September, and October, 1914, there are no quotations, and for November only nine of the issues are quoted. The reason is, of course, that from July 31 to November 28, the New York Stock Exchange was closed to bond trading. This is a serious gap, but no attempt has been made to fill it with interpolated figures, since there is no adequate basis for making such interpolations. Prices of the Pennsylvania

1. This fact and the undeniable superiority of the issue itself justify the selection of the Pennsylvania 4s of 1948 on which there are no quotations for the first four months of 1908.

2. Five of these bonds are included in Kemmerer's list of twenty-seven, namely the Atchison, the Central of New Jersey, the New York Central, the Northern Pacific, and the Union Pacific. Kemmerer. Seasonal Demands for Money and Capital. 174.

Only one of them, the Central of New Jersey bond, stands in Mitchell's original list, but three others, the Atchison, the Pennsylvania and the Reading, were chosen by him to replace bonds of financially embarrassed roads, the change being made in the quotations for January, 1913. Security Prices and Interest Rates. 24 Jour. Pol. Econ. 144. For Mitchell's list see Business Cycles. 142.

3. Mitchell's assumption, 24 Jour. Pol. Econ. 143, that prices remained at the July level, seems unwarranted since the very reason for the closing of the exchange was the dread of a slump in prices due to wholesale marketing of European holdings of American securities. On the other hand, quotations derived from "outlaw trading" during these months would hardly be reliable even if they could be obtained.

TEN RAILROAD BOND ISSUES

Name of Issue	Authorized (thousands)	Outstanding (thousands)	Tax features	Legal for investments	Moody Rating	Moody Factor of safety
Atchison, Topeka and Santa Fe general gold 4s of 1995	\$165,491	\$150,635	Company pays normal income tax of 2%	Of savings banks	Aaa	87
Atlantic Coast Line first consolidated gold 4s of 1952	80,000	51,326	"	"	Aaa	85
Central Railroad of New Jersey general gold 5s of 1987	50,000	45,091	"	"	Aaa	69
Chicago, Burlington and Quincy Illinois Division first gold 4s of 1949	85,000 *	33,976	Company does not pay tax	"	Aaa	90
New York Central and Hudson River refunding gold 3½s of 1997	100,000	94,000	Company pays normal income tax of 2%	"	Aaa	86
Northern Pacific prior lien gold 4s of 1997	130,000	110,132	"	"	Aaa	87
Pennsylvania Railroad consolidated sterling and dollar 4s of 1948	100,000 *	39,837	Company pays normal income tax of 2% and issue is exempt from Pa. state taxes	"	Aaa	93 96
Reading general gold 4s of 1997	135,000	93,269	"	Of Baltimore trust funds	Aaa	83 79
Southern Pacific -- Central Pacific collateral gold 4s of 1949 <i>first ref</i>	100,000 36,819	98,753 34,101	Company pays normal income tax of 2%	<i>and savings banks</i> No-statement	Aaa	87 93
Union Pacific railroad and land grant 4s of 1997	100,000	100,000	"	Of savings banks	Aaa	94

* Figures include more than the issue listed.

Data in this table are from Moody's Analyses of Investments - Steam Railroads, 1916, 1921.

4s are lacking for the four months in 1908 preceding their issue. The bonds were not in existence; no scheme of substitution seems justifiable. For July, September, October, November, and December, 1910, there are no monthly quotations of the Southern Pacific bond. Weekly statements, in the Chronicle, of bond transactions on the New York Stock Exchange indicate that there was some trading in the issue, however, and figures for the five months were taken from those weekly statements. ¹ In June, 1918, no sale was recorded for the Pennsylvania bond. In this case a yield figure was interpolated. ² Quotations on the Pennsylvania

1. The Chronicle gives each week the bid and ask or the sale price for Friday, and the week's range or, in case there have been no sales during the week, the price of the last sale. Its monthly high and low quotations are quite consistent with the weekly figures in most cases and are evidently compiled from the more complete data upon which the weekly figures are based. It does not follow, however, that the month's range can be read from the weekly data, for frequently one week falls partly in one month and partly in the following month. The high and low prices for that week's range cannot be assigned with certainty to either month. In the present instance the high and low values selected are those quoted for the weeks falling entirely within a single month. The following table shows that the difference between this range and the greatest possible range is slight, except in the case of the July quotations.

QUOTATIONS ON THE SOUTHERN PACIFIC BOND
1910

	Range selected	Possible low	Possible high
July	94-1/2 96-3/8	91	96-3/8
Sept.	96 97-5/8	95-7/8	97-5/8
Oct.	97-1/2 98-1/4	97	98-1/4
Nov.	96-3/4 97-3/8	96-5/8	97-1/2
Dec.	96-3/8 97	96-3/8	97-1/2

2. The method of interpolation was as follows: The sums of the yield figures for the other nine bonds were found to increase from May to July; that is, the sum for June was greater than the sum for May and the sum for July greater than the sum for June. Likewise, the yield on the Pennsylvania bond was higher for July than for May. The June yield for the Pennsylvania bond was set so that the difference between the June and the May yields on that bond should

bond for December, 1919, were not given in the annual review, but¹ were taken from the Chronicle's weekly figures for that month. An evident misprint in the review, in the low quotation for the Northern Pacific issue, May, 1920, was corrected on the authority² of the weekly data.

An arithmetic average between the monthly high and low quotations was computed for each bond and the yield calculated from that. Undoubtedly this method involves a certain inaccuracy, for the majority of the transactions in a given month may have been made at a price much nearer one extreme than the other. However, there seemed to be no better method that did not involve an undue amount of labor, and even disregarding this practical aspect of the matter, it is doubtful whether the additional accuracy would be of value. Yields were calculated to two decimal places. In some instances the final digit was indeterminate. It was impossible, for example, to say with certainty whether it was a seven or an eight.³ If there was reason to believe that either of the two figures was correct, that one was taken; otherwise the choice was arbitrary.

bear the same proportion to the difference between the July and the May yields, as the difference between the June and the May sums for the other nine was found to bear to the difference between the July and May sums.

1. The minimum range for the month was 82-84. This range rather than the possible range $82-84\frac{1}{4}$ was taken.
2. The review gave 79 low and $73-1/8$ high. It appeared that 69 was the correct low quotation.
3. In no case was the range of error wider than this. All such yield figures are marked with the letter "x" in the tables.

In order to obtain a single rate representing the yields on all ten bonds, it was necessary to strike an average of those yields for each month. The question whether the proper average for a series like this is the arithmetic or the geometric, is a controversial point in statistical theory that cannot be discussed here. C. M. Walsh has pointed out the fact that in some cases the arithmetic, in other cases the geometric average may be the nearer of the two to a theoretically true mean. He gives rules for determining the choice of an average to represent a distribution, saying that the terms may group themselves in three ways around the true mean: "...either (1) the terms extend both above and below without any conceivable or assignable limits, and then the arithmetic average must be used; or (2) there is a definite lower limit at or above zero and no upper conceivable or assignable limit, and then the geometric is the right one to use; or (3) the terms either cannot, or at least so far as we find in experience do not, fall below some figure, and do not, or cannot, rise above some other figure, which two figures serve as limits either necessary in the nature of the things or found in practice to exist; and then, when enough data are provided for examining their orderly dispersion, if their mode is found nearer to the arithmetic average, the arithmetic average is the proper one to use, and if their mode is found nearer to the geometric average, the geometric average is the proper one to use." The series of railroad bond yields seems to fall into the second of Walsh's categories. It has been argued, to be sure, that in certain cases the pure interest rate (the

theoretically true mean of our series) may be negative. But the reasoning holds for the individual's rate of time-preference rather than for the market rate of interest. The man who has a large present income, who has made scanty provision for the future and who has a lively sense of the insecurity of material possessions, may be willing to lend money waiving all interest payments and even paying something for an assured return at some future date. There may even be, conceivably, a large group of such persons. But their costless accumulations are not the marginal savings that concern the market rate of interest. In modern society such a thing as a negative rate of interest is unthinkable. Taussig has noted the steadiness of the interest rate since the industrial revolution. He thinks it improbable that within the next twenty or fifty years the volume of accumulations can be so great as to cause the rate to fall below 2 per cent.¹ It may well be objected at this point that Taussig's observation of the steadiness of the interest rate implies an upper as well as a lower limit to its fluctuations, and so violates the second of Walsh's conditions. But the objection does not seem valid. In the first place, Taussig expressly states that 2 per cent is the probable minimum, while he sets no maximum, refusing to predict the extent or duration of the rise in the rate in the twentieth century. And, in the second place, the rate has not fallen below 2 per cent,² while experience during the war years

1. In the eighteenth century Holland and England borrowed at 3 per cent, he says, and since then the "long period rate on permanent investments" has moved within a range of 3 to 6 per cent. Principles of Economics. 2nd ed. (rev.) ii. 26, 27.

2. The call loan rate has frequently been under this figure, but the present discussion is concerned with investment rates.

has shown us the possibility of striking advances in the rate on the most conservative investments. It would seem, then, that the rate of interest, under present conditions, cannot fall below 2 per cent, while it can and does rise above rates that previous experience would have led us to assign as upper limits.¹ If this is the case, Walsh's second rule applies, and the geometric mean is the one to use.

The point is interesting and warrants further investigation, but, for the data in hand, it is of no immediate practical importance. The geometric average was selected for the index of the yields of ten railroad bonds, but both means were computed and they proved to be so near each other that in most instances the differences do not appear in figures rounded off at the second decimal place.²

So far it has been taken for granted that the yield on bonds which is represented by the prices at which they sell on the Stock Exchange is in fact the rate of interest on long-time loans. But the point does not stand without examination, for transactions on the Stock Exchange are actually transfers of securities from lenders of funds to lenders of funds. The fluctuating rates obtained from market quotations are indices, not of the price which the borrowing enterprise must pay for loanable funds, but

1. In the Annalist for Jan. 6, 1919, the National City Company published in an advertisement, the yields on more than twenty-five issues of bonds of various kinds. The yields range from 4.40 for a municipal bond to 7.00 for a public utility and 7.10 for a foreign government issue. In a similar advertisement by the same company just one year later the bond that was lowest on the list yielded between 3.25 and 3.50 per cent, while the highest yield bond was offered to net more than 9.75.

2. Tables of average monthly prices, individual yield figures, and the arithmetic and geometric means of the yields on all ten bonds are to be found in the Appendix.

indices rather of the price which is necessary to induce new lenders to take over the burden of waiting.

One is led to ask whether a study of the rates actually paid for new capital would not have served our purpose better. But such a study presents difficulties that are at present insurmountable. In the first place, while it would be possible to find several new issues for every month of the period, and while the Chronicle usually gives the basis on which such issues are marketed by the underwriting houses, the labor involved in assembling the data would be very great. And, once assembled, the items would not be comparable. For a few of the months it would be possible to get quotations of important issues of highly reputable corporations, issues that command a wide market because of their very volume. But for the other months the listings are few, and the yields, because of the obscurity or poor standing of the issuing road, disproportionately high. Then, too, there is the matter of syndicate profits. The price which the investing buyer receives for the loan funds which he supplies is not the price which the corporation pays, and it is impossible to allow for the middleman's share since there is no way of discovering what it is and no way of¹ making sure that it bears any fixed proportion to the total price.

In the place, then, of the yield on new loans, we have taken the yield on transactions in bonds that have been for some time on the market. Is this substitution justifiable? Mitchell did not

1. For information concerning the sales practices of bond houses the writer is largely indebted to conversations with a member of the bond department of a large bank in Minneapolis.

question it.¹ But the fact that he saw no difficulty here is negative evidence after all. It seems desirable to show, not that the absolute amounts of the two rates are the same, for it is with fluctuations that we are concerned, but that the rates move together. Obviously this cannot be done by actual comparison. One must fall back upon a line of general reasoning.

The price which the borrowing corporation pays for its capital is fixed in the first instance by the terms set by the house or houses of purchase. This price, the yield basis, that is, upon which these first purchasers insist, must be higher than the yield basis which investors demand by a margin that will allow both expenses of transacting the deal and a reasonable profit to the investment banking houses.² Their calculations of the yield basis which investors will demand are determined to a very great extent by the trend of the market for old issues of similar securities. They will make allowance, to be sure, for the hesitancy of the investor to purchase a new issue, a hesitancy that must be overcome by advantage in yield. But there seems to be no reason why this penalty for newness should not be a fairly steady thing, and if it is, changes in the yield on market transactions in old issues will be accompanied by roughly corresponding changes in the yield paid by the original borrower, provided only that the

1. He says: "For long-time loans no market rates of interest are regularly quoted. A good substitute for such quotations, however, is afforded by the net rates of interest realized by investors who lend money to governments or business enterprises by purchasing bonds." Business Cycles. 140.

2. They do not usually speak of it in these terms but say rather that they take two, three or four points on the price of the bond, but the terminology is not a matter of consequence.

stock exchange investor is a fair representative of the buying public.

Now it is true that some issues reach the market only in very small lots. Many investors - insurance companies, savings banks, charitable or educational institutions, individuals who are purchasing for permanent holding - buy their securities from bond-houses and do not sell them for years, in some cases keep them until they mature. Is the semi-speculative trading on the exchange of any use as an indication of what yield such investors will demand? It probably is, for unless one supposes them to be childishly trustful, he must believe that they will follow the market, and if they do, they will insist upon getting an interest return on their investments that is not far from the market rate. On the other hand, the selling house will be unwilling to take a lower price from its clients than it could secure by placing its bonds upon the open market.

If there is validity in this reasoning, the yield on new issues fluctuates with the yield on old, and we are justified in taking the trend of yields realized in market transactions in railroad bonds as an index to the trend of interest rates paid in the long-term investment market for the use of loanable funds.

CHAPTER III

THE RATE OF INTEREST1908-1914

The period from 1908 to 1921 may well be divided at the point where the outbreak of the European war threw the money markets of the world into confusion and caused the stock exchanges of Paris, London, and New York to close. To study separately the seven years that preceded this event and the seven years that have followed it is not only convenient¹ but logical. The rate of interest on investment loans was remarkably stable during the earlier years. From January, 1908, through March, 1913, the average rate on ten railroad bonds did not go above 4.20 or below 3.90 per cent, and although it was distinctly higher from March, 1913, until the closing of the Stock Exchange in July of the following year, its fluctuations were well within .15 of one per cent, and the highest point reached was 4.35. Contrast this with its trend in later years. During 1915 and 1916, to be sure, the rate moved within a range only slightly wider than it had known before, but from January, 1917, to the end of the period, its fluctuations were violent, carrying it to the high point of 5.69 in June, 1920, and to a second peak of 5.57 just one year later. Still another reason for dividing the period at 1914 lies in the change in the character of our investment market that resulted from the diversion of European capital to the enterprise of war.

1. In the index of railroad bond yields there is a gap that cannot well be bridged, from August to December, 1914.

Europe's war-time need of funds expressed itself first in the sale in this country of a great volume of American securities that had been held abroad,¹ and later in foreign government loans that were floated in our markets. The importance of this reversal of the flow of investment funds will be discussed in the chapter that deals with the years from 1915 to 1921. At present we are concerned with the earlier period.

After the panic of 1907 the business life of this country had suffered a severe reaction. At the opening of the new year prices had fallen far and were still on the decline,² production was heavily curtailed,³ and trade was stagnant.⁴ Business failures had been many and serious in the closing months of 1907,

1. See p. 93 *infra*.

2. Bradstreet's index shows a drop from 9.13 in March, 1907, to 8.39 in January, 1908, with a further fall in the following months to the low point, 7.72, in June. (The index, published weekly in Bradstreet's, gives figures to four decimal places which are quoted here correct to two decimal places only.) Mitchell believes that neither this nor other indices reveal the full extent of the fall, since "there are broad hints in the contemporary issues of the financial periodicals that heavy reductions from list prices were quietly made in private negotiations by overstocked houses, as one means of raising money". *Business Cycles*. 533.

3. The January output of pig iron in the United States was less than half that of the previous October, the numbers being, respectively, 1,045,000 and 2,336,000 tons. The *Harvard Review of Economic Statistics*, Jan. 1919, p. 66, gives monthly data from the Iron Age. Mitchell, in quoting similar figures, says that "other trades making similar goods suffered almost as severely", though the shrinkage in staple articles of consumption was not so great. *Business Cycles*. 82.

4. A. D. Noyes says that there was a "shrinkage in volume of general trade a month or two after the panic to barely 25 per cent of what it had been before". A Year after the Panic of 1907, 23 *Quar. Jour. Econ.* 189. Idle freight cars in January were reported as 350,000. *Com. and Fin. Chron.* Jan. 2, 1909, p. 8.

but the tale was not yet told.¹ The banks of the country, particularly the banks of New York, had gone through some extremely trying weeks and had resorted to such expedients as the issuing of clearing-house loan certificates and other forms of emergency currency, and the import of gold from Europe at high exchange rates.² Prices on the stock market had broken under the stress of panic conditions.³

Industrial depression continued throughout the greater part of the year. In the cotton goods trade where there were price cuts, as in the steel industry where conferences among manufacturers resulted in the maintenance of existing prices, buying was light.⁴ The railroads suffered from the general inactivity, their gross earnings falling off heavily for the first six months and only partially recovering later in the year.⁵ In agriculture alone is the record a satisfactory one. The crops were large and, except for cotton, sold at good prices.⁶ Partly because of this

1. ... "the number increased as the panic relaxed after the first of the year". Business Cycles. 530.

2. Ibid. 518, 524.

3. By January preferred stocks and bonds had recovered but common stocks were still exceptionally low. Ibid. 524.

4. Com. and Fin. Chron. Jan. 2, 1909, p. 8.

5. After the first six months "the losses gradually diminished, though they were still large on the roads running through the manufacturing districts, like the Pennsylvania railroad". Ibid. p. 6. There were a number of receiverships in January and February, and dividends were cut by several roads, the most notable instances being the cut from 6 per cent to 5 per cent by the New York Central, and from 3½ per cent to 3 per cent by the Pennsylvania. Ibid. 8, 10, 11, 12, 16.

6. Ibid. p. 6.

stimulus the volume of production increased toward the end of the year, but the revival was far from being a complete one.¹

In rather surprising contrast to the industrial situation we find that financial recovery was rapid. By the eleventh of January the New York banks had replenished their reserves so that they stood above the required minimum and at the end of the month there was a substantial surplus. Meanwhile the clearing-house loan certificates were being retired, and in spite of gold exports² and gradual withdrawal of government deposits, money was plentiful. Interest rates on call loans³ and on commercial paper fell sharply during the first few months. They remained low and cash reserves⁴ steadily increased.

The index of yields on ten railroad bonds, after a slight rise during the first months of 1908, from 4.16 in January to 4.19 in March, declined steadily to a low point in 1909. The actual range of the movement was not very great (4.19 to 3.91) but the trend was unmistakable. In July the yield had reached 4.07 per cent and from that time on the conditions in the investment market must have been quite satisfactory to borrowers for practically all the new

1. After steady increase during the months from June to December the output of pig iron at the end of the year was still under the figure for November 1907 and less than 75 per cent of the figure for October. Harvard Review of Economic Statistics, Jan. 1919, p. 66.

2. Com. and Fin. Chron. Jan. 2, 1909, p. 8, 12, 13.

3. The real advantage to the merchant was greater than appears in any quoted rate, since high commission charges for loans had been levied in many cases during the time of greatest stringency. Ibid. p. 10.

4. On June 27, the surplus reserves of the New York clearing-house banks reached "the highest figure in fourteen years". Ibid. p. 7.

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issues took the form of long-term bonds. The encouraging success of several flotations of new security issues and the ease in money led to a general rise in stock and bond prices that was practically continuous throughout the year. Every month a large volume of new issues was absorbed, and from May to the end of the year the Chronicle makes frequent mention of oversubscriptions. The volume of new financing in 1908 was great because during the months of money tension in 1907 corporations had been unwilling to float new loans or, hard pressed, they had issued 1-year notes, hoping to be able to replace them with long-term bonds sold on a lower yield basis. But the flood of deferred and refunding issues

1. The greater part of the short-term financing in the investment market in 1908 was done in the first half of the year. Of a total volume of note issues of \$187,516,000 mentioned by the Chronicle, only six issues, representing \$16,230,000, were put out during the last six months. Com. and Fin. Chron. Jan. 23, 1909, p. 196.

2. The Chronicle notes interruptions to the upward swing in February and September and ascribes them to recurring fear of Roosevelt's radicalism. Ibid. Jan. 2, 1909, p. 7. The characteristic emphasis on political causes is to be discounted, but that there actually was a February slump is apparent from Mitchell's table of the prices of forty transportation stocks. Probably the decline was due to the large number of railway receiverships at this time, as well as to President Roosevelt's letter to the Interstate Commerce Commission. The reaction in September does not show in Mitchell's figures. Business Cycles. 185.

3. Com. and Fin. Chron. Jan. 23, 1909, p. 193. The aggregate, \$648,870,000, of "new capital" bond issues listed on the New York Stock Exchange was greater by 160 per cent than the volume of similar issues listed in 1907, and was the largest in the decade. Old issues listed for the first time and bonds to the amount of \$128,295,000 to replace maturing or callable securities bring the total up to \$872,958,000. The bonds are classified as follows according to the nature of the issuing corporation:

Railroad	\$506,160,000
Street Railway	65,076,000
Miscellaneous	301,722,000

The third class includes industrial, government, state and municipal issues. Not all new bonds are listed on the New York Stock

was readily taken up.

The explanation of the steadily improving bond market lies largely in the condition of the banks. Money stringency had passed away at the first of the year. Merchants and manufacturers, because of the trade depression and the fall in prices, had not resumed their borrowing on anything like the former scale. Accordingly, the banks were in possession of a large volume of idle funds which they were willing to lend at very low rates. The ever ready broker found employment for this cheap money in stock exchange speculation. There resulted a rise in prices that was quite out of proportion to any immediate prospects of business profits, and a part at least, of the speculative buying was diverted to the bond market. Moreover, even buyers who were not speculating for a rise found it well worth their while to borrow at low rates, buy bonds, and secure the advantage in interest payments.

Exchange. The class of state and municipal bonds is poorly represented, and, of the issues of private enterprises, in addition to the vast and undiscoverable quantity of obscure local bonds that rarely find their way onto organized stock markets, there are each year, several reputable issues of national importance that are not listed in time to appear in the year's totals, and others, important but perhaps of questionable security, that the Exchange refuses to put on its "regular list" from which the annual figures are compiled; in still other cases reputable bonds are excluded from the list because the issuing corporation refuses to furnish information which the Exchange demands. The Chronicle does not attempt to estimate the amount of such unlisted issues, but names a few of them; in 1908 the most notable seems to have been a Union Pacific loan of \$50,000,000. The Chronicle does attempt, however, a compilation of the important note issues for the year recording in all, \$171,175,000 in railroad and street railway bonds and \$16,341,000 in industrials, a total, that is, of \$187,516,000. This total should be added to the total of listings on the Stock Exchange in order to arrive at an approximate figure for the volume of new financing, for only one of the note issues was listed. Ibid. pp. 193-196.

1. A. D. Noyes. A Year after the Panic of 1907. 23 Quar. Jour. Econ. 211, 212.

It is probable, too, that still another group shifted their investments from stocks to bonds. Such action is, by tradition, a feature of the depression period.¹ From the nature of the case it is impossible to secure figures to prove it, but at least one may be sure that in 1908 with a rising, speculative market for stocks, the conservative owner was able to sell his holdings to advantage and invest the proceeds in bonds. Furthermore, the demand did not come from American buyers alone. In the early part of 1908 European investment took the form of purchases for foreign account on the New York Exchange. These purchases,² however, were partly counterbalanced by sales later in the year. More significant and more permanent were the investments made when American loans were floated abroad. It is impossible to set a figure for the total volume of such flotations but they seem to have furnished an important addition to the supply of long-time funds available in this country.³ Rates on long-term bonds were such that American corporations were able to borrow to advantage in European markets. But at the same time market rates for bank loans were somewhat higher there than in the United States. The result was that the investment bankers who had placed new American issues abroad made the necessary payments to the borrowing corporations out of funds available in this country, and did not

1. "Business depression disposes investors to diminish their purchases of speculative securities and to increase their purchases of gilt-edged bonds.....This rule held of the hard times of 1908 when compared with the flush times of 1907". Mitchell. Security Prices and Interest Rates in 1900-1912. 21 Jour. Pol. Econ. 511.

2. Com. and Fin. Chron. Jan. 2, 1909, p. 7.

3. Idem.

withdraw the proceeds of bond sales from Europe at once but left this money to be loaned temporarily in London, Paris, and other European centers.¹ In the United States this amounted virtually to a transfer of funds from the bank loan- to the investment-market. Low rates in the one market effected, indirectly, low rates in the other.

During 1909 and the first part of 1910 business experienced a marked and steady improvement. Construction work in the building months of 1909 was more than usually large and had decreased only slightly the following year.² In May, 1909, it was reported that many steel mills and furnaces were working up to eighty and ninety per cent of capacity.³ In September, manufacturers of steel products were placing orders abroad for raw materials.⁴ The output of pig iron that month passed the high point of 1907 and for eight months thereafter was of record-breaking proportions.⁵ In October the demands upon our transportation systems were sufficient

1. In August, however, it was being called back to the United States. Com. and Fin. Chron. Jan. 2, 1909, p. 20.

2. According to Babson's index of building permits in twenty cities. Harvard Review of Economic Statistics, Jan. 1919, p. 74.

3. Com. and Fin. Chron. Jan. 1, 1910, p. 14.

4. Ibid. p. 19.

5. Mitchell ascribes the boom in the steel industry largely to the February cut in prices and the resulting scramble of buyers for orders. Undoubtedly many purchases had been deferred in expectation of such a cut, and the increase in volume in steel with the corresponding increase in iron is not typical of industry in general. However, Mitchell finds that other indices, such as railway gross receipts and clearings outside of New York, point to a steadily increasing volume of business. Business Cycles. 83.

to call into service all idle freight cars.¹ Prices advanced, reaching peaks in January and April of 1910 and maintaining a fairly high level throughout that year.²

The increasing demand for funds incident to this expansion did not have any great effect on the money market for some time. The monthly average rate on 60-to-90 day commercial paper in New York declined from 3.68 in January, 1909, to 3.25 in June.³ It advanced sharply in August, but even in the closing months of the year, when commercial paper rates usually reach high levels, it did not go far above 5 per cent. The rate on 4-to-6 months paper followed a similar course. The monthly average of the call loan rate on the New York Stock Exchange was under 2 per cent for all but one of the first seven months of the year, and it did not rise above 3 per cent until October.⁴ In March interest rates were lower here than abroad and exports of gold were unusually large.⁵ The slight rise in rates that occurred during the following months,⁶

1. A statement to this effect was made on October 27 by the American Railway Association. Com. and Fin. Chron. Jan. 1, 1920, p. 20.

2. According to Bradstreet's index. The peak came in March for both raw materials and their manufactured products according to Mitchell's "twenty pairs". Business Cycles. 101.

3. This was the lowest point it reached in the seven years, 1908-1914.

4. The Harvard Review of Economic Statistics. Jan. 1919.

5. They amounted to \$21,252,000. Annual Report of the Treasurer of the United States.

6. The monthly average call loan rate rose from 1.85 in March to 1.94 in April, returning to 1.84 in May, and while there was no advance in the rate on 60-to-90 day paper at this time, there was a halt in its otherwise steady decline. Harvard Review of Economic Statistics. Jan. 1919.

caused the trust companies to enter the market, whereupon the rates promptly fell.¹ May brought still easier money. In August and September, however, the seasonal demand for funds from the interior and withdrawals by Canadian banks, ~~together with~~^{caused} the rates, ~~rose~~^{to rise} to levels which they had not known since the early months of 1908. The Chronicle finds the seasonal demand for funds in the interior² and Canadian bank withdrawals largely responsible for the rise. But there seems no reason for doubting that increasing trade demands for funds were a contributing factor. During November money rates advanced still further, and for the same month we have records of the calling of out-of-town loans, from which one might conclude that correspondent banks had been finding new and profitable³ opportunities for lending in their own localities. The rise in money rates attracted foreign funds to the New York market, but their entrance made little impression.⁴

Meanwhile the rate on railroad bonds had risen steadily but not very far. It had advanced from 3.91 in February to 3.98 in

1. Com. and Fin. Chron. Jan. 1, 1910, p. 13. When rates were very low, the New York trust companies often withdrew from the market, placing their funds with commercial banks and drawing the 2 per cent interest that is paid on such deposits.

2. Ibid. p. 18, 20.

3. Total reserves of national banks in New York had amounted to \$325,100,000 on June 23. On November 16, they had been reduced to \$253,600,000, and the ratio of reserves to deposits had fallen in the same period from 27.3 to 25.5 per cent. Report of the Comptroller of the Currency for 1912. Data presented before a House sub-committee in the Money Trust inquiry seem to indicate a very considerable withdrawal of funds by out-of-town banks. Thirty "representative" down-town New York banks reported deposits of out-of-town correspondents to have been \$567,875,000 on July 1, 1909, while for November 1, thirty banks (presumably the same institutions) reported \$433,145,000. Com. and Fin. Chron. Dec. 21, 1912, p. 1656, 1657.

4. Com. and Fin. Chron. Jan. 1, 1910, p. 20, 21.

November. There it remained for four months. After a dull period in March the volume of trading in bonds on the New York Stock Exchange had increased greatly, the figure for April being much larger than for any but the last two months in 1908.¹ It seems probable that investors who had bought in 1908 when bond yields were still above 4 per cent, were selling now, glad to realize on the price increase and eager because of the improvement in business, to put their money to more active use. For a long while the rise in yields was slight, buyers evidently being ready to take these offerings at only a trifling price advantage. The low money rates that persisted until August, undoubtedly go far to explain the situation.

Call loan rates in 1910 fluctuated widely. Rates on commercial paper were higher on the whole than they had been for some time, the rate on 60-to-90 day paper rising from a low point of 4.44 in February to 5.56 in October.² The most interesting feature of the money market was the divergence between the rates on commercial paper which were high and the call loan rate which was exceptionally low. This divergence was due to uneasiness among the lenders. According to the Chronicle, bankers were filled with "vague

1. In April the par value of corporate bonds traded in was \$135,474,500, and the addition of government, state and municipal issues brings the total up to \$138,748,200. The figures for March are \$80,286,000 and \$84,381,000 respectively, for February, \$106,141,500 and \$111,434,600. The increase in the volume of stock transactions was not so great proportionately, but it was striking. The number of shares traded in were as follows: February, 12,337,199; March, 13,650,595; April, 19,055,618. Com. and Fin. Chron. Bank and Quotation Section.

2. See Harvard Review of Economic Statistics, Jan. 1919, for indices.

apprehensions" of money difficulties later in the year, and accordingly were reluctant to loan money on time.¹ The decline of the call loan rate from the first of the year to August, was broken by a sharp rise that began in March, was most striking in April, and continued through May. This movement was reflected in less violent fluctuations in commercial paper rates. It was the usual spring rise exaggerated, it seems, by tremendous exports of gold in April.² These exports were themselves due to the foreign trade situation and to the offering by the Bank of England of a premium on gold.³

The rise in the yield on ten railroad bonds, noted during 1909, continued in 1910. After a pause the first of the year, the index rose sharply in March, seemingly in sympathy with money rates. But the influence of a temporary stress in the bank-loan market is not a sufficient explanation of the decided and continuous rise of bond yields in 1910. From 4.01 in March the index advanced to the high point of 4.08 in July, remaining there the following month. Meanwhile the volume of transactions on the New York Stock Exchange had fallen off astonishingly.⁴ The reluctance of the investor to

1. Com. and Fin. Chron. Jan. 7, 1911, p. 22, 23.

2. They amounted to \$36,284,000, while imports were only \$2,101,000. Annual Report of the Treasurer of the United States.

3. Exports were less than imports by \$19,000,000 in March, and this, together with the Bank of England's premium on gold, led to gold exports in April in spite of the large payments due the United States on account of flotations of new security issues. Com. and Fin. Chron. Jan. 7, 1911, p. 18.

4. The total transactions for the two years were:

1909	\$1,279,404,100 par value
1910	591,769,200 " "

Com. and Fin. Chron. Bank and Quotation Section.

purchase old issues in 1910 was accompanied by a corresponding apathy toward new securities. Many American railroad loans were placed abroad, particularly in the late spring and summer, when investors in this country demanded what were considered exorbitant yields or refused to purchase at all.¹ It was not the railroads alone that felt the stringency in the investment market. No consecutive yield figures on industrial, state or municipal bonds are available. But we are told that industrial corporations were paying higher rates for borrowed funds,² and even states and municipalities were finding it difficult to sell their bonds.³

What were the market forces that produced this situation?

Demand for investment funds in the United States at that time came

1. The following loans, as well as a great number of smaller issues, were floated largely or entirely in European markets:

Chicago, Milwaukee and St. Paul	\$50,000,000
Baltimore and Ohio	40,000,000
New York Central	22,000,000
Southern Pacific	19,000,000

Com. and Fin. Chron. Jan. 7, 1911, p. 7, 17.

The Chronicle cites, as an illustration of the difficulty in placing new railroad bond issues in this country, the case of the syndicate that had underwritten the \$43,686,000 convertible bonds of the Atchison Topeka and Santa Fe. The shareholders, to whom the bonds had been offered in April, had taken only 10 or 15 per cent of the issue, and in June the syndicate was forced to call upon its members for a "first installment". Ibid. p. 19, 20.

2. Business Cycles. 84.

3. Com. and Fin. Chron. Jan. 7, 1911, p. 17, 21.

chiefly from corporate enterprises.¹ And demands from corporate enterprises in 1910 were still heavy. The volume of new issues listed on the New York Stock Exchange was smaller than it had been in 1908 and 1909, but it must be remembered that those were record years for the placing of bond issues.² Moreover, while the total

1. This is indicated by the following figures culled from various sources. They are, for the most part, rough estimates, and are set down here, not because they are thought to be complete but because they are the best available.

INVESTMENT LOANS OUTSTANDING IN THE UNITED STATES IN 1910

<u>Type of Security</u>	<u>Amount</u>
U. S., state and municipal bonds,	\$3,000,000,000
Corporate bonds, including \$8,865,000,000 railroad bonds,	23,000,000,000
Farm mortgages reported by the Census,	1,726,172,851
Other farm mortgages,	1,500,000,000

The figure for U. S., state and municipal bonds, is Sereno S. Pratt's. The figure for corporate bonds is derived from his estimates and the quotations which he gives from excise tax returns. The Work of Wall Street, 49, 50. The figure for railroad bonds is quoted in the Report of the Railroad Securities Commission, Dec. 1911, p. 22, as coming from the statistician of the Interstate Commerce Commission. The first figure for farm mortgages is from the census report of mortgage debt on one class of farms (those operated entirely by owners, 52.7 per cent of the entire number in 1910). Thirteenth Census. Abstract of the Census - Agriculture, p. 292, 293. The last figure is an estimate, necessarily rough and probably too generous, of the unreported farm mortgage debt.

2. The aggregate of "new capital" issues, listed on the New York Stock Exchange in 1908, was 160 per cent greater than for 1907, and the largest in a decade. Com. and Fin. Chron. Jan. 23, 1909, p. 193. Issues in 1908, 1909, and 1910 were as follows:

BONDS LISTED ON THE NEW YORK STOCK EXCHANGE (thousands)

	Issues for new capital, etc.	Old issues now listed	Replacing old securities	Total
1908	\$648,870	\$95,794	\$128,295	\$ 872,958
1909	712,735	8,479	377,743	1,098,957
1910	571,527	52,008	184,627	808,163

Com. and Fin. Chron. Jan. 19, 1918, p. 230.

volume of listed issues was smaller in 1910, the volume of "miscellaneous" bonds was greater than it had been the previous year, indicating that, while railroads and street railways had curtailed their borrowing, industrial corporations and municipalities were making heavier demands than before. ¹ Depression set in early in the year, it is true. The Chronicle notes a slackening in demand for iron and steel in the first month of 1910, and from February to the end of the year makes frequent mention of the falling off of general trade demands for goods. ² The physical volume of production was growing less from month to month but figures for pig iron tonnage lead one to believe that it was actually greater in 1910 than it had been the previous year. ³ Not only the volume of production but the price level as well remained high and demands for funds for construction purposes were probably not materially

1. The Chronicle classifies new bond listings into railroad, street railway and miscellaneous issues, the third class including industrials, public utilities, government, state and municipal bonds. The following table shows the increase of miscellaneous issues:

BONDS LISTED ON THE NEW YORK STOCK EXCHANGE
(thousands)

	Railroad	Street Railway	Miscellaneous
1908	\$506,160	\$65,076	\$200,503
1909	770,501	37,339	291,116
1910	444,168	53,679	310,316

Com. and Fin. Chron. Jan. 17, 1914, p. 197.

2. Ibid. Jan. 7, 1911, p. 9, 11.

3. Monthly tonnage fell from a March peak of 2,617,000 tons, to 1,759,000 tons in January, 1911. The total output in 1909 was 25,407,000 tons, in 1910, 26,849,000. Figures quoted from the Iron Age in the Harvard Review of Economic Statistics, Jan. 1919. Mitchell found that in other lines as well the volume of production was greater in 1910. Business Cycles. 84. See also the Com. and Fin. Chron. Jan. 7, 1911, p. 20.

diminished until the middle of the year.

There was not a sufficient increase in the available supply of loanable funds to meet this fairly active demand, at the former rates. The depression of 1910 was not a major one and, at the time when bond yields were rising, it had just begun, so there is little reason to believe that any considerable volume of funds had been released from active business. Nor had any crisis occurred to shake the confidence of the investor and impel him to give up his stock holdings to purchase bonds. It is quite possible that the uneasiness which kept the New York bankers from lending their money on time,¹ made them unwilling to purchase bonds as invest-²ments and so removed one group of buyers from the market. A more important restriction upon the supply of funds was due to the impairment of railroad credit. The railroads had been forced to grant large increases in the wages of their employees,³ and the Interstate Commerce Commission was successfully blocking all attempts to secure compensating rate advances.⁴ Until July,

1. See p. 49 Ch. III infra.

2. The total bond holdings of state, savings and private banks, and loan and trust companies reporting to the Comptroller increased from \$3,010,000,000 on April 28, 1909, to \$3,111,000,000 on June 30, 1910. Reports of the Comptroller of the Currency, 1909, p. 34, 35; 1910, p. 56. But it is probable that the greater part of this increase came in 1909, and in the holdings of railroad bonds there is a decrease of \$43,000,000.

3. Com. and Fin. Chron. Jan. 7, 1911, p. 8.

4. On May 31, for example, an injunction was issued preventing western roads from putting into effect extensive rate advances which they had scheduled for the following day. The Railroad Law of June, 1910, gave the Interstate Commerce Commission power to suspend for ten months any proposed rate advances, and the power so conferred was exercised the following month when the Commission suspended all advances for one hundred and twenty days. Ibid. p. 6. The decision in the Pacific Coast cases called for reductions of from 20 to 50 per cent. Ibid. p. 19.

figures for net earnings of the total railway system compared favorably with similar figures for 1909, but from July to the end¹ of the year they fell farther and farther below the 1909 records. And individual roads had experienced losses in net earnings some time before.² There are evidences of some concern in the business world over the predicament in which the railroads found themselves.³ As one might expect, the Brotherhoods favored higher freight rates; more significant is the fact that the meat packers agreed to an increase of 11 per cent.⁴ The result of the decrease in earnings⁵ was that railroad credit suffered, and railroads had more difficulty than other corporations in floating loans in a market that did not respond generously to new issues of any kind.

What bearing have these facts and inferences upon the theory

1. Com. and Fin. Chron. Jan. 7, 1911, p. 7.
2. Ibid. p. 12.
3. Ibid. p. 24.
4. Ibid. p. 19. Less conclusive, because less reliable, is the evidence furnished by the questionnaire sent out by the National Association of Manufacturers to its three thousand members in December, 1910. After the cry for a "non-partisan" tariff commission, and for prompt decisions in the Standard Oil and American Tobacco Company cases, the most insistent demand voiced in the two hundred and thirty-one published replies is that the railroads be granted "reasonable" freight rate advances. American Industries, Dec. 1910, pp. 12-23.
5. The Chronicle says that the injunction in June prohibiting rate advances on the western roads "dealt a blow at the credit of the roads", and made it impossible to float railroad loans even in the foreign markets. Com. and Fin. Chron. Jan. 7, 1911, p. 7. It seems likely that the Chronicle exaggerates the effect of the activities of the Interstate Commerce Commission upon the London market, for Hartley Withers says that American bonds were sold in London in 1910 on a high yield basis because there was a great volume of new flotations, not because the underlying security was "a pennyworth worse". Stocks and Shares. 319, 320. But there is no doubt that the adverse decisions of the Commission were serious deterrents to the American investor.

of interest? The decline of the index of bond yields during a year of depression and its gradual rise during the recovery that followed might lead to the conclusion that productivity was exerting an appreciable influence upon the rate of interest. The conclusion needs to be very carefully stated. By productivity we do not mean the technological advantages attaching to capitalistic methods of production. There was no significant change in those advantages from 1908 to 1910. We should mean, rather, the possibility of obtaining value return for value outlay. The productivity of capital invested, for example, in a blast furnace was greater in 1909 than it had been in 1908, not in the sense that the capacity of the furnace was greater but in the sense that the product could be sold at a higher price. Even according to Fisher's method of reckoning, the value of the furnace had undergone no corresponding change, for a person discounting its future income, in 1908, would not expect the future to be made up entirely of lean years, nor would a person making the computation in 1909 expect a future of none but prosperous years in the production of iron. Making allowance for changes in the rate of discount and for changes in prime costs, it would be possible to say in a rough way that the value productivity of the furnace was greater in 1909 than in 1908. Similar statements might be made with reference to a great number of other fixed capital goods. But describing depression in terms of the productivity of capital does not advance the argument, and it is apt to be confusing. As far as the investment market is concerned, the depression of 1908 did not greatly affect the volume of demands for loanable funds; there were more new loans floated that year than in the relatively prosperous years that had gone

before. The depression contributed to the decline of interest rates chiefly because it meant curtailment of production, fewer applications for bank loans, and consequently a large volume of loanable funds that could be had on easy terms for the semi-speculative purchase of bonds, because it caused men to put their money into securities rather than inventories and because it caused investors to shift from stocks to bonds. The data for 1909 and the early part of 1910 lend themselves more easily to the productivity analysis. Interest rates were rising and in spite of the fact that the volume of capital flotations had been great in 1908, the total for 1909 was still greater. Productivity, as we have defined it, seemed to be having a direct effect upon the interest rate through its stimulus to borrowing. But we can draw only a tentative conclusion here because the rise was slight, it persisted for some time after depression set in, and it was in part due to other factors than the one we have been discussing. The analysis, at best, is far from the usual productivity argument. As for the applicability of the agio theory, there is no evidence of a change in time-preference at this time. The theoretical concept that seems most helpful is Davenport's. We can best describe the situation in terms of the loan fund, more particularly in terms of the loan fund in the American investment market. The banks created at least a part of this fund and their function of intermediary proved an important one. But it must be remembered that the loan fund concept is a method of analysis rather than an explanation in itself. One who adopts it must still determine what, specifically, governs the amount of the fund, on what terms it will be available, and how great a premium men will pay for the use of it.

The downward trend of bond yields in September and October,¹ 1910, coincided with the successful placing of a few new issues, and with the revival of activity in bond trading on the Stock Exchange.² The only plausible explanation that appears, is that stagnation and uncertainty in business, the moderate rise in prices on the Exchange³ and the disrepute into which commercial paper had fallen because of questionable sales methods of a number of new brokers⁴ caused the banks to raise the rates on mercantile paper and to make loans on stock exchange collateral more liberally than had been their custom. But the upward swing in bond prices soon came to an end. If the preceding explanation is the correct one the reason for the abrupt termination of the movement is to be found in the calling of funds from New York to the south and west and to Canada.⁵ At all events bond yields rose and quite contrary to expectations they remained fairly high during the depression of 1911 and have not at any time since October, 1910, reached the low point of that month.⁶ The investment in bonds of a large portion of the proceeds of January interest and dividend

1. Com. and Fin. Chron. Jan. 7, 1911, p. 24.

2. Com. and Fin. Chron. Bank and Quotation Section.

3. Com. and Fin. Chron. Jan. 7, 1911, p. 25.

4. Ibid. p. 26.

5. Idem.

6. It is reasonable to infer that the banking world expected a further fall in bond yields, since the 50,000,000 franc loan floated in October by Morgan Harjes & Company for the Michigan Central took the form of 1-year notes. Idem.

payments made almost no impression upon the price level, although it served to swell the transactions on the New York Exchange.¹

The year 1911 witnessed continued trade depression, falling prices, and the accumulation of idle funds in the banks of the country, particularly in New York banks. Curtailment of production was probably most striking in the leather industry but it was common in all lines.² Iron and steel manufacturers lived through alternate periods of hope and despair.³ Throughout the year prices were falling and it was not until November that revival really came with the renewal of railroad orders for equipment goods.⁴ General commodity prices declined from January to March and did not return to their January level until November.⁵ The cotton crop of 1911 was the largest on record, so large indeed that the farmers were urged to pledge themselves to a reduction in acreage in 1912.⁶ But the other crops were seriously damaged by the heat, and a shortage was noted in wheat, corn, oats, barley,

1. Com. and Fin. Chron. Jan. 7, 1911, p. 26. The volume of transactions on the Exchange in railroad and miscellaneous bonds rose from \$49,319,000 in December, 1910, to \$71,386,500 in January, 1911, and the total volume of bond transactions from \$52,187,000 in December to \$91,504,000 in January. Com. and Fin. Chron. Bank and Quotation Section.

2. Ibid. Jan. 6, 1912, p. 7, 10, 12.

3. After a slight improvement in demand in February, pig iron production increased, in expectation of orders that never came. Ibid. p. 14, 16; see also the index of pig iron production, quoted from the Iron Age, in the Harvard Review of Economic Statistics. Jan. 1919. Purchases by the railroads in April were light and there was a general cut in steel prices in May. Ibid. p. 20. Foreign demand increased the volume of orders in August. Ibid. p. 27.

4. Ibid. p. 33.

5. According to Bradstreet's Index.

6. Com. and Fin. Chron. Jan. 6, 1912, p. 31, 35.

rye and potatoes.

Because of this shortage the demand for funds during the crop-² moving season was much lighter than usual. It was not only in the early fall that bank loans were in slight demand, however. There is hardly a month in the year for which the Chronicle does not record that the banks were in possession of vast amounts of idle money and were unable to lend it at what they had been accustomed to consider remunerative rates. Several important New York institutions withdrew from the money market, many others invested heavily in "standard bonds", the proceeds of American loans were left as credit in European centers, gold was shipped to Canada, banks and trust companies bought German government notes and loaned directly on time at Berlin, Paris and London, and yet³ money in October was "almost unlendable" in the New York market. The reserves in national banks in New York City were greater on⁴ June 7, 1911, than at any call date since September 23, 1908. The deposits of out-of-town banks with the New York institutions

1. Com. and Fin. Chron. Jan. 6, 1912, p. 11, 24, 27.
2. Ibid. p. 31, 35.
3. Ibid. p. 13, 15, 17, 18, 19, 23, 28, 30, 32. Investments of all banks reporting to the Comptroller (national, state, savings and private banks and loan and trust companies) in bonds other than United States government issues increased by about \$328,000,000 from June 30, 1910, to June 7, 1911. Reports of the Comptroller of the Currency.
4. They amounted to more than \$332,000,000 and were 28 per cent of deposit liabilities. Reports of the Comptroller of the Currency.

seem to have been considerably larger in 1911 than in 1910.¹ Rates on call loans and commercial paper indicate prevailing ease in money.²

During this remarkable year the yield on ten railroad bonds did not fall below 4 per cent. Instead of a steady decline such as occurred during a similar period in 1908, we find that bond yields remained almost on a level from the beginning of the year to the end.³ The high points were 4.06 in March and September; the low, 4.01 in November. The rise that seems to have begun in November, 1910, was checked by the rapid absorption of a number of new loans offered in January.⁴ But in spite of the fact that new issues were comparatively small this year⁵ and funds were plentiful,

1. Deposits of out-of-town banks with the New York banks reporting to the investigators in the Money Trust inquiry were very much greater in 1911 than they had been the previous year and remained large up to the middle of 1912.

DEPOSITS OF OUT-OF-TOWN BANKS WITH NEW YORK BANKS AND TRUST COMPANIES
(thousands)

Date	Number of New York Banks Reporting	Deposits
Jan. 1, 1910,	31	462,002
July 1, 1910	31	464,416
Nov. 1, 1910	31	455,691

(See p. 60-a)

Com. and Fin. Chron. Dec. 21, 1912, p. 1656, 1657.

2. Harvard Review of Economic Statistics, Jan. 1919.
3. Mitchell's index is almost as stable, its fluctuations falling within a range of 4.13 to 4.20. Business Cycles. '16.
4. For example, the New York Central's offer of \$60,000,000 50-year bonds on January 24, received 571 bids, aggregating \$324,933,000. Com. and Fin. Chron. Jan. 6, 1912, p. 12.
5. Issues for new capital listed on the New York Stock Exchange amounted to \$397,564,000 against \$571,527,000 in 1910. Com. and Fin. Chron. Jan. 19, 1918, p. 230.

DEPOSITS OF OUT-OF-TOWN BANKS WITH NEW YORK BANKS AND
TRUST COMPANIES
(thousands)

Date	Number of New York Banks Reporting	Deposits
Jan. 1, 1910	31	462,002
July 1, 1910	31	464,416
Nov. 1, 1910	31	455,691
Jan. 1, 1911	31	519,157
July 1, 1911	32	548,612
Nov. 1, 1911	32	540,179
Jan. 1, 1912	32	523,573
July 1, 1912	31	550,534
Nov. 1, 1912	32	483,373

there was no decline in the yields and at the end of the year the railroads were seriously embarrassed by their inability to secure new loans.¹ Mitchell finds it worthy of note that the yield on bonds did not follow the same course during the two depressions of 1908 and 1911. He thinks the fall in yields which occurred in 1908 the typical movement during depression and finds it necessary to explain the rise that persisted through the revival of 1909, the depression of 1910 and 1911 and the return to activity in 1912, by "the effort of investors to force the overdue adjustment of long-time interest rates to the higher level of commodity prices."²

In the first place it should be noted that the general rise in bond yields from February, 1909, through 1912 was actually checked by a fall in October and November, 1910, and that the rise during 1911, even in Mitchell's series, was almost imperceptible. What we have to explain is rather a failure to decline than an actual rise. Secondly, the depression of 1911 was much less

1."the necessary development of railroad facilities is now endangered by the reluctance of investors to purchase new issues of railroad securities in the amounts required." Report of the Railroad Securities Commission, Dec. 11, 1911, p. 32.

2. Business Cycles. 511. Mitchell is in a position to speak with authority of the magnitude of price changes during the years in question, and it is reasonable to suppose that investors, finding commodity prices higher, would set a higher premium on present purchasing power, would tend to consume more of their income in the present if only to maintain their accustomed way of living. But this does not explain the point at issue, namely the low prices of bonds in a year of industrial depression. Why should the adjustment have been "overdue" in the first place? And why should adjustment of interest rates to higher price levels take place in a year of low and falling prices following two years of rising and comparatively high prices?

1

severe than the former one, and it had been preceded by no panic to destroy men's confidence in speculative and profit-making enterprises. Bank purchases were important,² but it seems likely that purchases of individuals and of industrial corporations were comparatively light, since the prevailing depression had cut down the business man's profit and corporations were probably forced to reduce their surplus accounts in order to pay the customary dividends. In February, following the announcement of the rate decision of the Interstate Commerce Commission, there was a slump³ in the stock market. A light recovery in April⁴ was maintained through the month of July in spite of unfavorable news, but in August the financial interests that had been bolstering the market were no longer able to support it, and prices fell heavily during

1. Neither prices nor volume of production reacted so strongly. See indices in the Harvard Review of Economic Statistics, Jan. 1919, and see the Com. and Fin. Chron. Jan. 6, 1912, p. 7.

2. Investments of banks reporting to the Comptroller (this includes state, savings and private banks and loan and trust companies as well as all national banks), in bonds other than federal government issues increased from June 30, 1910, to June 7, 1911, by about \$328,000,000. Reports of the Comptroller of the Currency. The total volume of new listings on the New York Stock Exchange in 1911 was only \$580,834,000. Com. and Fin. Chron. Jan. 19, 1912, p. 230. These listings do not, of course, include all new issues put out during the year, but it seems reasonable to estimate the total of new issues traded in on any organized market in the United States at something less than three times that figure. This is an estimate purely; it is based upon data presented by Sereno S. Pratt in the Work of Wall Street, p. 49, 50. Pratt's figure for corporate bonds of 262,490 corporations in the United States in 1910 is something less than \$23,000,000,000, while his figure for total bond listings, old and new, on the New York Stock Exchange, October 18, 1911, is \$12,690,285,973.

3. Com. and Fin. Chron. Jan. 6, 1912, p. 14.

4. Ibid. p. 19.

the period of liquidation that followed.¹ Rumors of government prosecutions under the anti-trust law caused further depression in stock prices² which remained low throughout the year. Bond prices do not always follow stock prices but so decided a depression as this must necessarily have been accompanied by some declines in the prices of even high grade bonds. Moreover, railroad credit, already impaired in 1910, suffered still more in 1911. The Interstate Commerce Commission, in February, dealt it the first severe blow;³ later, unfavorable crop reports presaging losses in railroad tonnage darkened the outlook for the western roads;⁴ there were continued rumors that the Interstate Commerce Commission would not grant proposed rate advances;⁵ the reports of railroad earnings⁶ were discouraging;⁷ receivers were appointed for the Wabash, and in spite of previous wage advances there was a strike involving 35,000 men on the Harriman roads.⁸ Reluctance of the investor to purchase railroad bonds was the inevitable result.

1. Com. and Fin. Chron. Jan. 6, 1912, p. 26. The number of shares traded in on the New York Stock Exchange in July was 5,476,559. The figures for August and September are 14,994,533 and 17,395,957 respectively. Com. and Fin. Chron. Bank and Quotation Section.

2. Com. and Fin. Chron. Jan. 6, 1912, p. 30.

3. On February 23, it was announced that there would be no general rate increases in eastern or western areas. This decision, the first under the law of 1910 which gave the Commission the right to decide on proposed increases, was a grave disappointment and involved large groups of roads. Ibid. p. 13, 14, 21.

4. Ibid. p. 26.

5. Ibid. p. 27.

6. Ibid. p. 15, 30.

7. Ibid. p. 36.

8. Ibid. p. 30.

In 1912 there was a general revival in business which the Chronicle explains chiefly by the fact that the railroads could no longer defer their orders for equipment.¹ The new orders were not due to an increase in railroad earnings, however. The New York Central and the Pennsylvania lines, because of rigorous retrenchment in expenditures, were able to show a slight improvement in net earnings in January, but all other roads suffered losses and the railroad situation as a whole appeared gloomy indeed.² But the latter half of the year the reports of earnings were good and threatened labor difficulties were avoided by liberal wage advances.³ The iron and steel industry had begun to feel the effects of the revival in 1911. Prices were low until June, 1912,⁴ but there was continuous activity from the first of the year,⁵ and in September so great was the demand for steel products that it was practically impossible to place orders even at the new and

1. Com. and Fin. Chron. Jan. 14, 1913, p. 11.

2. On Jan. 25, the Milwaukee & St. Paul reduced its semi-annual dividend on common stock from $3\frac{1}{2}$ to $2\frac{1}{2}$ per cent. According to a statement given out on Jan. 27, this was due not only to crop failures but also to the fact that there was "no prospect of improvement in general conditions, and in addition there was the continued reduction of rates and the high cost of labor." These remarks were considered typical of the railroad situation in general. Ibid. p. 13.

3. Ibid. p. 35, 36.

4. Ibid. p. 29.

5. Ibid. p. 14, 16, 21, 29, 31, 32, 36, 38. The United States Steel report for the first quarter of 1912, showed low earnings, but there was steady improvement and at the end of April the mills were working at 93 per cent of capacity. Ibid. p. 21.

higher price level.¹ Other industries shared in the revival,² and the general level of commodity prices rose to a high point in December.³

Call loan rates were low until October, and until after the turn of the half year⁴ rates on commercial paper were not appreciably higher than they had been in 1911. In January, indeed, bankers were lending abroad because they were unable to employ funds profitably at home.⁵ Money was coming into the New York banks from the interior of the country,⁶ and the total reserves of national banks in New York City at the time of the Comptroller's call in February were greater than at any other call date in the six years from 1909 through 1914.⁷ At the end of March reserves⁸ of New York Clearing-House Banks fell below the required minimum.

1. Com. and Fin. Chron. Jan. 14, 1913, p. 32.
2. Prices in the dry goods trade were rising in February. Ibid. p. 16. In August the meat packers raised their prices to unusually high levels. Ibid. p. 31. The Chronicle mentions, frequently, increasing activity in "general business". Ibid. p. 8, 29, 32.
3. According to Bradstreet's index.
4. The monthly rate of interest on call loans reached 3 per cent in April but except for this high point following the usual spring rise it remained below 2.9 per cent through September. The monthly rate on 4-to-6 months paper did not rise above 5 per cent until July, and the rate on 60-to-90 day paper kept from one-half to three-quarters of one per cent below it. See the Harvard Review of Economic Statistics, Jan. 1919.
5. Com. and Fin. Chron. Jan. 14, 1913, p. 14.
6. "Money flowed here in enormous amounts from the interior. This was due not merely to the release of funds used in moving the crops, but to the inactivity of general trade." Ibid. p. 15.
7. The figure was \$336,200,000. The percentage of reserves to deposits was not greater than it had been during 1911 but it had increased to 27 per cent from 25.3 per cent on December 5. Reserves of New York City Banks, in the Reports of the Comptroller of the Currency.
8. Com. and Fin. Chron. Jan. 14, 1913, p. 13.

This was only temporary, however, and it was not until June that a definite stiffening of the rates was noted, following exports of gold to France and withdrawal of funds by the United States government in the form of corporation tax payments.¹ In August the Chronicle notes a general rise in money rates and offers, as an explanation, the fact that Canadian banks were calling demand loans and gold was accordingly being exported to Canada.² A further rise in September was due to an unusually great seasonal demand for crop-moving purposes, and to the inquiry for funds that resulted from increasing activity in business.³ It was in October, with the liquidation of foreign holdings of American securities at the time of the outbreak of the Balkan war, that money rates rose sensationally.⁴ Bank rates were raised by all the European banks, wholesale selling of American securities in this country made the demands from the Exchange greater than usual in spite of the fact

1. Com. and Fin. Chron. Jan. 14, 1913, p. 28. Gold exports, however, were not phenomenally large in June. They amounted to no more than \$7,171,000 and were offset by imports of \$5,611,000. Annual Report of the Treasurer of the United States.

2. This is the Chronicle's view. Com. and Fin. Chron. Jan. 14, 1913, p. 32. The Annual Report of the Treasurer of the United States gives imports of gold that month of \$5,577,000, and exports of \$2,498,000, a net import balance, that is, of \$3,079,000.

3. Com. and Fin. Chron. Jan. 14, 1913, p. 33.

4. The monthly average call loan rate advanced from 2.63 per cent in September to 5.33 per cent in October, and was well above 6 per cent the last two months in the year. The rate on 60-to-90 day paper was 5.56 per cent in September, 5.93 per cent in October, fell to 5.72 in November, and rose to 6 per cent in December. The 4-to-6 months rate was already at a high level in September (6.13), and rose to 6.50 in October. See the Harvard Review of Economic Statistics, Jan. 1919.

that the liquidation caused a fall in stock prices.¹ In November the call loan rate reached 9 per cent, and on the 29th of that month some loans were made at 20 per cent. The Chronicle finds the explanation for these extremely high rates in demands for funds from the interior of the country,² in Canadian bank withdrawals, in the calling of loans for interest and dividend disbursements, and in the demand for funds for tax payments in New York. The banks, on the other hand, were anxious to maintain their cash reserves because they were expecting a call from the Comptroller of the Currency.³ In December rates were somewhat lower, according to the Chronicle, but there was little demand for time-loans because borrowers anticipated a drop in the rates in January.⁴

The volume of trading on the Stock Exchange was large for the first four months of 1912, dwindled in June and July, but increased again later in the year.⁵ The upward movement in stock prices began in July with the Great Northern and the Northern Pacific in

1. Com. and Fin. Chron. Jan. 14, 1913, p. 34, 35.

2. There were thirty-two New York banks that reported to the House sub-committee in the Money Trust inquiry for November 1, 1912, and only thirty-one for July 1, and yet the deposits of out-of-town banks with the reporting institutions were only \$483,373,000 in November while they were \$550,534,000 in July. Com. and Fin. Chron. Dec. 21, 1912, p. 1656, 1657.

3. Com. and Fin. Chron. Jan. 14, 1913, p. 37. In spite of the efforts of the banks to maintain a good showing of reserves, the report of the Comptroller records only \$260,100,000 as the reserves of New York City national banks on November 26, while reserves on Sept. 4 had been \$288,500,000, and on June 14, \$323,900,000. The percentage of reserves to deposits was 26.7 in June, 24.8 in September, and 24.7 in November. Report of the Comptroller of the Currency.

4. Com. and Fin. Chron. Jan. 14, 1913, p. 24.

5. Com. and Fin. Chron. Bank and Quotation Section.

the lead.¹ Prices rose further in August, still under the influence of good crop reports, and in spite of a slight check in September, due probably to the sharp rise in the call loan rate, prices continued to advance, the gains being most marked among the industrials.² We have already noted the liquidation in October. In December there was a decline in stock prices due largely to the announcement of the decision of the United States Supreme Court in the case of the Union Pacific.³

The yield on ten railroad bonds rose steadily from 4.02 in February, 1912, to 4.12 in September, dropped to 4.11 in October where it remained for two months and rose to 4.13 in December. The slight drop that had preceded this rise was due probably to the usual investment of January disbursements.⁴ The general upward trend of the yield throughout the year seems to have been due principally to the renewed demands of corporate enterprises for loanable funds, accompanying the expansion in business. The issues listed on the New York Stock Exchange in 1912 for new capital purposes amounted to \$447,667,000, over \$50,000,000 more than the

1. The rise in the price of these stocks seems to have been due largely to the prospect of good crops in their district. Com. and Fin. Chron. Jan. 14, 1913, p. 30.

2. Ibid. p. 32, 33.

3. On December 2 the court handed down a unanimous decision against the ownership by the Union Pacific of about 46 per cent of the stock of the Southern Pacific Company. Ibid. p. 37.

4. The monthly records of bond trading on the New York Stock Exchange support this conclusion, since one would expect such investments to be made largely upon the Stock Exchange rather than through investment houses, and the total bond transactions on the Exchange rose from \$90,613,500 in December, 1911, to \$113,384,000 in January, 1912, dropping again to \$51,828,000 in February. Com. and Fin. Chron. Bank and Quotation Section.

total for the preceding year.¹ Now such an increase in the demands of business enterprise was to be expected in a year when the volume of production was expanding month by month and when the price level was rising. That the rise in yields was so slow was due probably to the general ease in the money market during the first few months of the year. Reports of bond holdings of the banks show an increase of \$256,000,000 from June, 1911, to June, 1912,² and it is probable that a report taken in February or March would have shown a still greater increase, since the banks had fewer profitable means of employing their funds then than they had after the April rise in money rates. The check in the rise of railroad bond yields in October and November, when other rates were soaring,³ is surprising, and difficult to explain. Unfavorable conditions in the stock market may have caused some persons to buy bonds who would otherwise have purchased stocks. One is at a loss to know who these investors were and where they got their money. Evidently they were permanent investors, and as such concerned with the return on their investments over a period of years and not at all with the possibility of putting out money for a short time at unusually high rates. The upward turn in December was undoubtedly due to the impairment of railroad credit following the Union Pacific decision.

In 1913 and 1914 the fluctuations in the yield on ten railroad

1. Com. and Fin. Chron. Jan. 19, 1918, p. 230. The issues for re-funding old securities rose also, from \$148,149,000 in 1911 to \$207,301,000 in 1912.

2. Reports of the Comptroller of the Currency.

3. It appears in Mitchell's index also, but there the drop came in November rather than in October.

bonds were distinctly greater than they had been for the five years that had gone before. The rise that began in March, 1913, marked the beginning of a period in which bond yields reacted to conditions of the investment market far more strongly than they had previously done, and in which they maintained distinctly higher levels.

In January, 1913, the index had dropped slightly from its December figure, and it remained low in February. In March it rose to 4.19, in May to 4.28, and thence by a more gradual advance to 4.32 in July. August and September witnessed a decided decline, the rate going to 4.24 in the latter month, but the closing months of the year saw a further rise to a new high point of 4.35 in December. The decline was marked in the first month of 1914 and the rates fell still further during the early spring, reaching 4.22 in April, remaining low through June, and rising only to 4.29 in July. Here the story ends, for the New York Stock Exchange closed on July 28, and although we may be fairly certain that the yields on railroad bonds realized in the transactions of the following months reached unprecedented levels,¹ we must guess at their course, since we have no reliable data.

In 1913 the usual slight fall in bond yields at the first of² the year coincided with easy rates in the money market, due, the

1. Rates on commercial paper and call loans rose to high points in August, 1914, and did not decline until the end of the year. The monthly average call loan rate went from 2.65 in July to 6.25 in August, the rate on 60-to-90 day paper from 4.40 to 6.34, and the rate on 4-to-6 months paper from 5.03 to 7 per cent. See the Harvard Review of Economic Statistics, Jan. 1919.

2. The call loan rate dropped from 6.50 in December, 1912, to 3.23 in January, 1913. Declines on commercial paper rates, though less striking, were decided. Ibid.

Chronicle says, to the return of funds from the interior in sufficient quantities to offset the gold exports needed to cover finance bills drawn at the time of the October liquidation.¹ Speculation, stimulated by the low call loan rate, seems to have taken the bond market rather than the stock market as the field of its operations, probably because the Union Pacific decision had its effect in January in a decided break in stock prices.² Speculation and the usual January investments were able to keep bond prices up in spite of large offerings of equipment trust certificates and short-term notes,³ which, it may be supposed, tended to draw funds from the long-term investment market. Stock prices suffered severe declines in February partly due to the impairment of railroad credit, and partly to the beginning of tension in the money market.⁴ Bonds, as we have seen, followed in March. In April railroads⁵ experienced difficulty in placing new issues, and the immediate

1. Com. and Fin. Chron. Jan. 3, 1914, p. 16. The net export balance of gold from the United States in January, 1913, was more than \$11,000,000. Annual Report of the Treasurer of the United States.

2. The volume of transactions in stocks on the New York Exchange, instead of increasing as is usual from December to January, decreased from 12,632,000 shares sold during December, 1912, to 8,748,973 shares sold during January. The total volume of bond transactions advanced at the same time from \$44,219,000 to \$54,903,500. Com. and Fin. Chron. Bank and Quotation Section; see also Com. and Fin. Chron. Jan. 3, 1914, p. 16.

3. Ibid. p. 16.

4. Ibid. p. 18. The prices of industrials as well of rails declined.

5. The Chicago, Milwaukee and St. Paul road received subscriptions for only two-thirds of a \$30,000,000 issue of 4½ per cent bonds, and London was "not interested" when the securities were marketed there at 99½. A \$10,000,000 issue of 1-year notes of the Lake Shore and Michigan Southern was sold to a Longdon house to yield 5¼ per cent (an issue early in March having gone at 4½ per cent).

cause for one receivership in May was inability to secure funds for retiring a note issue due the following month.¹ Municipalities as well as railroads paid higher rates for borrowed funds, and found it hard to dispose of their issues.² In June stock prices fell to extremely low levels, partly under the influence of liquidation on European exchanges.³ Rates on new issues of notes and equipment trust certificates were higher than ever.⁴ July saw a partial recovery in the stock market but there was "continued difficulty" in floating bonds.⁵ The situation in the bank loan market at this time was similar to that noted in 1910. There was a wide divergence between the call loan rate and the rates on commercial paper.⁶ The rise in commercial paper rates at a time when the call loan rate was falling was caused partly by increased trade demands. Anticipation of tension in the money market seems to have been a more important factor, however, because upon the

Of a \$63,250,000 issue of the Baltimore and Ohio, \$47,000,000 were held by the syndicate. Com. and Fin. Chron. Jan. 3, 1914, p. 22.

1. Ibid. p. 24.
2. A New York City issue of 1-year notes put out in April was estimated to have cost the city 6 per cent. Ibid. p. 22. The price which New York City received for a May issue was said to have been the lowest on record. "Many municipalities in other parts of the country had difficulty in effecting sales at all." Ibid. p. 24.
3. Ibid. p. 28, 29.
4. Ibid. p. 29.
5. Ibid. p. 32.
6. With the exception of the usual spring rise, the call loan rate was falling from the first of the year until June, when it reached 2.25. In the meanwhile the general trend of commercial paper rates was upward, and during the first half of the year they stood on unusually high levels. See the Harvard Review of Economic Statistics, Jan. 1919.

announcement of the Secretary of the Treasury that special government deposits would be made with western and southern banks to provide for the seasonal demands for funds for crop-moving purposes, rates on commercial paper fell.¹ The course of the yield on railroad bonds seems to reflect the relief which this announcement afforded to the money market for bond yields also fell in August. Before we can consider this movement, however, we must explain the rise which took place during the first half of the year.

The Chronicle suggests repeatedly that the fall in price of railroad bonds as of stocks was due to impaired railroad credit.² Low earnings reports, receiverships and adverse decisions in the long-pending rate cases all had their part in destroying the confidence of the investor.³ Railroad credit was so shaken that rate decisions caused declines that were quite out of proportion to the probable effects of the decisions.⁴ Stock prices were the first to suffer from this lack of confidence but bond prices were also affected. However, we have seen that municipal bonds were selling on a higher yield basis in 1913, and this leads to the conclusion that the impairment of railroad credit was only one contributing

1. The announcement was made on July 31. By August 26 deposits of \$24,700,000 had been made in the banks of fourteen western states and \$21,800,000 in the banks of thirteen southern states. Com. and Fin. Chron. Jan. 3, 1914, p. 34. The monthly rate on 60-to-90 day commercial paper fell from 6.06 in July to 6.00 in August and to 5.78 in September. The rate on 4-to-6 months paper fell from 6.66 in July to 6.63 in August and to 6.45 in September. See the Harvard Review of Economic Statistics, Jan. 1919.

2. Com. and Fin. Chron. Jan. 3, 1914, p. 11, 16, 18, 22, 27.

3. Ibid. p. 24.

4. Ibid. p. 27.

cause of the rise in railroad bond yields, and that there were other more important causes, affecting the market for municipal securities as well as for railroad securities. According to the Chronicle, to be sure, the rise in railroad bond yields, due primarily to the railroads' weakened credit, was itself the cause¹ of the rise in the yields on municipals. The argument would run somewhat in this fashion. Railroad and municipal bonds appeal to much the same class of investor. When railroad bond yields are high, prospective investors, seeing the attractive possibilities in the railroad bond market, will refuse to purchase municipals at the old prices. This reasoning would hold, were the high yields on railroad bonds due to excessive demands for funds rather than to an inherent weakness in the security underlying the loan. But high yields due to impaired railroad credit may be expected to drive investors into the municipal bond market and so actually cause lower yields there, unless some other factor is operating to raise the rates. The weakened credit of the carriers no doubt played an important part in discouraging investment, but it does not of itself account for the general rise in interest rates that occurred in 1913.

Possibly the explanation lies in the depletion of the reserves of the New York City banks, due to the active demand for bank loans on time.² Stringency in the bank-loan market, as we have seen, can affect the investment market in two ways. Because it offers

1. Com. and Fin. Chron. Jan. 3, 1914, p. 11.

2. The reserves of national banks in New York City on February 4, 1913, amounted to more than \$307,000,000, a considerably greater amount than had been recorded on the call dates in September and November, 1912, but deposits had expanded also, the percentage being 25.9. Reports of the Comptroller of the Currency.

the banker profitable opportunities for short-time loans, it may cause him to reduce the bank's investments in bonds. And in the second place, because it raises the rates at which loans may be had on stock exchange collateral, it reduces somewhat the profit on speculative purchases of stocks and bonds, and so far as such a reduction has weight with the brokers and their clients causes a fall in prices. Does either of these explanations fit the case in hand? The bond investments of banks of all classes reporting to the Comptroller of the Currency, instead of increasing as they had done the two preceding years, decreased from June, 1912, to June, 1913. This of course is not sufficient to account for the whole rise, but it shows that one group of bond-holders was withdrawing from the market. The evidence for the effect of high rates upon speculation is not so convincing. The volume of transactions on the New York Stock Exchange was decidedly smaller than it had been in 1912² but one hesitates to say that this was due to the rise in money rates because, while rates on commercial loans were high, the call loan rate, which is the rate of immediate concern to the stock broker, was low throughout the year.

1. Bank holdings of railroad bonds diminished by about \$86,000,000, holdings of state and municipal bonds by \$32,000,000, holdings of public service corporations other than railroads increased by \$116,000,000, and holdings of all other bonds, stocks and warrants decreased by \$92,000,000, making the net decrease about \$94,000,000. Reports of the Comptroller of the Currency.

2. BOND SALES ON THE NEW YORK STOCK EXCHANGE
(millions)

	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>
1912	\$70	\$63	\$61	\$46	\$52
1913	40	56	42	43	35

Com. and Fin. Chron. Bank and Quotation Section.

Is it possible that the rise was due to increased demands for funds from borrowing corporations? In January, 1913, general trade was still active,¹ and although it was noted in March that new orders were not coming in at the same rate as in 1912,² there was no contraction in the physical volume of production.³ The same was true of April. It was not until May and June that trade seems to have actually declined.⁴ And while prices were falling, they were still at high levels.⁵ Probably no considerable amount of new construction work was undertaken at this time, since the slackening in orders must have given business men a foretaste of the depression that was to ensue later in the year,⁶ but what work was done was contracted for at high price levels and capital requirements were correspondingly great. Listings on the New York Stock Exchange show a decided decrease in loans for refunding

1. Com. and Fin. Chron. Jan. 3, 1914, p. 14.

2. Unfilled orders reported by the United States Steel Corporation were as follows:

Jan. 1, 1912,	7,932,164 tons
Jan. 31, 1913,	7,827,368 "
Mar. 31, 1913,	7,468,956 "

Ibid. p. 8, 20.

3. "Complaints of the slowness of [textile] mills in making deliveries continued, but new business was confined entirely to purchases to meet immediate requirements." Ibid. p. 20.

4. Ibid. p. 22, 25, 27.

5. According to Bradstreet's index.

6. The value of new construction represented by building permits for twenty cities is less in 1913 than in 1912 for each month from March through August. See Harvard Review of Economic Statistics, Jan. 1919, for figures quoted from Babson.

purposes but the volume of new capital issues is practically the same for 1913 as for 1912.¹ Since the major portion of the new financing was probably done during the first six months of 1913, this represents, no doubt, some increase in the demands upon the investment market during that period. But it is to be noted that these demands for long-time loans did not come from industrial enterprise at large but from comparatively few corporations.² At best they account for only a fractional part of the rise. More important were the demands for short-time loans, for in 1913, as might be expected in a period when the market was unfavorable to the borrower, old issues were retired and current needs provided for chiefly by the issue of short-term notes. This method of obtaining investment funds had been commonly practised for the past two years and consequently the fresh demands upon the market were unusually great in proportion to the capital needs of the borrowers. The Chronicle's list of the important note issues of the year gives a total of \$539,739,500 or \$171,738,164 more than the figure for 1912.³ If the volume of issues on which it is impossible to secure data increased in like proportion, the demands for loans in 1913 were distinctly greater than they had been the preceding year. They were not all demands for new investments, however. Many short-term loans were contracted for the purpose of

1. Issues to replace old securities decreased from \$207,301,000 in 1912, to \$175,251,000 in 1913, while new capital issues were \$447,677,000 in 1912 and \$447,815,000 in 1913. Com. and Fin. Chron. Jan. 19, 1913, p. 230.

2. Thirty-four corporations, including railroads, street railways, municipalities and industrial enterprises, put out about 88 per cent of the total volume of new issues. Com. and Fin. Chron. Jan. 17, 1914, p. 197.

3. Idem.

retiring issues that had been put out in 1911 and 1912, and since it seems probable that payments of principal on maturing issues were reinvested in similar securities, such loans amounted, for the most part, to a mere shifting of funds. Short-term financing, though it swells the total of new issues, is itself an effect of temporarily higher interest rates rather than a cause.

The explanations that we have mentioned are partial once only. Taken together they may be sufficient to account for a rise in the rate of interest in 1913, but a consideration of the magnitude of the rise leads to the conclusion that here there is some more fundamental factor at work, that for some reason investors were no longer willing in 1913 to part with their savings on the old terms. Was this because they expected higher rates in the future and were waiting for the rise? Borrowing corporations were issuing short-term notes and this indicates that they, at least, were expecting a drop in the rates when they would be able to refund their obligations to advantage. But investors in long-term bonds look farther ahead than one, two, or even five years, and it seems probable that in 1913 they partly foresaw the great increase in the demand for funds and the consequent rise in the rate of interest on investment loans. Whether they expected a war or whether they argued from the gradual rise in bond yields since 1909, it is difficult to say. But the effect of the reluctance of astute and far-sighted investors was cumulative. Each new rise served to convince men that there would be a further rise. The situation is not to be explained in terms of productivity nor by an account of contraction of the loan fund or shifting of the fund from one market to another. It seems to be a case of a distinct rise in the rate

of time-preference due to anticipation of heavy demands for funds in the future. The rate of time-preference in this case does not apply to present as against future income, but to income available in the near future as against income not available for a long period of years.

In August there was a break in the rise of railroad bond yields. It does not seem to have been due to any increased activity in the trade in old issues.¹ Nor was railroad credit greatly improved.² The interruption is to be explained chiefly by a recovery of stocks in July,³ and by the greater ease in money following the announcement by the Secretary of the Treasury of the readiness of the government to make deposits for crop-moving purposes. In October bond yields rose again, partly, it was thought, because of the drain of funds employed in the cash purchases of Union Pacific offerings of certificates of interest in Southern Pacific stock,⁴ but chiefly, it seems, because the former rise had been merely checked, not terminated, by the events of the summer. The upward movement in bond yields at this time was not confined to the United States. In London also it was difficult to

1. The volume of bond transactions on the New York Stock Exchange decreased slightly from July to August, 1913. Com. and Fin. Chron. Bank and Quotation Section.

2. Com. and Fin. Chron. Jan. 3, 1914, p. 32.

3. The publication of a "splendid" earnings report from the United States Steel Corporation was one reason for the upward turn in stock prices. Idem.

4. The total amount was \$88,357,600 and most of the payments were made in cash. Ibid. p. 35.

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float new issues.

At the opening of the new year there was monetary ease both in this country and abroad. Call loan and commercial paper rates in New York fell abruptly from their December levels and remained low for the first six months of the year.² Abroad, the gold holdings of the Bank of England increased, and the London market again rapidly absorbed a large volume of new loans.³ This revival of the investment demand abroad, improvement in stock prices in New York,⁴ increased activity in both stock and bond trading on the New York Exchange,⁵ together with the extremely low call loan rates, undoubtedly explain the decline in railroad bond yields from 4.35 in December, 1913, to 4.27 in January, 1914, and 4.23 in February. Until July the index on ten railroad bonds did not vary more than one one-hundredth of one per cent on either side of its February

1. "In London the new loan offerings were attended with such poor success that a formal agreement was again entered into by the important underwriting concerns at the British center not to bring out any more new issues for the present". This note occurs in the Chronicle's review for October, 1913. Com. and Fin. Chron. Jan. 3, 1914, p. 38; see also p. 12.

2. Com. and Fin. Chron. Jan. 9, 1915, p. 87, 92, 96, 105. The monthly average rate on 60-to-90 day paper fell from 5.68 per cent in December to 3.84 in February and did not rise above 3.90 until July. The rate on 4-to-6 months paper followed a similar course ranging from 4.28 to 4.50 for the five months ending in June. The call loan rate reached 1.78 in February and its range for the five months was between that point and 1.91. See the Harvard Review of Economic Statistics, Jan. 1919.

3. Com. and Fin. Chron. Jan. 9, 1915, p. 87.

4. Idem.

5. In December, 1913, there were 7,152,000 shares of stock sold; in January, 1914, 10,088,895. The increase in bond sales was even more notable. Total bond transactions in December amounted to \$45,584,000; in January to \$89,474,000. Com. and Fin. Chron. Bank and Quotation Section.

level, in spite of the fact that money was plentiful and new bond issues few. ¹ In 1914 there seems to have been a balancing of forces. The renewed European demand for bonds, money ease, and business depression, ² would lead one to expect a fall in bond yields. On the other hand, grave doubts that the Interstate Commerce Commission would grant the freight rate advances for which the railroads were asking, ³ decreased railroad tonnage, and unfavorable reports of earnings with no immediate prospect of a re-⁴turn to normal activity in the transportation business, made the investor unwilling to put his money into railroad securities. The

1. Including the New York State highway issue of \$51,000,000 the aggregate of new issues listed on the New York Stock Exchange was only \$488,993,000, the smallest figure in seven years. It is true that the greater part of the 1914 flotations were made during the first half of the year, but at that the financing was restricted. Com. and Fin. Chron. Jan. 30, 1915, p. 346.
2. Reports of idle cars, of unemployment, of earnings and unfilled orders of the United States Steel Corporation, of earnings of the American Woolen Company and the American Sugar Refining Company, and of the volume of production in the mills and furnaces of independent companies in the steel industry as well as of the United States Steel Corporation, and the monthly output of pig iron all point to business depression. Com. and Fin. Chron. Jan. 3, 1914, p. 87, 88, 90, 97, 100, 101, 105. And see the Harvard Review of Economic Statistics Jan. 1919, for figures quoted from the Iron Age.
3. In February the suggestion was made by a member of the Commission that increased revenue was not necessary, since the railroads were in a position to make great reductions in expenditures, by charging large industrial concerns for the special services which they had been rendering free. Com. and Fin. Chron. Jan. 9, 1915, p. 90. The 5 per cent rate case was pending until August 1, when the Interstate Commerce Commission announced a decision against the railroads. Ibid. p. 85.
4. Ibid. p. 90, 93, 94, 83, 84, 85. In March the Pennsylvania road had withdrawn 118 trains, had laid off 28,000 employees since the close of 1913, and had put 40,000 men on part time. The Lehigh Valley road had 86 per cent of its normal force working 66 per cent of regular time, and the New York Central had laid off 25,500 men since September. Other roads had taken similar action. Ibid. p. 93.

upward turn of bond yields in July, 1914, was only a slight one.¹

It seems to have been due to the cumulative effect of the blows to railroad credit,² and to the tension in the money market that preceded the outbreak of the war.³

We have followed in some detail the course of events in the bond market from 1908 to 1914. What can be said, by way of summary, concerning the more important movements of the interest rate during those years? Bond yields rose during the first few months of depression in 1908, then fell steadily. They rose slowly with renewed prosperity in 1909 but by no means recovered their former level. Depression had already set in when bond yields were climbing to their highest point in 1910, and in 1911, with continued stagnation in manufacturing and trade and a remarkable congestion of funds in the banks of the country, the interest rate on long-term investments remained practically on a level from one end of the year to the other. The following year saw the rate rising once

1. From 4.23 to 4.29.

2. A German banker discussing American business conditions in a speech on June 3, said that financial conditions throughout the world were threatened by the difficulty American railroads were experiencing in floating their bond issues. Com. and Fin. Chron. Jan. 9, 1915, p. 105.

3. Com. and Fin. Chron. Jan. 16, 1915, p. 189. The monthly average rate on 60-to-90 day paper rose from 3.84 in June to 4.40 in July and to 6.34 in August, the rate on 4-to-6 months paper from 4.50 in June to 5.03 in July and 7.00 in August. The rise in the call loan rate was, if anything, more striking. The monthly average rate for June was 1.84, for July, 2.65, and for August, 6.25. See the Harvard Review of Economic Statistics, Jan. 1919. The beginning of tension in the New York money market came in June with the failure of H. B. Claflin & Company, a wholesale dry goods house in New York, that was part owner of a number of chain stores. Com. and Fin. Chron. Jan. 9, 1915, p. 102, 105. This advance was slight, however, in comparison with the later movement, due to threats of war and to the outbreak of war itself.

more, and in 1913 there was a marked, though not continuous, advance that overshadowed all the movements of the preceding five years. The rate of interest on long-time loans, like other rates, varied little up to the outbreak of the war after its downward turn in January, 1914. It has been possible to find explanations of the fluctuations of the first five years of the period in the conditions of bank reserves, in shifts of speculative activity between the bond and stock markets, in changes in the volume of new issues, in the relations of the American investment market to foreign investment markets, and in the effect of business prosperity or depression upon the trade demand for funds. But these explanations do not appear sufficient to account for the marked rise in investment rate in 1913. That rise, the only striking movement during the period, seems to have been due to the fact that there was a distinct rise in the rate of time-preference partly because the demands upon the investment market had already been heavy, but more particularly because investors anticipated heavier demands and higher rates in the future.

CHAPTER IV
THE RATES OF INTEREST
1915-1921

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THE RATES OF INTEREST
1915-1921

During 1915 and 1916 the rate on long-term investments did not vary greatly from its pre-war levels, and toward the end of 1916 it was declining. It was with the entrance of the United States into the war, and not with the outbreak of hostilities in Europe, that the investment markets in this country witnessed¹ the predicted rise in interest rates.

In 1915 the course of bond prices on ten railroad issues was remarkably even for the first four months, but from a low point of 4.34 in April yields rose steadily to 4.48 in August, remained there in September and declined heavily the last few months in the year, reaching 4.26 in December. There was a slight rise from 4.25 in January, 1916, to 4.32 in August, and the decline at the end of the year, while it resembles the decline at the end of 1915, was much less precipitous. Perhaps the most striking feature of the loan market during the two years was that money rates were distinctly lower than the yield on railroad bonds. The call loan rate, to be sure, usually keeps below the railroad bond rate, but it is rare to find a year to which it maintains so low a level as it did in 1915 and in which the rise at the end of the

1. The upward trend began in February, 1917, and the United States did not declare war until April, but there was little hope of peace after January 31, when Germany announced a policy of unrestricted submarine warfare.

year does not carry it above 2 per cent.¹ That commercial paper rates should range below the yield on railroad bonds is even more unusual. In 1915 the monthly rate of interest on 60-to-90 day commercial paper, already at a low point in January, followed a course of irregular declines to 2.98 in November and experienced only a slight upward turn at the close of the year. Even the 4-to-6 months rate did not rise above 4.40 and for six months in the year was below 4 per cent. In 1916 the call loan rate began to rise in March, rose sharply in June and July, fell from 3.13 in the latter month to 2.33 in August, began to rise slowly from that point, then jumped to 4.44 in December. The rates on commercial paper quoted in the Harvard Review for the first five months of 1916 seem to have been merely nominal. The indices show that commercial paper rates advanced sharply in June and July, their course being strikingly like that of the call loan rate. They fell in August and the upward turn did not come until almost the end of the year.² During 1915 and 1916 we must account, then, not only for high rates on railroad bond issues but for phenomenally low rates in the bank-loan market.

The most obvious reason for the original decline in money rates in 1915 is that in spite of increasing activity in the war industries, general trade was slack. The iron and steel industry was naturally in a more prosperous condition than any other and yet the production of pig iron, according to monthly figures, did

1. The only other year in which the rate was not 2 per cent or more for the last four months was 1908. See the Harvard Review of Economic Statistics, Jan. 1919.

2. Idem.

not reach the volume of 1912 and 1913 until July, 1915.¹ Steel mills in April were working at only 70 per cent of capacity, and while this shows a decided improvement from the low level of production in December, 1914, the first quarter of the year had been far from satisfactory.² Outside of the war industries production was restricted, prices were low, and in spite of war shipments the idle cars reported by the American Railway Association increased from November, 1914, to March, 1915, from 172,325 to 322,290.³ Under such circumstances it was not surprising that demand for short-time loans should have been light. Later in the year business began to recover. The steel industry led, chiefly under the impetus of war orders,⁴ but in September it was reported that railroad buying of steel products was becoming important, in October other industries began to feel the effects of reviving activity, railroad tonnage increased suddenly and the falling off in the number of surplus cars led the roads to place still more orders for equipment, in November there was a freight blockade due to traffic within the country as well as to the difficulty shippers experienced in securing ocean freight accommodations, and in

1. According to figures quoted from the Iron Age by the Harvard Review of Economic Statistics, Jan. 1919.

2. Financial Review, 1916, p. 26. The report for December, 1914, had been that production was only 30 to 35 per cent of capacity. Ibid. p. 17.

3. Ibid. p. 12.

4. There were price advances in July, the Steel Corporation reported that its mills were working at from 87 to 93 per cent of capacity then, and later months saw still higher prices and a greater volume of production. Ibid. p. 35, 36, 41, 46, etc.

December the output in the iron and steel industry was enormous.¹
 In spite of the increased demands for bank-loans that must have accompanied this expansion in business, money rates did not show even the usual seasonal rise at the crop-moving period. The explanation lies chiefly in the tremendous gold imports that set in during February. The gold inflow, together with the economy of reserves made possible by the Federal Reserve system,² brought about great increase in the lending power of the banks, so that they were able to supply the short-time funds demanded by business enterprise without creating any tension in the money market.³

1. Fin. Rev. 1916, p. 46, 49, 53, 54, 60. The monthly output of pig iron in the United States had increased from 1,601,000 tons in January to 3,202,000 in December. See the Harvard Review of Economic Statistics, Jan. 1919.

2. The Federal Reserve banks had opened on November 16, 1914. Report of the Comptroller of the Currency, 1915, p. 3.

3. The reserves (to the nearest \$100,000) of New York City national banks on the successive call dates throughout the year and the percentage of reserves to deposits were as follows:

	<u>Reserves</u>	<u>Per Cent - Reserves to Deposits</u>
Mar. 4	\$373,100,000	25.6
May 1	408,200,000	26.3
June 23	450,500,000	27.9
Sept. 2	507,400,000	28.9
Nov. 10	541,600,000	25.6
Dec. 31	499,600,000	23.3

Report of the Comptroller of the Currency.

Even in December, when reserves were somewhat reduced, loans were still expanding and rates advanced only slightly.

LOANS AND DEPOSITS OF THE CLEARING HOUSE BANKS AND TRUST
 COMPANIES IN NEW YORK

	<u>Loans</u>	<u>Deposits</u>
Jan. 2	\$2,191,508,000	\$2,114,101,000
Dec. 4	3,137,859,000	3,360,276,000
Dec. 31	3,257,606,000	3,466,720,000

Fin. Rev. 1916, p. 63.

The foreign exchange situation which resulted in the import of gold into the United States in 1915 was in marked contrast to that of 1914. At the outbreak of the war the United States was indebted to the international short-time market, to use Sprague's phrase, a quantity of bankers' long bills having been drawn on New York in anticipation of heavy exports in the late summer and fall.¹ This was the normal situation for that season of the year and would have caused no embarrassment had not the war cut off the demand for our cotton and, to a lesser extent, reduced foreign purchases of other types of merchandise. The closing of the stock exchanges of the United States was due, Sprague says, not so much to the amount of foreign offerings of securities, though that was large, as to the unwillingness of bankers to grant loans for speculative purchases of foreign-owned securities, since this would involve them in further indebtedness to Europe.² Because of the closing of the exchanges, debts to Europe on account of foreign sales of securities were light, but other obligations remained,³ and while there shipment of gold became increasingly difficult,⁴

1. The cotton and wheat crops promised to be phenomenally large. O. M. W. Sprague. *The Crisis of 1914 in the United States*. Amer. Econ. Rev. V, p. 509.

2. *Ibid.* 509, 510.

3. It was estimated by G. M. Reynolds of the Continental and Commercial Bank that the debt to Europe maturing between August 1 and January 1 amounted to \$500,000,000, of which \$200,000,000 was due immediately. Effect of the European War on American Credits. 22 Jour. Pol. Econ. 931. This consisted not only of the debt on account of bankers' bills but of \$82,000,000 on warrants of New York City.

4. J. M. Keynes. *War and the Financial System*. August 1914. 24 Econ. Jour. 467.

was no question that the balance would be paid eventually in merchandise exports when once the nations of Europe resumed their buying in this country, England's demands were imperative, exchange rates rose alarmingly,¹ and American bankers were forced to take immediate steps to meet the situation. The formation of the Gold Pool, the shipment of a comparatively small amount of gold to Ottawa,² together with the natural trade adjustment that followed the placing of war orders with American manufacturers, removed the difficulty, and in January it was announced that foreign exchange was again "normal".³

Before the end of 1914 the country's export trade had recovered,⁴ and 1915 saw great gains in merchandise exports, with a slight decrease in imports, so that the balance was decidedly in

1. On August 1, cable transfers on London were quoted at \$7.00, and there were quotations at more than \$6.00 for some time. Rates remained high through September, the range for that month being \$5.06 to \$5.06 $\frac{1}{4}$ for sight bills, \$5.07 to \$5.07 $\frac{1}{2}$ for cable transfers. Fin. Rev. 1916, p. 108.

2. The money was placed in Ottawa for account of the Bank of England. Reynolds. Effect of the European War on American Credits. 22 Jour. Pol. Econ. 933; and see the Fin. Rev. 1916, p. 17.

3. Ibid. p. 16.

4. Cotton prices were low and shipments small and yet merchandise exports in December, 1914, showed an increase over the exports for the same month in 1913. Ibid. p. 16.

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 favor of the United States. Europe paid her adverse trade balance in three ways: with shipments of gold, with shipments of foreign-held American securities and by means of loans floated in the United States. Until December, 1915, gold exports were insignificant, while gold imports from February to the end of the year were enormous. The net addition to the country's stock of gold from the movements in 1915 was more than \$420,000,000, a substantial increase, since the total amount of gold coin and

1. The reports of the Bureau of Foreign and Domestic Commerce give the following figures for the country's foreign trade:

	<u>Merchandise Imports</u>	<u>Merchandise Exports</u>	<u>Excess of Exports</u>
		(millions)	
Year ending June 30, 1913	\$1,813	2,466	653
Year ending June 30, 1914	1,894	2,365	471
Year ending June 30, 1915	1,674	2,769	1,094
Foreign Commerce and Navigation of the United States, 1914, p. xi, 1918, p. xi.			
Calendar year 1915	1,779	3,555	1,776
Foreign Commerce and Navigation of the United States, 1919, p. xi.			

2. Monthly imports of gold from 1908 through 1914 had ranged from something over \$1,000,000 to \$10,000,000 for all but two of the months, July and August, 1910, when they reached \$10,283,000 and \$12,819,000, respectively. Contrast with that the figures for 1915:

<u>Gold Imports</u> <i>thousands</i>					
(in millions)					
Jan.	6,896	May	31,136	Sept.	42,062
Feb.	12,726	June	52,342	Oct.	79,699
Mar.	25,620	July	17,263	Nov.	60,982
Apr.	16,203	Aug.	61,641	Dec.	45,413

Annual Reports of the Treasurer of the United States.

bullion in the United States on June 30, 1915, was less than
 \$2,000,000,000.¹

Gold shipments are the key to the banking situation in 1915; the bond market was affected in quite another way by Europe's second method of settling her trade balance, namely by the sale of American securities. Gold imports, great as they were, paid for only a part of the excess of merchandise exports, and stocks and bonds formerly held by European investors found their way into American markets, in part payment of the balance of the debt. Since the early part of the nineteenth century, the investments of European nations in American enterprise, particularly in American railroad enterprise, had been great. Sir George Paish, in a report published by the National Monetary Commission in 1910, estimated that European holdings of "permanent securities" issued in the United States, amounted in the aggregate to about \$6,000,000,000.³ Of this amount, more than half was held by British investors.⁴ German and Dutch holdings seem to have been

1. Report of the Director of the Mint.
2. Separate figures for England and France are not available. Net imports of gold into the United States from all parts of the world were, as we have seen, something more than \$420,000,000, while the excess of merchandise exports amounted to \$1,776,000,000.
3. The Trade Balance of the United States, Sen. Doc. 579, 61st Cong. 2nd Sess. v. 32, p. 175. The estimate for 1915, made by the British Chancellor of the Exchequer, was smaller - "somewhere between £300,000,000 and £800,000,000." Fin. Rev. 1916, p. 59.
4. The "official list" of the London Stock Exchange at the end of 1908 included \$7,500,000,000 par value of American railroad securities, and other American securities quoted in London bring the total up to \$9,000,000,000. British investors did not, however, own this whole amount. *Ibid.* p. 173, 174.
the Trade Balance of the United States

next in importance.¹ The flow of new capital into this country had not been steady. At all times, of course, it was partly offset by the annual interest and dividend payments, while at infrequent intervals the United States was repaying its loans and the tide set in the other direction.²

In 1914 European investors began to sell securities of all kinds. Even before the actual declaration of war by the great powers, money tension in the European markets had been great. Beginning on July 27, the continental bourses closed, one after another, and on the last day of the month the London Stock Exchange was no longer able to withstand the pressure. For several days before the formal closing there had been no speculative trading in London, and consequently the New York Exchange had been the scene of tremendous liquidation, buyers from all parts of the world seeking New York because it was the only available market. On July 31, the New York Stock Exchange and indeed all the important³ organized exchanges in the country were forced to close. During the months when the Stock Exchange was closed there had been a certain amount of authorized trading in securities but it had been severely restricted. At the formal opening on November 28, bond

1. An estimate of the German Admiralty in 1904, placed the amount of German holdings in securities of the United States and Canada somewhere between \$625,000,000 and \$750,000,000, while German bankers at the time Paish was writing gave \$1,000,000,000 as the probable amount of German holdings in securities of the United States. Paish has adopted the latter estimate. v. *Ibid.* p. 175.
The Trade Balance of the United States.

2. *Fin. Rev.* 1916, p. 192, 194. Paish makes the point that the amount of capital invested here is greater than the amount that has come into the country, because frequently profits have not been paid out in dividends but have been allowed to accumulate, increasing the amount of invested capital on which dividends must be paid. *Ibid.* p. 193.

3. *Com. and Fin. Chron.* Jan. 16, 1915, p. 189.

trading in listed issues was allowed but the Exchange required that payment should be made in cash and that transactions should not be engaged in at prices below certain minima which were set by the stock exchange committee. The minimum prices were steadily reduced and in January, 1916, the cash requirement was removed, but it was not until the first of April that trading was resumed on the former basis.¹

Figures for the amount of American securities sold by foreigners in this country since the beginning of the war, are mere estimates. Sir George Paish from an analysis of Great Britain's trade balance concludes that the withdrawals of British capital from abroad amounted to about £124,000,000 during the five months ending December 31, 1914, and to £390,000,000 the following year.² Withdrawals from the United States would fall within these totals but it is probable that they would make up the major portion of them. Figures of another kind are quoted from estimates, made by President Loree of the Delaware and Hudson Company, of the nominal and market value of American railroad securities held abroad. They purport to include the securities of all roads over one hundred miles in length. They show a decrease in foreign held securities of about \$480,000,000 from January 31, 1915, to July 31, a decrease of about \$807,000,000 in the following year, that is, from July 31, 1915, to July 31, 1916, and a decrease of about \$230,000,000 in the six months ending Jan. 31, 1917. Mortgage bonds constituted between

1. Sprague. The Crisis of 1914 in the United States. Amer. Econ. Rev. V, p. 532. Fin. Rev. 1916.

2. War Finance. 79 Royal Statistical Society Journal, part III, p. 271.

one-third and one-half of these securities.¹ During 1915 shares of United States Steel Corporation stock of \$53,130,200 par value were transferred from foreign to American holders.²

There were two principal ways in which these foreign holdings reached American markets. From the beginning the sales on private account were numerous. They differed in amount only from the sales that had been going on at intervals before the war, whenever price changes on the New York market prompted European investors to dispose of their holdings. The new feature during 1915 and 1916 was the systematic sale of securities by foreign governments in order to establish dollar credits to pay for large war orders placed in this country. This so-called mobilization of securities was effected by the purchase or borrowing of American securities from the citizens of the foreign nations concerned and the resale of those securities in the New York market.³ France undertook in

1. AMERICAN RAILROAD SECURITIES HELD ABROAD

	<u>Par Value</u>	<u>Market Value</u>
Total		
Jan. 31, 1915	\$2,704,402,364.42	1,751,437,912.50
July 31, 1915	2,223,510,229.18	1,110,900,090.00
July 31, 1916	1,415,628,563.00	924,542,646.19
Jan. 31, 1917	1,185,811,486.16	
Mort. Bonds		
Jan. 31, 1915	\$1,371,156,851.00	962,081,613.26
July 31, 1915	1,150,339,130.00	628,183,797.00
July 31, 1916	774,793,834.00	554,787,819.46
Jan. 31, 1917	672,969,224.08	

Quoted by Abraham Berglund. Our Trade Balance and our Foreign Loans. 26 Jour. Pol. Econ. p. 737.

2. Fin. Rev. 1916, p. 61.

3. Not all mobilized securities were sold. Some were held as collateral for loans.

June, 1915, to buy from her citizens their holdings of two American railroad issues to be used in payment for government orders here.¹

Purchase and sale under the British mobilization scheme began in January, 1916,² but evidently the response of British investors to the government's appeal was not very satisfactory.³

The third way in which France and England paid their trade balances to this country was by securing dollar credits through arrangements with bankers here and by selling their own bond issues to American investors. Arrangements for credits were made by foreign banking and commercial interests and usually involved shipments of gold and securities to this country.⁴ The French and British governments floated two loans in American markets in 1915, a \$50,000,000 issue of one-year French bonds in March, and in September the \$500,000,000 issue of five-year bonds negotiated by the Anglo-French Commission.⁵ This joint obligation of the allied powers was by far the most important government loan placed in the

1. The issues were the Pennsylvania 4s of 1921 and the Milwaukee and St. Paul 4s of 1925. Fin. Rev. 1916, p. 34.

2. Com. and Fin. Chron. Jan. 6, 1917, p. 15, 16. The government published an official list of fifty-four bond issues which it offered to buy or borrow.

3. In May Parliament adopted a resolution, introduced by the Chancellor of the Exchequer, imposing a 10 per cent additional tax on incomes derived from securities which the government had offered to purchase or borrow. Com. and Fin. Chron. Feb. 20, 1917, p. 204.

4. The Financial Review mentions a total of \$135,000,000 to \$160,000,000 of such credits. 1916. p. 34, 41, 54.

5. Ibid. p. 24, 34, 44, 50. The first loan fared rather badly. The sales amounted to only \$40,000,000. The larger loan was given wide publicity and was oversubscribed. It sold to yield about 5.5 per cent.

United States, but borrowing by other foreign governments was considerable and served to swell the demands upon the American investment market.¹

In contrast to the large volume of foreign loans, the issues put out by domestic corporations were few. The total listings on the New York Stock Exchange were greater than in 1914, to be sure, but smaller than for any other year since 1907. An increase from 1914 was to be expected since the closing of the exchanges had made it almost impossible to market securities during the later months of that year and financing had been accordingly restricted.² But if we except the amount representing listings of old issues, the increase is slight.³ Issues for new capital increased about 25 per cent,⁴ but there was a decided decrease in issues for replacement. New issues, for all purposes, were about evenly divided between the first and the last six months of the year.⁵ Short-term financing

1. Issues put out by Germany and various neutrals bring the total of foreign government loans mentioned in the Review to \$742,700,000. Fin. Rev. 1916, p. 17, 23, 24, 30, 38, 50. It is interesting to notice that the Canadian government placed its first loan in New York City; it had formerly done its external financing through London.

2. More than \$40,000,000 in 1915 against \$5,000,000 in 1914. Fin. Rev. 1916, p. 66.

3. From \$361,770,667 to \$451,854,514. Idem.

4. The 1914 figure was \$122,222,333; the figure for 1915, \$48,798,786. Idem.

5. The total listings for the first six months are about \$278,000,000; for the last six months, about \$265,000,000. If we except the issues of the State and City of New York, however, the total for the first six months is reduced to \$186,000,000. The volume of railroad issues was much greater the latter part of the year, the volume of industrial issues much smaller. Fin. Rev. 1916, p. 67.

was very considerably reduced in 1915, if one may judge by the Chronicle's compilations of the important note issues.¹

There was nothing remarkable about the investment loans of American corporations in 1915 unless it be that they amounted to less than one would expect after a year when financing was necessarily restricted. But heavy demands were made upon the country's stock of loanable funds by the sale of foreign-held securities and by the direct borrowing of foreign governments. One is not surprised to find bond yields remaining high in comparison with other interest rates. That they did not rise still higher is explained in part by the speculative demand for securities of all kinds. This demand was encouraged of course by the low call loan rates. It seems to have been in full swing in April, with war stocks leading, railroad securities, both stocks and bonds, somewhat "neglected", but stocks and bonds of every class feeling to some extent the effect of great activity on the Exchange and the resulting price advances.² In May there was a distinct reaction,³ but speculative purchases began again in July, continued to August in spite of wide fluctuations in prices, and seemed to reach a peak in October in both volume and price level.⁴ Bond yields fell

1. After a steady increase in the volume of note issues mentioned in the Chronicle, from about \$368,000,000 in 1912 to \$561,000,000 in 1914, the total fell to \$374,657,926 in 1915. Fin. Rev. 1916, p. 68.

2. Ibid. p. 27.

3. Ibid. p. 31.

4. Ibid. p. 39, 43, 51, 52. The volume of transactions on the New York Stock Exchange, monthly, is given by the Commercial and

slightly in April, 1915, seemingly in response to the activity in speculative trading. From May to August they were on the increase, an advance that is quite consistent with the record of trading on the Exchange, for comparatively little attention was paid the securities of the railroads until October when reports of railroad tonnage showed tremendous increases and railroad issues shared in the general gains.¹ The war stock mania was over in November, but the prices of railroad securities did not decline greatly and some of them rose to new high levels.²

But speculative activity on the Exchange is not the only explanation of the failure of bond yields to rise in a year when the demands upon the American investment market were great. The increased bank reserves that led to lower money rates also made it possible and profitable for the banks to increase somewhat their

Financial Chronicle in its Bank and Quotation Section.

TRANSACTIONS ON THE NEW YORK STOCK EXCHANGE 1915

(thousands)

	<u>Shares of Stock</u>	<u>Par Value of Bonds</u>
Jan.	5,076	\$ 57,111
Feb.	4,383	43,843
Mar.	7,862	63,215
Apr.	21,022	110,360
May	12,581	64,284
June	11,004	57,957
July	14,372	55,536
Aug.	20,432	72,253
Sept.	18,399	80,741
Oct.	26,679	105,192
Nov.	17,634	130,089
Dec.	13,699	120,517

1. Fin. Rev. 1916, p. 52.

2. Railroad earnings continued to improve. Ibid. p. 56, 63.

holdings of bonds.¹ But the banks were not the only important buyers. American exporters were realizing high prices on their shipments to Europe, and however profitable their business it was neither prudent nor practicable to invest the entire volume of new income in enlarging plant and equipment, nor were profits paid out at once in dividends. Corporations engaged in the war industries were, at least temporarily, investors in bonds.² It is probable, too, that dividends, when they were paid, were largely reinvested by the shareholders, and while many enthusiasts must have purchased war stocks, the more conservative invested in standard bonds. There was a considerable addition, that is, to the loan-fund of the country, and the addition consisted largely of war profits.

The rapid absorption of new offerings, while it kept bond yields from rising very high, was not able to prevent an advance from 4.34 in April to 4.48 in August. It is difficult to say just why the rise began and ended when it did, but we may hazard an explanation. It was on the first of April, as we have seen, that the New York Stock Exchange removed its last minimum restrictions. Bond prices did not fall at once, but actually rose because of the speculative demand. In May, however, that demand

1. Total investments, including bonds, stocks, claims, warrants, etc., of national banks increased from about \$1,854,000,000 on June 30, 1914, to about \$1,975,000,000 on June 23, 1915, the increase in holdings of state and municipal bonds amounting to about \$68,000,000, the increase in railroad bonds to about \$37,000,000, and the increase in foreign government bonds to about \$23,000,000. Reports of the Comptroller of the Currency.

2. It was reported that one-fifth of the Anglo-French loan was taken by six subscribers, and that the Bethlehem Steel Company and the du Pont interests were among the "larger applicants".
Fin. Rev. 1916, p. 50.

had ceased for a time, foreign-owned securities were coming onto the market in great quantities, and bond prices, since they were no longer supported by the minimum requirements of the Stock Exchange, began to fall. The recovery in the autumn was due to the excellent reports of railroad earnings, and probably also to the turning of new investors to the bond market rather than to the stock market because war stocks at least had been discredited at the time of the "mania" which ended in October.

What does a study of the situation in 1915 contribute to the theory of interest? There were extraordinarily heavy demands upon the loan fund in the American investment market in that year. They came, for the most part, from the nations engaged in the war, and they would probably have been insistent even if interest rates had risen to far higher levels than they actually reached. But at the same time there was a very considerable addition to the loan fund. The addition seems not to have resulted from any notable increase in the concrete wealth of the country, nor from the exercise of greater thrift. It consisted chiefly of the proceeds of war sales at high prices, and, to a lesser extent, of bank credits created in a spirit of optimism and on the basis of the large gold imports. Clearly, Davenport's loan fund concept is more applicable here than Boehm-Bawerk's idea of the subsistence fund. Europe's time-preference was high because her present needs for war consumption were great. But her bidding for loans did not result in any very considerable rise in the interest rate simply because her war purchases had themselves created conditions in this country that caused an increase in the pecuniary volume of the loan fund. For

example, the man who sold supplies to the British government received high prices for them. This gave him a differential advantage in this country since the general price level had not risen very far. He invested a considerable portion of his profits in the American security market. His prospects were good, bank credits were easily obtained and the process was repeated. Europe was paying in the ever-increasing prices of war materials.

The year 1916 witnessed the continuation on a still larger scale of the characteristic movements of 1915. Exports of merchandise and the excess of exports over imports were both much greater than they had been,¹ gold imports were not so great at the beginning of the year and they were more than offset in February, March, and April, by large exports of the metal, but the imports for June set a new high record,² and from that time to the end of the year they were heavy. Bank reserves were still large in absolute amount, though they had shrunken in proportion to

1.	<u>Merchandise Exports</u>	<u>Excess of Exports</u>
	(millions)	
1915	\$3,555	\$1,776
1916	5,483	3,091

Foreign Commerce and Navigation of the United States. 1919,
p. xi.

2. Imports in June were \$122,735,000, and net imports were more than \$110,000,000. Imports for the following months ranged from about \$20,000,000 net to about \$130,000,000 net. Annual Report of the Treasurer of the United States.

deposits.¹ The volume of foreign loans was much greater than it had been in 1915,² and foreign-owned securities continued to come back to this country.³ Money rates were low until the middle of the year.⁴ In June and early July income tax collections caused large withdrawals of funds from the New York banks, and money rates rose sharply.⁵ The volume of production, particularly in the war industries, continued to be great,⁶ prices of iron and steel products were rising sensationally,⁷ and profits were

1. The Report of the Comptroller of the Currency gives the following data concerning the reserves of the national banks in New York City on the various call dates in 1916:

	<u>Reserves</u> (thousands)	<u>Per Cent - Reserves to</u> <u>Deposits</u>
Mar. 7	\$513,400	23.7
May 1	456,700	21.7
June 30	447,900	22.2
Sept. 12	422,900	20.7
Nov. 17	461,400	21.1
Dec. 27	457,600	21.9

2. The foreign loans mentioned in the Chronicle for 1916 amount to more than \$1,113,000,000, including \$105,000,000 in French credits. Com. and Fin. Chron. Jan. 6, 1917, p. 12, 16, 20, Jan. 13, p. 112, Jan. 27, p. 306, Feb. 3, p. 398, Feb. 10, p. 502, Feb. 17, p. 604, Feb. 24, p. 708, Mar. 3, p. 803, 806.

3. See, for example, the figures for foreign holdings of American railroad securities, quoted on p. 94 infra.

4. See the Harvard Review of Economic Statistics, Jan. 1919.

5. Com. and Fin. Chron. Jan. 27, 1917, p. 307, Feb. 3, p. 398.

6. The output of pig iron was more than 3,000,000 tons for every month in the year, a record that is unsurpassed in the period 1908-1921. See the Harvard Review of Economic Statistics, Jan. 1919, for figures quoted from the Iron Age.

7. Com. and Fin. Chron. Jan. 6, 1917, p. 14, 15, 21, Jan. 13, p. 112, 115. Prices fell in June because purchases for use in this country had declined. In July, however, there was renewed buying on a large scale and in October the demand seemed almost insatiable. Jan. 27, p. 306, Feb. 3, p. 398, Feb. 24, p. 708.

tremendous.¹ Wholesale prices of all commodities were advancing from the very beginning of the year,² and in November the high level of food prices seemed to be causing real distress.³ Railroad traffic was very heavy and railroad earnings were good.⁴ Wage increases were common throughout the year, and from the end of March until September 4 the attention of the country was fixed upon the struggle of the Railway Brotherhoods for an eight-hour day and time and a half for over-time. The struggle culminated in the issue of a strike order by the Brotherhoods, and the passage by Congress of the Adamson Act, in order to avert the catastrophe of a nation-wide railroad strike.⁶ The volume of new loans listed on the Stock Exchange was appreciably larger than in 1915, even if

1. A Federal Trade Commission report gives the following figures for the percentage of profits to investment of the United States Steel Corporation and the company's own figures for the amount of net income (in millions) before the payment of federal income and excess profit taxes.

	<u>Percentage Profits to Investment</u>	<u>Net Income</u>
1914	2.8	\$ 47
1915	5.2	98
1916	15.6	294
1917	24.9	478

Sen. Doc. 248, 65th Cong. 2nd sess. p. 9.

2. The Bureau of Labor index number rose from 106 in December, 1915, to 146 in December, 1916. Monthly Labor Review, Feb. 1920, p. 87, 88.

3. Com. and Fin. Chron. Mar. 3, 1917, p. 802.

4. Com. and Fin. Chron. Jan. 6, 1917, p. 15, Jan. 13, p. 113, 117.

5. Com. and Fin. Chron. Jan. 6, 1917, p. 15, Jan. 13, p. 115, Jan. 20, p. 205, Mar. 3, p. 803.

6. Com. and Fin. Chron. Jan. 13, 1917, p. 111, Feb. 10, p. 500, 501, Feb. 17, p. 604.

one omit the government loans.¹ There was a decrease, in 1916,
in the volume of unlisted notes.² Government loans bring up the
total, however, and, according to the Chronicle's listings, there
was a net increase of more than \$1,150,000,000 in the volume of new
issues put out in the United States in 1916 over the 1915 volume.³

Neither threatened strike nor large earnings, neither foreign
loans nor gold imports, neither low money rates at the first of the
year nor the sudden advance of the rates in June and July seem to
have affected at all the yields on high grade bonds. The railroad
bond index held an even course, rising from 4.25 in January to
4.32 in August and then declining, only less gradually, to 4.22 in
November. It is difficult to balance factors as diverse as those
in operation in 1916, but of the influences we have mentioned,
those tending to raise the yield undoubtedly predominate. There

1. The total, without the government loans, was \$559,695,500 in
1916 against \$541,192,000 in 1915. Government loans raise the
1916 amount to \$1,829,186,000. Ibid. Jan. 19, 1918, p. 230.

2. Due, says the Chronicle, to the fact that the investment market
had become more favorable for borrowing corporations. Ibid. Feb.
3, 1917, p. 394, 396.

	<u>1915</u>	<u>1916</u>
3.		
Unlisted notes	\$375,000,000	\$ 225,000,000
Total Stock		
Exchange Listings	<u>541,000,000</u>	<u>1,829,000,000</u>
	916,000,000	2,054,000,000
Old Issues Now		
Listed	<u>41,000,000</u>	<u>26,000,000</u>
	875,000,000	2,028,000,000
		<u>875,000,000</u>
		1,153,000,000

The figures given in the preceding table are taken from the
Chronicle correct to the nearest million. Com. and Fin. Chron.
Feb. 3, 1917, p. 395, 396; Jan. 19, 1918, p. 230.

was a rise, to be sure, but it was a slight one, and the decline that followed carried the index to a lower point in December than it had reached in January. How are we to explain this situation?

Early in 1917 the western manager of a large investment house¹ accounted for the great demand for investment securities by the fact that extensions and improvements were being financed out of profits and the new issues were therefore fewer than they otherwise would have been, by the fact that the large earnings and the "improved financial position" of corporations were inspiring the investor with confidence, by the fact that low money rates were driving the banks to buy bonds while corporations were buying for surplus account, and by the fact that dividend payments had been large and were being reinvested. This explanation is more pertinent to a discussion of interest rates in 1916 than in 1917, since it applies to the decline in bond yields that set in during the latter part of 1916 rather than to the rise that began soon after the statement was published. The first point in the explanation seems to be of little importance. The fact that demands for loanable funds would have been still heavier if profits had not been used for capital purposes helps us little in determining how the large existing demands were met. The second point is more convincing. Investors had reason to be confident, and, moreover, the course of bond prices since August, 1915, must have discouraged those who were holding out for cheaper prices and higher yields on prospective investments in standard bonds. The rest of the

1. W. L. Ross of Kean, Taylor and Company, quoted in the Com. and Fin. Chron. Feb. 3, 1917, p. 402.

explanation is practically the same as the one we offered for the course of the interest rate in 1915, and it seems, if anything, more applicable here. The records corroborate the statement concerning the increase in bank investments,¹ and the opinion of an officer in a reputable bond house is probably reliable evidence of the investment policy of corporations and individuals.

What does this mean in terms of interest theory? At a time when demands for loans were more than usually great, and when productivity, in the sense of value return, was high, the interest rate on long-term bonds was actually declining. We are not justified in saying that the willingness of men in general to sacrifice present for future income had undergone any marked change either because of greater foresight in providing for the future or because present incomes were greater. Wages had increased but it is not wage-earners who buy bonds. But there was another group that profited. Holders of securities in the war industries received large additions to their incomes, and, since there was little prospect that war dividends would last for long, they invested them. It seems to be a clear case of the influence of the time-shape of the income-stream upon the rate of interest. Large present income and a prospective decline in the income-stream

1. National bank investments amounted to \$2,298,000,000 on June 30, 1916, against \$1,975,000,000 on June 23, 1915, holdings of railroad bonds having increased from \$379,000,000 to \$468,000,000 and holdings of foreign government bonds from \$33,000,000 to \$117,000,000. By June 20, 1917, total investments had risen to \$2,748,000,000, investments in railroad bonds were practically the same and investments in foreign government bonds amounted to \$284,000,000. Reports of the Comptroller of the Currency.

in the future lowered the rate of time-preference. Corporations engaged in the war industries invested some of their profits in expanding their own plants, but they feared that the war demands might cease and hesitated to expand greatly on so precarious a footing. Moreover they realized that a liberal credit policy was requisite to the very maintenance of the war demand, and for these two reasons they made large contributions to the loan fund in the investment market. Productivity, because it was temporary, seems to have resulted in additional supply of loanable funds rather than in increased demand for them.

In February, 1917, there began a steady rise in the rate of interest on long-time loans that is like nothing the index had shown in the past nine years. From 4.16 in January the yield on ten railroad bonds rose to 4.98 in December. There was no month during the year that did not see an advance over the figure of the preceding month, but the rise was somewhat steeper from March to June than it was later in the year. Commercial paper rates rose also. In February the rate on 4-to-6 months paper was once more in its normal position, that is, it had reached a higher level than the yield on railroad bonds after having been distinctly lower for all but one month in twenty-four. It advanced to a peak in June, declined in July but reached a new high point in December. The rate on 60-to-90 day paper followed a similar course, though it rose more slowly and did not pass the railroad bond index until

¹ May. This movement in interest rates, more particularly the

1. The Harvard Review of Economic Statistics. Jan. 1919.

movement in the yield on railroad bonds, is by far the most striking and significant one that we have encountered up to this point. Its beginning coincides, as we have seen, not with the actual declaration of war by the United States but with the events that made that declaration inevitable. Conviction that it was a matter of weeks only before the United States would become definitely involved in the European conflict caused interest rates to rise. This can hardly be doubted, but one wishes to examine as far as possible the attendant circumstances.

In 1917 there was a continuation of the large gold imports that had been a feature of the two preceding years, but they were met by increasingly large exports, and in July the net flow was out of the country. Imports did not again exceed exports until December and then only temporarily.¹ This change in the amount of gold imports was not due to any change in the balance of trade. The excess of merchandise exports over merchandise imports was in fact

1.	<u>Imports</u>	(millions)	<u>Exports</u>
January, 1917	59		21
February	104		22
March	139		18
April	32		17
May	52		58
June	91		67
July	27		69
August	19		46
September	4		31
October	4		11
November	3		7
December	17		5

Annual Reports of the Treasurer of the United States.
 The estimated stock of gold in the country increased from \$2,451,000,000 on June 30, 1916, to \$3,019,000,000 on June 30, 1917, but the greater part of this increase came in 1916. The increase from June 30, 1917, to June 30, 1918, was slight. Reports of the Director of the Mint.

1
 somewhat greater in 1917 than it had been the preceding year. The increase in the outflow of gold was due to shipments from the United States to South America and the Orient,² and the falling off of imports of the metal, to the fact that European nations, our largest purchasers of merchandise, were restricting the export of gold beyond their own boundaries and were paying their bills in this country by making use of the credits and loans which the United States, as an ally, was freely granting to them.

Foreign-owned American securities continued to find their way into the investment markets of the United States but their volume was almost negligible in comparison with the vast war loans floated here. In November, 1916, the Federal Reserve Board had issued a warning against the indiscriminate investment of bank funds in the obligations of foreign cities and governments. The result had been an immediate withdrawal of a quantity of short-term bills which the British and French governments were about to place on the American market, the cessation of foreign borrowing for a time, and no little indignation on the part of foreign bankers.³ In 1917 the situation was entirely changed. The overwhelmingly important new bond issues of that year were the two Liberty Loans put out by the United States

1. \$3,381,000,000 against \$3,091,000,000. Foreign Commerce and Navigation of the United States. 1919. p. xi.

² During 1917
 2. The United States exported \$215,000,000 of gold to South America, the West Indies, Japan, and other non-European markets. Com. and Fin. Chron. Feb. 2, 1918, p. 433.

3. Com. and Fin. Chron. Mar. 3, 1917, p. 803. For an indication of the attitude of British bankers toward the action of the Federal Reserve Board, see the quoted statements of Sir Edward Holden, managing director of the London City and Midland Bank. Com. and Fin. Chron. Feb. 3, 1917, p. 408.

government. On June 15, 1917, when subscriptions to the First Liberty Loan were closed, over 4,000,000 subscribers had sent in bids that totaled \$3,035,226,850. Only the authorized \$2,000,000,000 was allotted, however. Subscriptions to the Second Liberty Loan amounted to \$4,617,532,300, and the total allotment was \$3,808,766,150. The subscribers to this loan numbered about 9,400,000.¹ A considerable portion of the proceeds of these loans was directly extended to the allied governments through credits established for them in this country and through purchase of their obligations. The total of such loans to the allies made between April 24 and November 1, 1917, was \$3,717,200,000.²

The magnitude of the government issues in 1917 came as a surprise even to the best informed persons in financial circles. A statement quoted in the Chronicle for March 24, pointed out that a government bond issue might be looked for within the next sixteen months and that investors should not lose sight of the fact that authorized and unissued government bonds to the amount of \$790,500,000 were "overhanging the market".³ The following week Thomas W. Lamont in a speech on "financial preparedness" predicted that the entrance of the United States into the war would be followed by extensive grants of credit to the allies, and that the aggregate of such loans might possibly amount to \$1,000,000,000.⁴

1. Annual Report of the Secretary of the Treasury. 1917, pp. 5-11.
2. This was about \$400,000,000 less than the loans and credits agreed upon. Ibid. p. 17.
3. Com. and Fin. Chron. Mar. 24, 1917, p. 1095.
4. Com. and Fin. Chron. Mar. 31, 1917, p. 1212.

The tremendous volume of war financing was the chief factor raising the rate of interest in 1917. Although the amount of new loans to be put out during the year was at first underestimated, it was well known that the volume would be great. European experience had taught that modern warfare is a costly undertaking, and since the United States would not be able to get men into the field for some time, her chief contribution, it was understood, would be supplies and credits with which to purchase supplies. The prospect of new issues as well as the issues themselves raised the yield on long-term bonds. It is interesting to follow the courses of the bond index and the call loan rate. Call money was to be had on easy terms until June. The rate was below 2.50 per cent from January to April and rose in May only to 3.08. Demands for funds at the time of the flotation of the First Liberty Loan sent it to 4.69 the following month, but it fell off sharply in July.¹ The bond index, on the other hand, had risen steadily since the first of the year and the flotation of the First Liberty Loan did not appreciably accelerate its advance. One reason for this may be that payments for purchases of Liberty bonds were not made en bloc, but extended for two months following the subscription, but this by no means prevents one from concluding from the remarkably even rise of the rate during 1917 that the expectation of large demands for long-term loans in the future had at least as much weight with the investor as had immediate market demands in the form of new flotations.

1. Harvard Review of Economic Statistics. Jan. 1919.

While the large offerings of government loans were sending bond yields to higher levels than they had known for years, the demands for bank accommodation were having their effect upon commercial paper rates. The volume of production continued at a high pitch, wages and wholesale prices were advancing, and the banks were hard put to it to supply the current needs of business enterprise. As a result bank purchases of bonds were restricted and the available data seem to show that while the increase in bank holdings the early part of the year was rather generally distributed among the different types of investment, in the latter half it was almost entirely confined to United States and foreign

1. The monthly output of pig iron was not as steady as it was in 1916 but the total for the year is 38,185,000 tons in 1917, showing a decrease, but not a very great one, from the output of 39,025,000 tons in 1916. Harvard Review of Economic Statistics, Jan. 1919.

2. Com. and Fin. Chron. Jan. 12, 1918, p. 128, Mar. 30, 1918, p. 1285.

3. The index of the Bureau of Labor shows a steady advance from 151 in January to 186 in July. The August figure is one point less than the figure for July and there is no further rise during the year. This was due undoubtedly to the price-fixing activities of the federal government. Monthly Labor Review, Feb. 1920, p. 87, 88. Bradstreet's index, on the other hand, does not show the effects of price-fixing but rises from 13.73 in January to 17.60 in December.

4. Reserves of national banks in New York City (correct to the nearest million of dollars) and the percentage of reserves to deposits on the various call dates in 1917 were as follows:

	<u>Reserves</u>	<u>Percentage to Deposits</u>
Mar. 5	\$513	22.0
May 1	471	21.0
June 20	435	20.0
Sept. 11	348	15.4
Nov. 20	357	15.2
Dec. 31	559	14.9

Report of the Comptroller of the Currency.

government bonds.¹

The effect of war is to increase a people's preference for present goods, and provided the increase is great enough it must affect the interest rate. We could look for no better evidence of the limitations on the expansibility of the loan fund than is offered by the course of the rate of interest in 1917. Europe's war demands in our market could be met, for a time at least, by bank-created, profit-created funds, without any great rise in the interest rate. But our own entrance into the conflict increased both the demands upon the investment market in the United States and the popular estimate of the seriousness and the probable duration of the war. Real sacrifices must be made. Not only was the size of the First Liberty Loan astounding but the First Liberty Loan would probably not be the last. Patriotism and clever advertising could secure 4,000,000 subscribers to that Loan. But \$2,000,000,000 worth of claims to present goods and services were not to be had on the old terms, and there was a steady and very considerable rise in the interest rate.

After its phenomenal rise during 1917 the index on ten railroad bonds followed an uncertain and irregular course during 1918. It dropped in January from 4.98 to 4.89, went to 4.88 in February, recovered the following month, and reached 4.99 in April. After a slight decline in May it rose above 5 per cent in June and in September it reached a high point of 5.11. This was the peak of the long rise that had begun the year before when the index advanced from 4.16, its level in January, 1917. In October there

1. Reports of the Comptroller of the Currency.

was a steep decline in bond yields and November saw a still greater fall. The figure for the latter month was 4.69. In December there was an upward swing and at the end of 1921 the index had not returned to the low point of 1918. The course of money rates was quite as erratic in 1918 as the course of the long-term interest rate. Both 4-to-6 months and 60-to-90 day paper advanced during January, February and March. During the four months that followed, the rate on 60-to-90 day paper remained almost stationary just under 5.90 per cent, while the rate on 4-to-6 months paper fluctuated above 6.00 per cent. During September and October both rates stood at 6.00 per cent, and the call loan rate had risen to the same point. The rate on 4-to-6 months paper seems to have remained there the rest of the year, but the rate on 60-to-90 day paper and the call loan rate fell off to 5.86 and 5.31 respectively.¹

The factors causing the rise in time rates are large credits granted to the allies,² the practical cessation of gold imports,³ the low percentage of reserves to deposits, and the large trade demands for loans resulting from increasing volume of

1. See the Harvard Review of Economic Statistics, Jan. 1919.
2. According to one Chicago banker, the heavy demands for banking accommodation resulting from the extension of credit to foreign purchasers could not have been met had there been no Federal Reserve System. Com. and Fin. Chron. Feb. 2, 1918, p. 435.
3. The percentage of reserves to deposits in New York City national banks was 14.4 on the date of the Comptroller's call in March and 14.9 in May. In June there were large gold imports which seem to account at least in part for the fact that the absolute amount of reserves was much higher on the twenty-ninth of that month and that the percentage of deposits had also risen. Report of the Comptroller of the Currency. For imports of gold see Annual Report of the Treasurer of the United States.

production¹ and a rising price level.² But how shall we account for the course of railroad bond yields? The fall at the first of the year is a common occurrence and no doubt was due in 1918, as in other years, to the investment of January disbursements. The rise that followed hardly needs separate explanation. It is simply a continuation of the war rise of the preceding year. The German successes in the spring of 1918 convinced the most hopeful that the war would last for some time, and it was well known that the United States government would put out at least one more large bond issue. It is not the rise of the rate of interest in March and April that is difficult to explain, but its decline in May following the placing of the Third Liberty Loan, and the fact that it rose only comparatively slowly during the following months.

The most important items in the list of new flotations for 1918, as for 1917, are the Liberty Loans of the federal government. The Third and Fourth Liberty Loans, placed in April and September respectively, were larger offerings than the issues of 1917. Like those issues, they were over-subscribed, and the total allotments in this case were no less than \$11,141,041,500.³ Credits to the

1. The total amount of pig iron produced in 1917 was 38,185,000 tons. In 1918 it was 38,506,000 tons. See the Harvard Review of Economic Statistics, Jan. 1919.

2. The index numbers put out by Bradstreet's and the Bureau of Labor Statistics both indicate that prices were rising until after the middle of the year, that they declined somewhat during the second half but rose again at the close.

3. Allotments in the Third Liberty Loan were \$4,176,516,850, in the Fourth \$6,964,524,650. It is to be noted that with each successive loan the number of subscribers had increased. More than 18,000,000 persons subscribed to the Third, and nearly 23,000,000 to the Fourth Liberty Loan. Annual Report of the Secretary of the Treasury, 1918, p. 13, 1919, p. 31.

amount of \$4,602,304,750 were granted to our allies.¹ Long-term bond issues of American business enterprise were unusually small in amount.² There were two reasons for this. In the first place, rates were very high and borrowing corporations were naturally reluctant to put out long-term issues, preferring to secure necessary funds by the placing of callable, short-term notes. And in the second place the Capital Issues Committee was active throughout the greater part of the year. This committee had been appointed in February to discourage though it could not forbid the issue of securities for the purpose of "non-essential" expenditures. It received the support of bankers and of the New York Stock Exchange, and seems to have had considerable influence in restricting the volume of new capital issues.³ Not only was the issue of long-term bonds restricted in 1918, but in spite of the fact that corporations were encountering heavier charges for all their equipment goods and were depending more than ever upon note issues, the volume of short-term issues mentioned in the Chronicle was very

1. From November 1, 1917, to November 15, 1918. Annual Report of the Secretary of the Treasury, 1918, p. 36.

2. Of bonds listed on the New York Stock Exchange the issues of electric railways increased, but they are a relatively insignificant part of the whole. Railroad bond issues had amounted to more than \$525,000,000 in 1917, but in 1918 they were only \$61,294,600. The decline in the amount of miscellaneous bonds was only less striking. The total for 1917 was \$447,636,300, for 1918, \$97,954,000. Fin. Rev. 1920, p. 102.

3. A great number of corporations submitted their proposed issues to the Committee for its formal approval or disapproval. More effective and more common than actual disapproval of an issue was the informal statement that an issue would probably be disapproved if submitted. The support of the New York Stock Exchange came in the form of a resolution not to list issues that had not had the formal approval of the Capital Issues Committee. Com. and Fin. Chron. Feb. 2, 1918, p. 439, Feb. 9, p. 541, Mar. 30, p. 1290.

much less that year than it had been in 1917.¹ In the case of the railroads, borrowings were light because there was little new construction, and because the War Finance Corporation granted loans to the roads, holding their bonds as security.² This ruse did not diminish the volume of demands upon the investment market. It did, however, substitute government credit for railroad credit; of the two government credit was far superior.

In spite of the curtailment of private borrowing the aggregate of new issues in 1918 was great. Why did the rate of interest rise so slowly? One reason probably is that it had already risen far. Investors were receiving returns that were approximately one per cent higher than they had received in the pre-war years. Higher rates probably called forth increased savings, and while higher prices made the cost of maintaining a given standard of living greater than it had been, incomes were also greater.³ Furthermore,

1. The amounts were \$729,872,200 for the earlier, \$362,334,400 for the later year. Com. and Fin. Chron. Jan. 19, 1918, p. 230, Jan. 25, 1919, pp. 313 and 314.

2. Ibid.

3. Not only did incomes from property reported by individuals in income classes of \$3,000 and up, increase from \$3,861,000,000 in 1916 to \$4,027,000,000 in 1918, but incomes from personal service and business increased at the same time from \$4,489,000,000 to \$7,476,000,000. U. S. Treasury Dept. Statistics of Income, 1916, p. 9, 1918, p. 9.

banks purchased large quantities of the new issues,¹ and they facilitated the purchase by their customers of still larger quantities.² Investments of corporations for surplus account furnished, no doubt, an important part of the supply of loanable funds.

The course of bond yields in 1918 affords an opportunity of examining the effect upon the investment market of the rise of federal income tax rates. The usual argument is that the increase of the rates has driven investors, particularly large investors, to sell their holdings of railroad and industrial bonds and to purchase tax-free municipals.³ Such action, in the absence of opposing

1. Total bond holdings of national banks amounted to \$2,698,000,000 in June 20, 1917, and to \$3,866,000,000 on June 29, 1918. There was a slight increase in the holdings of state, county and municipal bonds, a decrease in every other type but United States government bonds, and an overwhelming increase in holdings of government bonds, the figures for the two years being, respectively, \$905,000,000 and \$2,117,000,000. At the same time investments of state, savings and private banks and loan and trust companies reporting to the Comptroller shifted in much the same way. Holdings of United States government issues increased from \$77,000,000 to \$455,000,000, but holdings of state, county and municipal and railroad and other public service bonds decreased from \$1,026,000,000 to \$850,000,000. The net result for the banking system, as represented by the Comptroller's reports is an increase in bond holdings of about \$950,000,000 from June, 1917, to June, 1918. (It has been necessary to exclude from these totals a part of the bond investments of banks other than national because these bonds are reported in the class of "other bonds, stocks, warrants, etc.", but the figures suggest that there was an increase here as well, so that the total increase given above is probably too small rather than too large.) See the reports of the Comptroller of the Currency for the data on which these estimates are based.

2. Warnings issued in February by a semi-official body called the Committee of Economics indicate that loaning to the government through borrowing rather than through saving was already a common practise. Com. and Fin. Chron. Feb. 16, 1918, p. 657.

3. For an ingenious presentation of this argument see an article by Roy C. Osgood entitled the "Effect of Taxation on Securities". 88 Ann. Amer. Acad. 156.

forces, would lower the rate on municipals as compared with the rate on railroad bonds. The War Revenue Act of October, 1917, increased the normal income tax rate from 2 to 4 per cent, reduced the maximum exempted income, and imposed a supplementary surtax¹ ranging from 1 to 50 per cent on incomes of more than \$5,000. The result was that upon that part of an individual's income by which the total income exceeded \$20,000, and did not exceed \$40,000, for example, the total tax rate was 12 per cent while under the former law it had been 3 per cent. For larger incomes the difference between the rates imposed by the two laws was greater. The excess of an individual's income above \$150,000 and not above \$200,000 was taxed at the rate of 35 per cent, against the rate of 8 per cent under the 1916 law, while the total tax on income over \$2,000,000 was now 67 per cent instead of 15 per cent.² The Revenue Act of 1918 was not passed until February, 1919, but hearings had begun in June and there could have been little doubt during the latter half of 1918 that income tax rates would be raised.³ The new law raised the normal rate and, what was more important for persons with large incomes, introduced a steeper graduation of the surtax rates.⁴ On income in excess of

1. U. S. Statutes at Large. 65th Cong. Sess. I. Ch. 63.

2. Figures given here have been taken from the statute itself and from the compilations of rates given in Professor Seligman's article, The War Revenue Act. 33 Pol. Sci. Quar. 37.

3. See R. M. Haig. The Revenue Act of 1918. 34 Pol. Sci. Quar. 370.

4. U. S. Statutes at Large. 65th Cong. Sess. III. Ch. 18.

\$20,000 and not in excess of \$22,000 the total tax was now 21 per cent whereas it had formerly been 12 per cent. Income over \$100,000 paid 64 per cent while it had paid 31 per cent under the old law, income over \$150,000 paid 68 per cent rather than 35 per cent, and income in excess of \$2,000,000 now paid a total tax of 77 per cent.

In 1918, then, and in the years immediately following, if high income tax rates do in fact induce investors to purchase municipal bonds, we may expect to discover a divergence of the municipal bond rate from the index on ten railroad bonds. As an index of yields in the municipal market, arithmetic means of the yields on two bonds of New York City and two bonds of the State of New York were calculated for the years 1915-1920.¹ Throughout the period the municipal bond index is, of course, lower than the index on railroad bonds. In 1915, 1916 and the first few months of 1917 the two rates follow almost parallel courses. For the first year the differences between them varied little, the minimum difference being .20 per cent and the maximum .33 per cent. Toward the end of 1916

1. The issues are:

New York State	
Canal Improvement	4½s of 1964
Canal Improvement	4s of 1960
New York City	
Corporate Stock	4½s of 1957
Corporate Stock	4s of 1958

Yields were calculated from prices quoted in the Bank and Quotation Section of the Commercial and Financial Chronicle. An index of so few issues is far from satisfactory, and the conclusions drawn above are necessarily tentative. It seems likely however that a more thorough examination of the point in question would yield similar results. The yield figures and their means are given in the appendix.

there was some divergence, the differences for the last six months of that year ranging from .37 to .43 per cent.¹ In 1917 the differences were not appreciably greater until September, but in that month the municipal index fell from its August level of 4.21 to 4.15, while the yield on railroad bonds continued to advance,² leaving a difference between the two of .56 per cent. In 1918 the divergence was somewhat smaller than this for the first four months, but from May to November it ranged from .60 to .79. This increased spread was due not only to the further rise in railroad bond yields but to a distinct drop in the yield on municipals. This seems to be the evidence for which we are looking. Why the divergence in the rates should have been delayed for some months after the passage of the act is hard to say, but it must be remembered that the difference even at the beginning of 1918 was much greater than it had been in 1915, and that the further spread in the latter part of 1918 may have been due to bond sales and purchases in anticipation of the law that was passed in February, 1919, as well as in response to the actual effects of the 1917 law. However that may be, the divergence between the two rates persisted throughout the two following years, and indeed was much greater in

1. The income tax law of 1916 was passed on September 8. It imposed a normal tax of 2 per cent, and surtaxes ranging from 1 per cent on that part of an individual's income that was over \$20,000 and under \$40,000, to 13 per cent on that part of an individual's income that was over \$2,000,000. U. S. Statutes at Large. 64th Cong. Sess. I. Ch. 463.

2. The divergence in the two rates preceded the passage of the War Revenue Act. There is no reason to suppose, however, that investors did not make shrewd guesses at the probable tenor of the law.

the latter half of 1919 and the first eight months of 1920.¹ The fact that while railroad bond yields were rising municipal bond yields dropped in April, May and June, 1918, and remained almost on a level from that time until February, 1920, shows that purchases for the sake of reducing income taxes were having a decided effect upon the municipal bond market.

Interest rates fell during the last few months of 1918, no doubt because the end of hostilities in Europe meant the cessation of war-time demand for funds and because it was generally believed that with peace would come lower prices, curtailed production, diminished business activity, a return to "normal" conditions. Our indices show that the rate on municipal bonds began to fall in September, the railroad bond rate in October, the call loan and 60-to-90 day rates in November, 1918, and the 4-to-6 months rate in January of the following year. What is the reason for this sequence? The drop in municipal bond yields one month before the drop in railroad bond yields may have been merely one incident in the divergence we have just noted between those two rates. More worthy of note is the fact that money rates remained high after the yield on railroad bonds had fallen. We have noted before that money rates are closely dependent upon the condition of the banks. Deposits of national banks in New York City were practically the same at the end of August, 1918, as they had been at the end of June, but reserves, and consequently the percentage of reserves to deposits, had been materially reduced. By the beginning of November reserves were still smaller, deposits had increased somewhat,

1. From August, 1919, through August, 1920, the minimum difference was .86 per cent, the maximum 1.02 per cent.

and the percentage of reserves to deposits had fallen to a low figure.¹ Trade demands for short-time loans had evidently not diminished, and this was to be expected since production continued at a high pitch and although prices had fallen somewhat they were still very high. Additional demands upon the banks came with increased activity on the Stock Exchange in October.² The very forces that contributed to the decline of bond yields were partly responsible for the fact that call loan rates remained high. But tension even in the money market did not persist for long. By January of the new year the rates had all reached low points.

The year 1919 saw bond yields once more on the rise. They had already advanced to 4.86 in January from the low point of the preceding November. In February they dropped slightly, but rose again, reaching 4.99 in April. Another drop, in May, was followed by a further rise to 5.18 in August. In October they fell, but they had risen by the end of the year to a new high point of 5.20 per cent.³ In contrast with the rise in railroad bond yields commercial paper rates remained fairly even throughout the year,

1. The Report of the Comptroller of the Currency gives the following data for New York City national banks (figures for reserves are given correct to the nearest million):

	<u>Reserves</u>	<u>Percentage - Reserves to Deposits</u>
June 29	\$424	17.3
August 31	368	15.1
Nov. 1	362	14.6

2. The number of shares of stock traded in during September had been 7,763,000. The figure for October is 20,671,000. Bond sales also show an increase, the figures for September and October being, respectively, \$21,859,000 and \$57,628,000 par value for railroad and miscellaneous bonds, and \$176,211,000 and \$230,933,000 for bonds of all kinds. Com. and Fin. Chron. Bank and Quotation Section.

if we except a distinct upward swing in June and the return in July almost to the May figure.¹ The call loan rate was even more erratic than usual. Already fairly high at the first of the year, it followed an irregular upward course during the first five months, rose sharply in June to 6.63, fell to 5.13 in August, and thence rose to 6.00 in September, 7.94 in October, and to 11.06² in November.

The expected contraction in the volume of business and fall in the price level in 1919 was by no means realized. January, to be sure, saw price reductions and curtailment of production,³ with a consequent diminution in trade demands for funds,⁴ and throughout the year production in the iron and steel industries was less than during the period of war orders.⁵ But even in the iron and steel industry the reduction was not as great as had been expected and in other lines, after temporary reaction, there was a return to great activity, accompanied by advancing prices and wage increases that served to raise prices still higher, since a large part of the demand for retail goods resulted from the lavish buying of the wage-earning classes.⁶ Consequently, after the first of the year

1. Harvard Review of Economic Statistics. Jan. 1919, 1920.

2. The call loan rate at the New York Stock Exchange was computed by Mitchell's method from data given in the Financial Review, 1920, p. 112.

3. Fin. Rev. 1920, p. 2, 3.

4. Ibid. p. 14.

5. Total pig iron output was 38,185,000 tons in 1917, 38,508,000 in 1918 and 30,582,000 in 1919. See the Harvard Review of Economic Statistics. Jan. 1919, 1920.

6. See the Financial Review, 1920, pp. i, ii, iii, iv, and reviews of the various months of 1919.

there was no considerable reduction in trade demands for banking accommodation, and commercial paper rates remained well above 5 per cent. The course of the call loan rate and extreme tension in the money market, which caused that rate to advance to heights that had been thought impossible under the Federal Reserve system are closely bound up with the year's history of Stock Exchange transactions. February saw the beginning of a remarkable rise in stock prices and a period of almost unprecedented activity on the Exchange.¹ The upward movement was particularly strong in April, received checks in June and July chiefly due to the high money rates and in August due, the Chronicle says, to threatened labor difficulties. The rise began again with renewed vigor in September and October carrying prices to high levels before the November slump.² The tremendous demands for call money that

1. The number of shares and par value of bonds traded in on the New York Stock Exchange in 1919 were as follows according to figures given in the Bank and Quotation Section of the Commercial and Financial Chronicle:

	<u>Shares of Stock</u>	<u>Par Value of Bonds</u>
	(thousands)	
Jan.	11,858	276,859
Feb.	12,211	238,364
Mar.	21,404	259,712
Apr.	28,587	297,875
May	34,413	288,994
June	32,860	251,714
July	34,502	265,589
Aug.	24,433	252,418
Sept.	24,142	286,961
Oct.	37,354	339,655
Nov.	30,169	373,967
Dec.	24,853	676,700

2. Fin. Rev. 1920, p. 20, 29, 38, 45, 59, 67, 74, 80, 88.

accompanied this speculative activity were largely responsible for the high rates that finally checked it. The matter is of importance to the present study chiefly because it affected the course of bond prices. The speculative boom had involved railroad shares less than industrials, and bonds less than stocks, but there are indications that it had some effect upon the prices of even standard railroad bonds, and is partly responsible for the fact that they did not fall farther in a year when railroad credit was seriously impaired.

Speculative activity did not, however, prevent a rise in railroad bond yields that was, as we have seen, practically continuous throughout the year. Undoubtedly this rise was due in part to the financial difficulties in which the railroads found themselves when Congress adjourned in March without providing for the expected fund of \$750,000,000 for the Railroad Administration. Extensive wage advances, and difficulties in securing legislation to effect the return of the roads to private ownership were also significant forces.¹ But there is little doubt that the rise was partly caused by the large new flotations of the year. Listings on the New York Stock Exchange indicate a distinct increase in the offerings of long-term bonds. In spite of the fact that railroad financing was restricted the total of new issues listed in 1919 is² more than twice as great as the figure for the preceding year.

1. See the Financial Review, 1920, p. 3, 4, 18, 32, 33, 93.

2. Issues for new capital listed on the New York Stock Exchange amounted to \$211,074,311 in 1919 as compared with \$100,148,400, and listings of railroad bonds for all purposes increased from \$61,294,600 in 1918 to \$205,251,700 in 1919. Fin. Rev. 1920, p. 102.

Note issues mentioned by the Chronicle also show a larger volume in 1919 than in 1918.¹ Up to this point we have taken the New York Stock Exchange listings and the Chronicle's estimate of new note issues as an indication of the volume of new flotations. For 1919 and the following years more complete figures are available. The monthly figures of new capital issues which the Chronicle began to publish in March, 1921, were compiled for preceding as well as current months and the series is complete from January, 1919. It is not of much value in making comparisons with issues before that date, but shows how the new offerings of 1919 were distributed throughout that year. The balance particularly for new issues is decidedly on the side of the later months, probably because corporate issues were forced to make way for the Victory Loan in the early part of the year, and because reaction from the temporary depression that followed the signing of the armistice carried neither prices nor construction work far until after the turn of the half year.² The offerings of the federal government while they were much more restricted than they had been in 1918, were yet considerable. The Victory Loan, put out in April chiefly for the purpose of funding the floating debt incurred

1. The figures are \$407,632,000 for 1918 and \$524,763,500 for 1919. Fin. Rev. 1920, p. 102.

2. The totals for corporate bonds, stocks, and notes, and foreign government, municipal and federal government bonds (excluding the Victory Loan) are as follows: Com. and Fin. Chron.

TOTAL LISTINGS
(millions)

Jan.	\$279	July	\$491
Feb.	274	Aug.	347
Mar.	151	Sept.	347
Apr.	320	Oct.	663
May	227	Nov.	380
June	443	Dec.	282

for war and demobilization purposes, amounted to \$4,500,000,000.¹ That the investment market of the United States, after a year in which the Government had made heavy calls upon it, was able to absorb these large offerings without a much greater rise in bond yields is due partly to the speculative demand for securities mentioned above, but probably more fundamentally to the fact that the buying power of the investing public was greatly augmented. Income tax returns indicate that the total incomes of persons receiving annual incomes of \$5,000 and more increased steadily from 1916 to 1918 and increased very greatly from 1918 to 1919, while incomes to those in the income classes of \$40,000 and up decreased somewhat from 1916 to 1917, but showed an even greater proportional increase from the latter year to 1919.² Statistics from the same

1. It was oversubscribed, but only the original amount was allotted. Payment for these bonds was made in installments extending from the date of issue, April 24, to November 11. There was a \$200,000 issue of the War Finance Corporation bonds the same month. Report of the Secretary of the Treasury, 1919, p. 50, 51, 52.

2. The figures taken from Treasury Department publications are as follows:

Income Groups	Income From Service and Business	Income From Property	Total Income
<u>\$5,000 and up</u>			
1916	3,735	3,608	7,393
1917	3,657	3,811	7,468
1918	4,353	3,319	7,671
1919	6,795	3,414	10,209
<u>Income Groups</u>			
<u>\$40,000 and up</u>			
1916	1,389	2,024	3,413
1917	940	2,004	2,944
1918	3,416	1,388	4,804
1919	5,270	1,309	6,579

Statistics of Income, 1916, p. 6, 1917, p. 8, 1918, p. 9, 1919, p. 9.

source show that corporation incomes were less on the whole in 1919 than they had been in 1917. It must be remembered however that 1917 was a most unusual year. Corporation incomes show a decided increase in 1919 over their 1918 volume and while we are by no means certain how much of the new income was invested for surplus account corporate purchases of bonds were probably somewhat greater¹ in 1919 than in the previous year.

In 1920 bond yields continued to rise, reaching their peak in June. January witnessed a slight drop to 5.19 from the December figure, but in February there was a steep increase to 5.37, another in April to 5.50, in May to 5.66 and in June to 5.69. This is the culmination of two successive advances in the rate on long-term investments. The war rise was followed by a sharp decline, but the post-war rise, though it was neither so steep nor so steady, carried the rate to a point where bonds yielded one and one-half per cent more than their highest yield in the first five years of our period.²

1. Net incomes of corporations reporting net and net incomes of all corporations, are reported as follows:

	<u>Corporations</u> <u>Reporting Net</u> (millions)	<u>All</u> <u>Corporations</u>
1916	8,766	8,109
1917	10,730	10,100
1918	8,362	7,672
1919	9,411	8,415

Statistics of Income, 1916, p. 11, 1917, p. 18, 1918, p. 13, 14, 1919, p. 9, 10.

2. The continuation of Mitchell's index, gotten out by the Harvard Review of Economic Statistics, reached a much higher point. It advanced from 5.51 in January, 1920, to a peak of 6.28 in June.

One feature of the trend of individual yield figures deserves mention here. In the pre-war years the dispersion of our series of railroad bond yields was relatively slight. The point can be illustrated by means of figures chosen at random. In January, 1908, for example, with an index of 4.16 the lowest individual yield figure is 3.94 and the highest 4.68. In June, 1909, the index was 3.93, the lowest yield, 3.76 and the highest, 4.20; in April, 1910, the index was 4.03, the lowest yield, 3.82, and the highest, 4.29; in October, 1911, the index was 4.05, the lowest yield, 3.85, and the highest, 4.26.¹ In 1913, when the index was rising, the range was somewhat greater, the lowest yield being 4.03 in May of that year, and the highest 4.56, with a second high of 4.48. The dispersion in 1917 was decidedly larger. The low yield for October was 4.47 and the high 5.27. In June, 1920, the range was greater still, extending from 5.24 to 6.36, with a second high of 5.97. This matter of dispersion would undoubtedly repay a more careful analysis. At present we can only point it out as an indication that at times of high and rising rates, the issues that are weaker in point of security suffer relatively greater depreciation in the market.

Commercial paper rates as well as bond yields rose to extraordinary heights in 1920. The monthly average rate on 60-to-90 day paper began to climb in November, 1919, rose continuously during the first half of 1920 reaching 7.72 in June and 8.00 in August, remaining high through October and not falling below 7 per cent

1. We have examined the range only. This somewhat exaggerates the amount of dispersion for the series as a whole because the yield on the Atlantic Coast Line bond was higher than the yield on any of the others. Taking the next highest bond for each of the sample months gives the following figures: 4.28 for January, 1908, 4.15 for June, 1909, 4.18 for April, 1910, and 4.16 for October, 1911.

until May of the following year. The rate on 4-to-6 months paper followed a similar course at somewhat higher levels.¹

It is a matter of common knowledge that the volume of business, whether measured in terms of physical output or value of transactions, was unusually great during the first six months of 1920. Physical volume of production had been great in 1919 as compared with the pre-war years, but the totals for 1920 were still greater.² The trend was not the same in all lines. Manufacture increased from the beginning of 1919 through the first six months of 1920, but mining and pig iron output continued to increase during the latter half of 1920.³ Prices, as we have seen, were high and rising, and there were heavy demands for bank accommodation. Imports of gold were great but they were largely offset by exports⁴ and bank reserves were low.⁵ From the beginning of

1. Harvard Review of Economic Statistics. Jan. and June, 1921.

2. In comparison with the war years, however, the showing is not so good. The following data are given in the Harvard Review:

INDICES OF PHYSICAL PRODUCTION, 1918-1920
(Average for 1909-13 = 100)

	<u>1916</u>	<u>1917</u>	<u>1918</u>	<u>1919</u>	<u>1920</u>
Agriculture	100.4	108.5	107.1	109.1	118
Mining	129.5	134.5	135.6	110.8	128
Manufacture	127.7	125.6	125.0	114.0	115

Physical Production in 1920. Harvard Review of Economic Statistics. Feb. 1921, p. 37.

3. Ibid. 38, 39.

4. Heavy imports in April in anticipation of payment of the Anglo-French loan brought the total for that month up to \$48,522,000, for example, but the exports that month were \$44,844,000. Annual Reports of the Treasurer.

5. The Report of the Comptroller of the Currency gives the

the year the issues of the Chronicle were full of warnings against further credit expansion, complaints that the efforts of the Federal Reserve Board to reduce the borrowing of member banks were almost entirely ineffectual and statements that the increase of Federal Reserve note circulation was both dangerous and ¹inexcusable. The increase in the number of Federal Reserve notes outstanding was indeed striking, but the credit inflation was even greater as measured by individual deposits in the national banks of the country. ²In spite of liberal credit extensions induced by the high rates further applications came in and the rates continued to rise. The beginning of enforced liquidation in some lines in May coincided with a much steeper rise in commercial paper rates, and the Chronicle reports that in June although the rediscount rate stood at 7 per cent, banks were still realizing profits on their ³loans.

following figures for national banks in New York City in 1920:

	<u>Reserves</u> (millions)	<u>Percentage -</u> <u>Reserves to Deposits</u>
Feb. 28	346	13.4
May 4	358	13.8
June 30	363	13.5
Sept. 8	333	13.2

1. Com. and Fin. Chron. Feb. 14, p. 588, Feb. 21, p. 684, Mar. 1, p. 13, 17, May 15, p. 2010, June 5, p. 2322.

2. The following figures were taken from the Reports of the Comptroller of the Currency:

	<u>Federal Reserve Notes</u> <u>Outstanding</u> (millions)	<u>Individual Deposits</u> <u>In National Banks</u>
June 30, 1916	176	8,143
June 20, 1917	547	9,522
June 29, 1918	1,848	10,182
June 30, 1919	2,688	11,891
June 30, 1920	3,150	13,705

3. Com. and Fin. Chron. June 5, p. 2322.

The high money rates had a direct effect upon the investment market. Bonds that had not been fully paid for were sold because of the great increase in the expense of carrying them, and men were selling bonds in order to meet various kinds of liabilities such as calls for bank loans and margins on stock purchases.¹ Not only was the market affected by these offerings of old issues, but the demands in the form of new flotations were heavy. After the first two months of the year issues of private corporations came largely in the form of short-term notes. Monthly totals for the first five months were well above the figures for the corresponding months in 1919,² and the year's listings on the New York Stock Exchange, although far short of the pre-war amounts, were larger than for 1918 or 1919.³ The refunding issues were slight, by far the greater part of the flotations being for new capital purposes, from which we may conclude that the prevailing optimism was leading men to expand permanent equipment almost as recklessly as they were expanding working capital, and that the extraordinarily high yields which they were compelled to allow to investors had little deterring force. Nor was domestic borrowing the only factor in the situation. Foreign governments had been floating loans in our markets. The actual volume of such loans was not very great but the imperative

1. The Chronicle gives these reasons for the fall in the price of United States bonds in March. They must have applied to other bonds as well, and with increasing force as the progress of liquidation continued. Com. and Fin. Chron. Mar. 6, 1920, p. 16.

2. According to the Commercial and Financial Chronicle's monthly compilations.

3. The Financial Review, 1920, p. 102; Com. and Fin. Chron. May 6, 1922, p. 1952.

need of the borrowers made them willing to pay high rates and it seems probable that these rates had some indirect and not wholly reasonable effect upon the yields which investors demanded on loans made to domestic corporations.¹ The supply of investment funds in the bond market was naturally restricted at a time when speculative opportunities for profit were great, and still more restricted when men were forced to realize on resources of all kinds in order to meet the pressing demands of liquidation. The Chronicle finds the heavy income tax rates a further reason for the fact that "investment capital" was scarce in 1920. Profits which would otherwise have been available for investment were being taken by the government in the form of payment on federal taxes.²

Wholesale prices reached their peak just one month before the peak of bond yields was attained. The Bureau of Labor Statistics index number advanced from 99 in September, 1915, to 106 in December. The January figures for the five succeeding years were 110, 151, 185, 203, and 248, and the figure for May, 1920, was 372.³ The coincidence suggests that Fisher's argument concerning depreciation is relevant to this situation. Depreciation there undoubtedly was, and men must have expected it, although the full extent of the price rise was probably not foreseen. Bond yields rose later than prices and their increase was less, proportionally.

1. In an article published in March, 1920, Thomas W. Lamont said that it was possible to buy bonds of the strongest governments to yield 9 per cent. *Foreign Government Bonds*. 88 Ann. Amer. Acad. 124.

2. *Com. and Fin. Chron.* April 17, p. 1562, April 24, p. 1672.

3. This is the Bureau's new series, calculated on the base 1913. *Monthly Labor Review*. Feb. 1920, p. 87, 88; Dec. 1920, p. 63.

This is quite consistent with Fisher's theory. Prices rise, bond yields rise; prices fall and hard upon the turn in the trend of prices comes a drop in bond yields. It is impossible to segregate the direct effect of depreciation. The fact that rising prices probably played an important part in stimulating business activity and so contributed indirectly to the increase in the demand for funds and the rise of the interest rate, is not corroboration of Fisher's point. What logical justification have we for believing that men demanded higher interest rates on their investments on the ground that the money in which the loan would be repaid would be worth less in terms of goods and services? The man who bought a thirty-year bond in 1915, intending to hold it to maturity could have been little concerned with the fact that prices were to rise until 1920, since only a small part of his real income from the investment could be affected by that rise. But if he argued from the fairly steady advance that had taken place since the closing years of the nineteenth century that prices would not return to their old levels for a decade or more, the expected depreciation may have affected his computations. The argument is stronger in the case of the temporary investor. The man who contemplated selling the bond in 1920, if he had had any foreknowledge of the rise in prices, would have reasoned that even were he able to realize the full monetary price which he had paid for the bond, the value of the return on his investment would be less in terms of commodities. His return, unlike that of the man who waited for the bond to mature, would depend upon market fluctuations in bond prices as well as upon depreciation of the monetary standard, but that complication need not be introduced into the argument. There seems reason to

believe, then, on the ground of general reasoning and the inconclusive but corroborative evidence of the data, that depreciation was partly responsible for the rise in interest rates that terminated in June, 1920. The evidence for the following months is far less convincing. Wholesale prices declined steadily to 148 in June, 1921.¹ A slight decline in bond yields in July was followed by a steeper and steady fall to 5.24 in October, but the index rose again in December. It declined at the beginning of the new year, but advanced to a second peak of 5.57 in June. If appreciation was having an effect upon the interest rate at this time, the effect was largely offset by other forces. However the period is comparatively short, the movements of both commodity prices and bond yields require further analysis, and no serious doubt is thrown upon our present conclusions by the conflicting evidence of these months.

How are we to explain the course of the railroad bond index since its peak in June, 1920? Perhaps the first thing to be noted is that the course was unlike that of commercial paper rates. Both the 60-to-90 day and the 4-to-6 months rate continued to climb through July and August, the former advancing from 7.72 to 8.00 per cent, and the latter from 7.95 to 8.25. They remained high throughout the year declining only slightly, to 7.88 and 8.00 respectively. The downward movement was gradual for the first four months in 1921, but in May both indices fell sharply, and from that time until November, when they stood at 5.18 and 5.45, their

1. Monthly Labor Review. Dec. 1920, p. 63; Mar. 1922, p. 67.

decline was steep.¹ Bond yields, as we have seen, followed a course that was far less regular than this.

By October, 1920, the bond index had almost reached its January level. Rates on mercantile paper remained high because liquidation was far from complete and the banks were cautious about making new loans. In August the influence of the crop-moving demands kept money rates from declining.² Bond yields, on the other hand, were feeling the effects of stock market activity. The course of stock prices during the latter half of 1920 was an erratic one. In July improved railroad prospects and easier call money caused a revival of trading on the New York Stock Exchange.³ Stock prices were fairly high in July but they declined later in the month. They rose in August upon the announcement that the Interstate Commerce Commission had granted rate increases for which application had been made in June.⁴ In October railroad shares, at least, were rising but in November there was heavy liquidation.⁵ The July recovery of trading in the stock market was felt in the bond market also in a slight increase that month in the total

1. Harvard Review of Economic Statistics. December 1920, Dec. 1921. The figures for December 1921 are not available.

2. Com. and Fin. Chron. Aug. 28, 1920, p. 820.

3. Com. and Fin. Chron. July 10, 1920, p. 116. The number of shares traded in had fallen from 28,447,000 in April to 9,354,000 in June. The figures for following months were 12,542,000 in July, 13,729,000 in August, 15,296,000 in September, 13,667,000 in October, 22,069,000 in November and 24,139,000 in December. Com. and Fin. Chron. Bank and Quotation Section.

4. Com. and Fin. Chron. June 19, 1920, p. 2512, Aug. 7, 1920, p. 522.

5. Com. and Fin. Chron. Oct. 29, 1920, p. 1398, Nov. 13, p. 1878, Nov. 20, p. 1976.

transactions in railroad and miscellaneous bonds, and in still greater increases in the succeeding months.¹ There were several reasons for this demand for bonds. In the first place, bond prices although they were rising were still phenomenally low. The man who was in a position to invest knew that he had an exceptional opportunity of realizing a high return on his investment, and he took advantage of it. As liquidation progressed more funds were released, and since direct investment in business enterprise offered no inducements and the bond market was attractive the funds continued to find their way into long-term investments. The liquidation on the stock market and the fact that bond prices had improved while general business conditions were still uncertain undoubtedly account for the sharp December rise in the bond index.

January, 1921, saw the decline in bond yields that so often occurs at the beginning of the year, and the index remained low in February. In March an advance began that reached a high point of 5.57 in June. As in the preceding year, bond yields fell in July and continued to fall. But in contrast with the upward turn at the end of 1920, there was a precipitate decline in the index in

1. The increase in trading in bonds of all classes did not come until September, however. The monthly figures are as follows:

	<u>Railroad and Miscellaneous Bonds</u>	<u>All Bonds</u>
	(thousands)	
June	39,765	321,193
July	44,836	239,764
Aug.	61,890	214,586
Sept.	89,458	287,250
Oct.	101,319	331,254

Com. and Fin. Chron. Bank and Quotation Section.

November and December, 1921. In December it stood at 4.88 per cent, the lowest figure since February, 1919. We are faced with this surprising situation. In a year of depression, low prices, greatly curtailed physical production and declining rates on commercial paper, bond yields followed a course that was, with the exception of a minor movement at the end of the year, very like their course in a year of prosperity, inflation and crisis, when prices were high and mercantile rates advancing. It is quite possible that the likeness is more apparent than real, for the peak in 1920 marked the end of a long rise, while the peak in 1921 seems to have been only a break, though it was a notable one, in the decline of bond yields that is characteristic of a period of depression. Nevertheless the coincidence is a singular one and requires an explanation.

Lower rates on long-term investments led to an increase in the volume of new issues in the later months of 1920 and the early months of 1921, and this increase was in a large measure responsible for the rise in yields toward the middle of 1921. The placing of an extraordinarily large issue in April, 1921,¹ although it was a refunding operation, probably gave an added fillip to the market rate. Borrowers in general seem to have seriously overestimated the power of the market to absorb new issues. Some persons were² expecting a revival in business in the near future and hence were

1. The Great Northern-Northern Pacific joint loan of \$250,000,000.

2. Professor C. J. Bullock, in a Review of the First Quarter of 1921, published in the Harvard Review of Economic Statistics, April, 1921, stated that indices of business conditions pointed to a fairly quick revival, and while an academic interpretation of statistical data does not necessarily accord with the impressions of business men in whose hands lies the control of affairs, nevertheless the more optimistic portions of the business world were probably not less hopeful.

reluctant to invest their funds in bonds since they hoped to recoup their recent losses by more speculative enterprises. In other quarters funds were tied up in almost unsaleable stocks of goods. Moreover the call loan rate was high, and the semi-speculative demand for new issues at their first appearance in the market was correspondingly light.

But the rise in bond yields could not continue for long. Depression was not broken by the expected revival, large gold imports and the almost complete lack of inquiry for bank accommodation caused money rates to decline. As a consequence of this decline banks invested more heavily in bonds and speculative buying became increasingly attractive in spite of the gradual decline in bond yields.

A summary account of the course of the investment rate from 1915 through 1921 must point out as the most characteristic feature of that period the unusually high level of the rate, and the fact that it fluctuated widely. The rise in 1915 was far short of expectations and in spite of repeated applications for foreign loans the rate actually declined toward the end of 1916. We have accounted for its course chiefly on the ground that war profits were added to the usual supply of funds in the investment market. When the United States became involved in the war and the federal government added its loans to the other demands upon our market the interest rate advanced. The restriction of private borrowing and the reinvestment of war dividends served to check the advance somewhat in 1918, but there was no return to lower rates until men saw the definite prospect of a conclusion to the war, and even then the

rate did not fall very far. The period of post-war inflation witnessed a further advance of the interest rate. Additions to the loan fund from profits and the liberal extension of bank credit were powerless to check this rise. Since June, 1920, there have been extreme fluctuations but the trend at the end of the following year was decidedly downward, a fact that is in accord with the usual line of reasoning concerning the interest rate in a period of depression.

CHAPTER V

CONCLUSIONS

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One of the conclusions of this study concerns the adequacy of the investigation itself. In many cases it was impossible to examine all the scattered data bearing upon the problem examined, and only the more available figures were chosen. This left gaps which a more extensive study would attempt to fill. In other cases the information required for a thorough analysis is not to be had. A study of all the available data would still be incomplete: it is a matter of degree only. With a reservation, then, we may proceed to a statement of the conclusions that have been drawn from this survey of the forces governing the interest rates from 1908 to 1921.

We have not found the productivity theory applicable as an explanation of the course of market rates. It may be objected that the theory is an analysis of normal interest and not in any way to be tested by such an investigation as this. There is validity in the objection. We cannot criticize the theory as such, but we can call into question its pertinence to an analysis of actual data. Alternate periods of depression and revival may be taken as roughly indicative of falling and rising profits. To say that productivity varies with profits does violence to the definitions of the theorists, but we cannot come nearer than this to a measure of productivity on the basis of the data in hand. The year 1908 witnessed both industrial depression and falling bond yields, but it is to be remembered that interest rates rose in that year for some months after the industrial decline had set in and that they continued to fall in 1909 when many lines of trade were recovering.

A lag is quite consistent with the theory, it may be argued, but what is to be said of 1911 when depression brought no appreciable fall in the rate either early or late? There was a slight rise in 1912 with the period of prosperity that year, but the rise was quite overshadowed by the greater one that came in 1913 when there was, to all appearances, a general decline in productivity. High productivity, in our sense, in 1916, seems to have been, in large measure, responsible for the fact that the interest rate that year was at first stable and later declining. It was not productivity but war need that sent the rate up in 1917, and although fear of depression because of the cessation of war demand may have been one reason for the sharp drop in 1918, the fact that people could see the end of government borrowing on the tremendous scale of the 1917 and 1918 loans, seems to have been a more important factor. The rise in 1919 and 1920 and the sharp drop in the latter half of 1920 are the best evidence this study can offer of the validity of the productivity argument. The trend of the rates in these years no more proves the strictly interpreted marginal productivity theory than the other evidence disproves it. But this much can be said of the forces in operation in 1919 and 1920. There was a considerable increase in the pecuniary value of the incomes of various sorts accruing to producers. The productivity of capital as of labor was becoming greater. Largely as a result of this productivity, and of the expansion in the volume of physical production and the rise in the price level that accompanied it, the rate on long-term investments advanced to an extremely high point. With the cessation of this increase in productivity and

the setting in of depression, the long-term interest rate fell. The course of the rate in 1921, on the other hand presents a situation that the productivity theorist would find it difficult to explain. In a period of depression when the productivity of capital must have been accounted low, the interest rate rose to a point that was almost as high as that attained in the preceding year of prosperity.

But this is not the only criticism of the applicability of the productivity theory that this study suggests. The theory seems to imply a single interest rate. In the market no such rate appears, and the statement that the productivity theory is concerned with normal and not with market rates is not an adequate reply to this attack. For there are many market rates and at least two classes of rates, namely those on what are commonly called investment and bank loans, which act in sufficiently diverse ways to demand separate study. A normal theory of interest that concerns itself with a single rate, then, though it were logically unassailable, would have little value as an explanation of economic facts. The answer that the marginal productivity theory does not necessarily involve the assumption of a single rate, but that it serves as an explanation of any rate, merely evokes a somewhat different statement of the objection. It is not only in the frequency of their fluctuations that commercial paper rates, for example, differ from bond yields. They fluctuate in response to forces which have little or no influence upon bond yields or which influence bond yields only indirectly, and, what should be of particular concern to the productivity theorist, they are more immediately affected than are bond yields by the borrowing which

comes as a result of increased business activity. A keener demand and higher price for its product may cause an industrial corporation to expand plant and equipment and therefore to put out a bond issue in order to raise the necessary funds. But capacity or "more than capacity" production in the existing plant usually comes first. This means, ordinarily, increased demand for bank accommodation in the form of time loans and, other things being equal, the increased demand causes a rise in the interest rate on commercial paper. The productivity analysis does not fit this situation very well. For quite another reason it proves inadequate as an explanation of the course of rates in the bond market. At a time of great and continued prosperity the volume of long-term borrowing resulting from that prosperity may contribute directly to the rise of bond yields, but when the revival has been mild, the rise of bond yields due only indirectly to prosperity, will somewhat discourage long-term borrowing and conversely, in a period of depression when rates are low, corporations who find it convenient to do so will put out large quantities of new issues. If the productivity theory is merely an explanation of trend in the interest rate through several decades or half a century, the present study has no bearing upon it, but if it refers at all to the general movement of the rate from year to year, the study indicates that the theory is neither an adequate nor a well-directed explanation.

The agio theory fails of being an adequate explanation, chiefly because it describes the situation only in terms of actual goods and services and the satisfactions to be derived from them. Fisher has supplemented his agio theory with a discussion of appreciation and interest which we have found to be in accord with

the facts as nearly as it was possible to determine them. But it is not only in this rather simple and direct way that the volume of money medium in a community affects the rate of interest. We shall leave to later discussion the validity of the loan-fund concept, and merely point out here that the agio theory must either be made to read in terms of loan fund as well as of goods and services, or it must take its place as only a partial solution of the interest problem. As such, it has proved of value. It seems probable that the steadiness of the rate from 1908 through 1912 was due to the adjustments effected by time-preference. The significant rise in the rate in 1913 could be satisfactorily explained on no other ground than that of a rise in the general rate of time-preference for income available in the near future over income available only in the remote future. The greater rise in 1917 was also explained chiefly in terms of time-preference. War is a fact which raises men's present needs for goods and services and makes them ready to lay heavy burdens upon the future. It acts to some extent upon the loan fund and to some extent upon the (pecuniary) productivity of capital, and by these influences tends to lower the rate of interest. But its chief effect is to raise the rate through its influence on time-preference. The agio theory is useful also in the explanation of falling interest rates. In at least one case, that of the decline in 1916, Fisher's argument concerning the influence on time-preference of the time-shape of the income-stream was found to apply in a most satisfactory way. The agio theory makes no more attempt than does the productivity theory to present an explanation of different market rates. But

the criticism urged against the productivity theory on this ground does not apply with equal force to the agio theory, for the agio theory is pertinent to various types of rate. It seems to fit best the rate of interest on investment loans chiefly because the exercise of the banking function has less influence upon this rate than upon others. Only a few instances have been cited in which the agio theory proved to be the satisfactory explanation of the rate, but those were cases of important fluctuations. It might be employed in other cases also. The agio theory is sufficiently complex and flexible that with a little ingenuity one would be able to fit it to widely varying situations. But so manipulated it would be of little real value, and the cases where it stands out as the one convincing explanation were found to be few.

What of Davenport's loan-fund idea? This concept would demonstrate its superiority more fully in a discussion of bank rates, in all probability, than in a discussion of bond yields, but even in explaining fluctuations in the long-term investment rate it has proved to be a fruitful one. As we have pointed out, the loan-fund theory is rather a statement of the proper method of approach to the interest problem than a statement of the causes of changes in the rate. It is of value chiefly as an outline and justification of a certain method of analysis. The data presented here have amply confirmed the correctness of this method. The precedent of contemporary discussion in the financial press and the necessities of the situation itself led us to discuss the fluctuations of the interest rate in terms of the loan-fund. Banking, credit, shift of funds from the stock market to the bond market and from the market for bank loans to the market for long-term investments, and the

purchase of bonds out of the proceeds of war sales have been advanced as explanations of changes in the rate and they all relate to the supply of present purchasing power measured in terms of the monetary standard rather than as quantities of concrete wealth.

If the statement that the rate of interest is to be explained by an analysis of the demand and supply of money funds furnishes the proper outline for a theory of interest, the question arises whether a study like the present one is able to give content to that outline. It is at this point that one most regrets the fact that the investigation has been limited. Further study along the same lines would be of real value, it is believed, as a basis and supplement for theoretical reasoning upon the interest problem. But even from the present investigation certain conclusions are possible.

There are several loan markets and while funds do pass from one to another of them the communication is not perfect and the adjustment of supply of funds is slow at best, and is probably never completely accomplished. A falling off of demand in the bank-loan market and a consequent congestion of funds there will affect the rate of interest on long-term investments only if the funds find their way into the investment market. There are three ways by which they may do this, through speculative purchases stimulated by low call loan rates, through the buying of bonds by banks as investment for idle funds, and through arbitrage transactions with distant markets. Conversely high rates in the bank-loan market may effect a withdrawal of funds from permanent investment through the sale of bank-holdings, through forced relinquishment of securities carried on a margin and in extreme cases through the

sale of bonds by business firms to supply them with needed funds which they can obtain at the banks only by payment of extremely high rates.

Events on the stock market have often, but not invariably, a decided effect upon the trend of bond yields. To a certain extent bond prices tend to move in sympathy with stock prices because bond investments are not riskless and although doubts concerning the future earning-power of a corporation affect more profoundly the prices of its stocks, they are not without influence upon bond prices. Similarly a boom in stock prices gives courage to the timid investor and seems to indicate still greater security in bond investments. So much for the coincidence of changes in bond and stock prices. It is probably a less important factor in the bond market than the shifting of funds from stocks to bonds or from bonds to stocks. Depression following a crisis makes men reluctant to undertake speculative investments of any kind. Prospective investors will turn to the bond market rather than to the stock market and even if they are compelled to sell at a loss, many persons will dispose of their stock holdings and purchase bonds. The more conservative investments are in greater demand and bond yields fall. On the other hand, when business prosperity, rising prices and increased demand for commodities promise large rewards to speculative enterprise there is a withdrawing of funds from the more conservative investments and bond yields tend to rise. The point is somewhat irrelevant but it should be noted here that the effect of this transfer of funds from the bond market to the stock market does not necessarily nor even usually raise stock prices, since generally there is at the same time a

withdrawing of funds from the stock market for direct investment in the working capital of business enterprise.

In the period from 1908 to 1921 we have found the shifting of loanable funds sufficient to account for such slight movements in the rate of interest as occurred during the first five years, but the rise from 1913 to 1920 requires another explanation. The loan fund in the American investment market comes chiefly from two sources: the savings of individuals out of current income to provide for future needs, and the investments of idle funds by corporations, including banks and insurance companies. Was the amount of this fund declining during the period in question or were the demands upon it becoming greater and more imperative? Monetary incomes, to be sure, were increasing steadily and considerably. But not all increases in monetary incomes lead to saving. The professional and salaried classes are typically the purchasers of bonds and these classes suffered during the period of monetary inflation since they enjoyed a relatively small increase in income and the prices of the goods which they consumed were advancing. Higher wages may have meant a corresponding increase in savings bank deposits and so, indirectly, an addition to the supply of funds on the investment market. And the classes of entrepreneurs, both small and great, country store-keepers and the owners of controlling shares in large corporations, were undoubtedly enjoying great increases in their pecuniary incomes. This would lead us to expect a considerable addition to the loan fund. But at the same time the standard of comfort of all classes was rising. Dealers in luxuries were finding ready market among persons who had formerly lived in a meager and frugal way and the large additions to the

incomes of the well-to-do seem to have made them extravagant as well as saving. The statement is based upon inductive reasoning but it seems probable that investigation would substantiate it. If it is true, the addition to the loan fund that larger money incomes would lead us to expect was not fully realized and furthermore there was probably a tendency on the part of some persons to spend past savings because of an unreasoning confidence born of unexpected profits that the future would be as well supplied as the present. What the net effect was upon the amount of loan fund it is impossible to state with any degree of certainty, but at least the supply was not as great as might be expected from a consideration of monetary incomes alone, since a larger supply of goods and services was required for present consumption and these goods and services were commanding higher prices. Corporate investments of surplus must have increased because of the expansion of the corporate form of enterprise and the depreciation of the monetary standard. We have at present no basis for estimating the amount of this increase. The point warrants careful investigation. Particular investments for surplus account are temporary but the total volume of such investments is maintained by frequent additions which offset frequent withdrawals. While our information concerning the supply of loanable funds is fragmentary, we have reason to believe that it has been increasing somewhat in recent years but that the increase has not been as great as the increase in the national dividend. Moreover one important source of supply has been cut off. European investors continued to furnish capital to American enterprise during the first years of our period, but

the data indicate that they were turning more and more to other and newer fields. By 1913 their contributions to the loan fund in the American market had become insignificant and after the outbreak of the war Europe was drawing capital from this market. The flow from this country to Europe has continued throughout the post-war period.

From the beginning of our period the demands of American borrowers upon the investment market have been increasing. On this point we have reasonably conclusive evidence. The bonds listed on the New York Stock Exchange each year are only a part of the total of new issues, but a great increase in these listings in all probability indicates a roughly corresponding increase in new flotations throughout the country. The twentieth century has witnessed a great, and fairly continuous increase in the yearly volume of these listings. And the increase seems not to have been a purely monetary one due to a depreciated currency. In a measure it is accounted for by the fact that a larger proportion of the nation's production is being carried on by corporate enterprises and consequently a larger proportion of the demand for funds is made formally upon organized loan markets. But it is also true, in all probability, that the total amount of the country's capitalistic undertakings has increased. Nor have the demands for bond investments been confined to private business enterprises. Government loans, since the beginning of the war, have been very large. We have considered the borrowing of states and municipalities and the volume of farm mortgage debt only incidentally but there has been a

notable increase in both.¹ Heavy demands upon the loan fund unaccompanied by a corresponding increase in the available supply account in large measure for the general rise in the rate of interest in recent years.

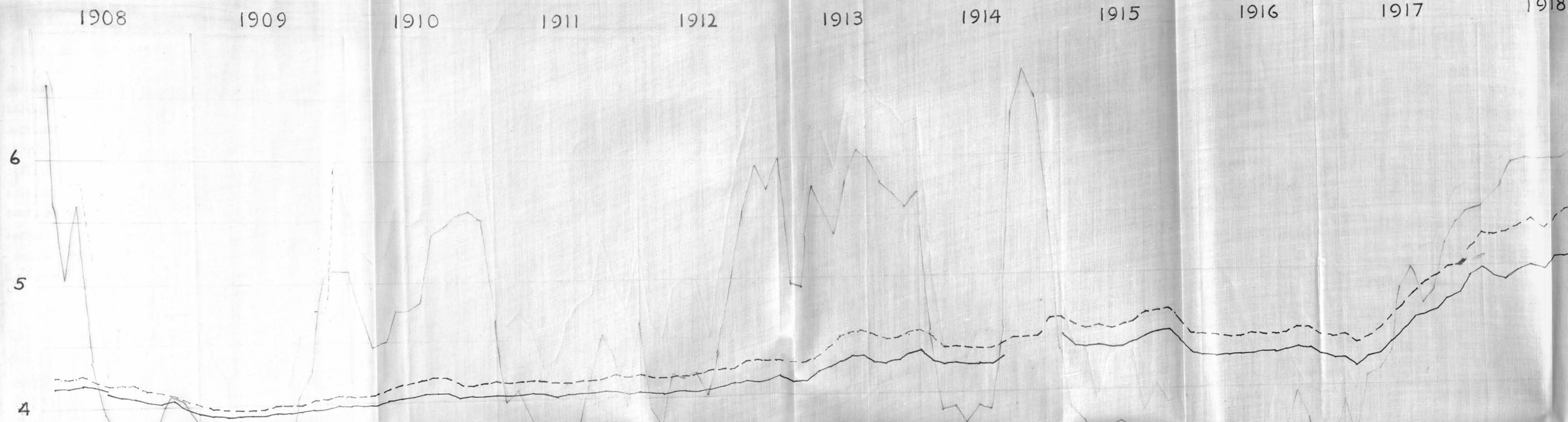
It has been found that the productivity theory is not applicable to an explanation of market rates. This leaves untouched the question of its logical soundness and the question of its adequacy as a theory of the long-run trend of the rates, that may underlie their year-to-year fluctuations. But it does suggest that a modification of the theory may be desirable. The agio theory we have found a useful one in explaining market conditions, and have criticized it chiefly on the ground that it runs in terms of concrete wealth only, not taking sufficient account of the influence of currency inflation upon the rate of interest. The loan-fund concept has proved to be in accord with the facts, but it provides a method of analysis rather than a statement of causes. To what can we turn as a theory of market rates? The answer of this study is that such a theory must take account of the fact that there are a number of loan markets and a number of interest rates. It must run in terms of demand and supply of the loan-fund, recognizing that there is no single force that dominates in the market at all times but that while time-preference may underlie all market changes a great many other

1. The Census reported the amount of farm mortgage debt in 1910 and 1920 on the same basis. The figures are \$1,728,172,851 and \$4,003,767,192 respectively. Thirteenth Census. Abstract of the Census - Agriculture, 292, 293. Fourteenth Census. Summary of the Census of Agriculture, 10.

factors are at work. They are not to be neglected, for while they sometimes offset one another and sometimes produce only small and temporary deviations from the rate as it would have been determined by time-preference alone, at other times their effects are cumulative and the resulting deviation is great. A scientific theory of market rates that attempts to make a quantitative statement concerning the forces that influence those rates cannot proceed upon the basis of assumptions, isolating one or two factors and determining what their effect would be in an unreal world. It must deal with market phenomena in their complexity if it is to be of value in interpreting those phenomena.

A P P E N D I X

BOND-YIELDS AND COMMERCIAL-PAPER-RATES



— INDEX OF RAILROAD BOND YIELDS.
- - - MITCHELL'S INDEX.

— 4-TO-6 MONTH'S PAPER RATES.
— 60-TO-90 DAY PAPER RATES.

1916

1917

1918

1919

1920

1921

6

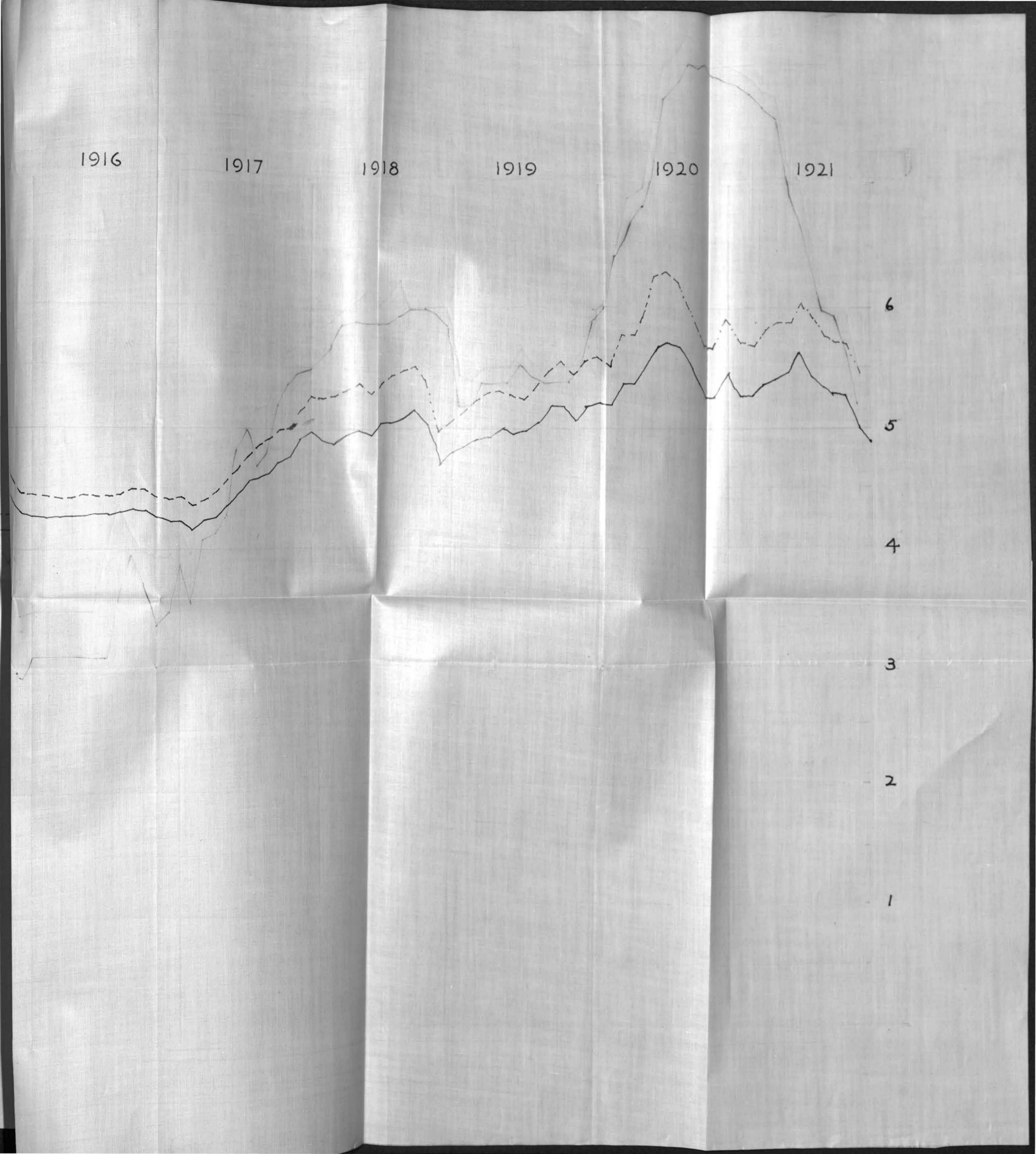
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4

3

2

1



AVERAGE PRICES OF TEN RAILROAD BONDS

ON THE

NEW YORK STOCK EXCHANGE

MONTHLY, 1908-1921

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	<u>1 9 0 8</u>											
A.T. & S.F.	97.5208	97.5625	96.4166	96.9583	97.1875	97.1041	97.2708	98.25	99.2291	99.6458	100.	100.1666
A.C.L.	87.25	83.0416	85.5833	85.375	89.6666	90.4583	90.875	93.1666	93.9583	94.0625	94.4166	94.8958
C. of N.J.	119.7917	121.375	122.2084	121.5417	122.4375	122.0209	122.0417	121.8751	122.7084	124.2917	125.25	127.4584
C.B. & Q.	99.2083	99.9375	98.1666	98.5833	99.1875	99.5416	99.8958	100.125	101.1666	101.2083	101.625	102.4166
N.Y.C.	89.1042	88.5	88.3959	88.7292	88.8125	90.1459	91.8542	91.	91.3334	91.4792	92.25	93.1459
N.P.	98.5833	100.	99.2916	99.8333	100.5625	100.6666	101.7083	102.25	102.5416	102.0833	102.875	102.7291
Penn.					100.7083	100.6875	101.2916	102.1458	102.1875	103.0416	103.5208	103.875
Reading	95.0833	94.0625	93.6666	95.0833	96.5	96.7916	97.5208	97.6875	98.4166	98.4583	98.4375	99.2916
S.P.	94.6666	95.8333	94.75	94.9166	95.0833	95.75	95.7916	95.8958	95.875	96.6666	96.7708	97.125
U.P.	100.3333	99.8125	98.9166	99.0833	99.5	100.2916	101.0833	101.8125	101.6666	101.3958	101.6875	102.4791

	<u>1 9 0 9</u>											
A.T. & S.F.	100.6875	101.25	100.9375	100.9375	101.0625	101.	101.4375	100.625	100.375	100.375	99.875	99.75
A.C.L.	95.375	96.875	97.	97.375	96.9375	96.1875	96.125	96.25	95.1875	95.25	95.375	95.
C. of N.J.	127.5	128.1875	128.0625	128.75	128.625	127.4375	127.75	127.5	127.125	126.1875	124.9375	125.125
C.B. & Q.	102.4375	102.9375	102.	102.125	101.875	101.3125	100.75	101.	100.8125	100.6875	100.5625	100.5
N.Y.C.	93.625	93.3125	93.	93.25	93.5	93.125	92.5625	91.75	91.75	91.125	90.625	91.5
N.P.	103.	103.625	103.1875	102.9375	102.75	102.625	102.8125	103.125	102.5625	102.25	102.1875	102.75
Penn.	104.4375	104.4375	104.375	104.8125	105.	104.875	104.375	104.4375	103.75	104.	104.4375	104.3125
Reading	100.125	100.1875	100.	99.875	99.875	100.4375	100.5	100.4375	99.75	99.4375	99.	99.375
S.P.	97.625	98.1875	97.6875	97.5625	97.5	97.0625	97.375	97.3125	97.375	97.	96.875	96.6875
U.P.	102.5625	103.5	103.0625	102.875	103.	103.4375	104.125	103.5	102.6875	102.75	102.4375	102.

	<u>1 9 1 0</u>											
A.T. & S.F.	100.4375	100.3125	99.4375	98.75	98.6875	98.75	98.5625	98.	98.9375	99.125	98.375	99.
A.C.L.	94.875	96.125	95.6875	94.3125	94.	93.25	93.25	92.875	94.8125	96.125	94.875	94.25
C. of N.J.	124.9375	125.	124.375	124.	124.25	122.5	120.875	121.25	123.	123.25	122.625	122.25
C.B. & Q.	100.3125	100.125	99.75	99.125	99.0625	98.8125	98.8125	98.8125	99.9375	100.8125	100.1875	100.1875
N.Y.C.	91.5	90.5	89.875	89.4375	88.875	88.375	87.6875	88.0625	88.5625	89.375	88.5	89.125
N.P.	101.9375	101.0625	101.	100.25	100.625	100.6875	99.75	99.5625	101.	100.5625	99.6875	100.
Penn.	104.4375	104.6875	104.3125	103.6875	103.1875	102.75	102.625	102.	102.3125	103.1875	103.375	103.5
Reading	99.5625	99.5	98.75	98.5	97.75	97.75	97.375	97.9375	98.375	98.6875	98.375	97.9375
S.P.	97.25	97.375	96.875	96.5	96.375	96.0625	95.4375	96.25	x _{96.8125}	x _{97.875}	x _{97.0625}	x _{96.75}
U.P.	101.4375	101.25	100.6875	100.25	100.75	100.75	100.625	100.5625	101.3125	101.5	101.25	101.

x. Supplied from quotations given weekly in the Chronicle.

	<u>1 9 1 1</u>											
A.T. & S.F.	99.	98.9375	98.5625	98.9375	98.9375	98.875	98.875	98.9375	98.6875	99.0625	99.3125	99.3125
A.C.L.	94.3125	94.125	93.9375	94.875	95.625	95.5625	95.0625	95.5625	95.5625	94.9375	95.75	95.5
C. of N.J.	122.75	122.875	122.75	122.9375	122.875	122.375	122.125	121.125	123.	120.625	122.0625	121.75
C.B. & Q.	99.9375	99.8125	99.5625	99.625	99.6875	99.5	99.25	99.0625	98.625	99.375	99.625	99.5625
N.Y.C.	89.375	88.4375	88.0625	88.5625	88.5	87.875	87.625	87.8125	87.5625	87.9375	88.3125	88.0625
N.P.	100.0625	100.375	99.8125	100.	100.0625	99.625	99.4375	99.0625	99.25	100.0625	100.0625	99.625
Penn.	103.625	103.875	103.5	103.375	103.8125	103.375	103.4375	102.625	102.25	102.875	102.8125	103.1875
Reading	97.875	97.375	97.0625	97.375	97.9375	97.875	98.1875	98.	97.4375	97.9375	98.25	98.25
S.P.	96.875	96.625	96.25	96.12	97.25	97.1875	97.	97.	96.6875	96.875	97.25	96.625
U.P.	100.75	100.625	100.5	101.3125	101.625	101.25	101.0625	101.0625	100.5	101.	101.1875	100.9375

ARITHMETIC AND
OF
YIELDS ON TEN
MONTHLY,

GEOMETRIC MEANS
THE
RAILROAD BONDS
1908-1921

	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>
					<u>19</u>	<u>08</u>						
Arith.	4.160	4.177	4.190	4.173	4.124 4.109	4.089	4.065	4.037	4.020	4.001	3.982	3.954
Geom.	4.155	4.168	4.184	4.167	4.121 4.106	4.086	4.061	4.034	4.018	3.999	3.980	3.951
					<u>19</u>	<u>09</u>						
Arith.	3.935	3.911	3.926	3.922	3.924	3.935	3.933	3.941	3.961	3.970	3.979	3.981
Geom.	3.932	3.909	3.924	3.920	3.922	3.933	3.931	3.940	3.959	3.968	3.977	3.979
					<u>19</u>	<u>10</u>						
Arith.	3.981	3.985	4.006	4.035	4.039	4.058	4.078	4.077	4.033	4.005	4.033	4.036
Geom.	3.979	3.983	4.004	4.032	4.037	4.056	4.076	4.075	4.032	4.004	4.032	4.034
					<u>19</u>	<u>11</u>						
Arith.	4.033	4.041	4.056	4.040	4.025	4.038	4.044	4.050	4.057	4.049	4.032	4.040
Geom.	4.031	4.039	4.054	4.038	4.024	4.037	4.043	4.049	4.056	4.048	4.031	4.039
					<u>19</u>	<u>12</u>						
Arith.	4.030	4.023	4.043	4.050	4.055	4.063	4.077	4.101	4.121	4.113	4.110	4.126
Geom.	4.029	4.022	4.042	4.048	4.053	4.061	4.075	4.099	4.119	4.118	4.109	4.125
					<u>19</u>	<u>13</u>						
Arith.	4.110	4.123	4.203	4.245	4.286	4.316	4.318	4.273	4.244	4.283	4.334	4.352
Geom.	4.109	4.122	4.201	4.243	4.284	4.314	4.315	4.271	4.242	4.281	4.332	4.350

YIELDS ON FOUR STATE AND MUNICIPAL BONDS
MONTHLY, 1915-1920

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						<u>1915</u>						
<u>NEW YORK STATE</u>												
4½s of 1964	4.09	4.09	4.09	4.04	4.09	4.08	4.06	4.08	4.02	4.04	3.93	3.93
4s of 1960	3.99	3.99	4.00	3.93	3.99	3.95	3.94	3.94	3.95	3.91	3.93	3.93
<u>NEW YORK CITY</u>												
4½s of 1957	4.25	4.27	4.26	4.23	4.30	4.35	4.41	4.40	4.36	4.21	4.20	4.20
4s of 1958	4.20	4.20	4.27	4.19	4.25	4.27	4.29	4.31	4.25	4.25	4.19	4.12
Arithmetic Mean	4.13	4.14	4.16	4.10	4.16	4.16	4.18	4.18	4.15	4.10	4.06	4.05
						<u>1916</u>						
<u>NEW YORK STATE</u>												
4½ Jan. 1964	3.85	3.82	3.82	3.82	3.82	3.86	3.82	3.79	3.81	3.80	3.80	3.79
4 Mar. 1960	3.86	3.78	3.77	3.78	3.78	3.90	3.77	3.74	3.74	3.75	3.74	3.74
<u>NEW YORK CITY</u>												
4½ May 1957	4.13	4.15	4.12	4.20	4.12	4.17	4.11	4.07	4.06	4.03	4.00	4.05
4 Nov. 1958	4.09	4.10	4.00	4.18	4.00	4.01	4.00	3.97	3.99	3.95	3.93	4.00
Arithmetic Mean	3.98	3.96	3.93	4.00	3.93	3.99	3.93	3.89	3.90	3.88	3.87	3.89
						<u>1917</u>						
<u>NEW YORK STATE</u>												
4½s of 1964	3.72	3.84	3.85	3.91	3.90	4.05	4.07	4.10	4.00	4.06	4.27	4.25
4s of 1960	3.69	3.90	3.83	3.83	3.90	3.95	4.00	4.00	4.00	4.00	4.18	4.25
<u>NEW YORK CITY</u>												
4½ May 1957	4.00	4.09	4.14	4.18	4.24	4.38	4.41	4.40	4.40	4.43	4.56	4.74
4 Nov. 1958	3.88	3.97	4.00	4.01	4.02	4.23	4.31	4.32	4.18	4.32	4.57	4.75
Arithmetic Mean	3.82	3.95	3.98	3.98	4.02	4.15	4.20	4.21	4.15	4.20	4.40	4.50

Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec.

1918

NEW YORK STATE

4½ Jan. 1964	4.12	4.10	4.19	4.19	4.19	4.02	3.99	4.05	4.01	4.01	4.14	4.16
4 Mar. 1960	4.16	4.13	4.37	4.20	4.22	4.09	4.08	4.08	4.19	4.11	4.08	4.10

NEW YORK CITY

4½ May 1957	4.72	4.72	4.75	4.75	4.51	4.47	4.48	4.60	4.51	4.48	4.35	4.38
4 Nov. 1958	4.73	4.70	4.72	4.83	4.51	4.49	4.51	4.57	4.56	4.52	4.32	4.39

Arithmetic Mean	4.43	4.41	4.51	4.49	4.36	4.27	4.26	4.33	4.32	4.28	4.22	4.26
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1919

NEW YORK STATE

4½ Jan. 1964	4.15	4.14	4.15	4.15	4.12	4.09	4.10	4.10	4.05	4.03	4.08	4.07
4 Mar. 1960	4.10	4.11	4.18	4.15	4.10	4.06	4.06	4.06	4.07	3.99	4.05	4.10

NEW YORK CITY

4½ May 1957	4.46	4.43	4.46	4.44	4.35	4.36	4.40	4.39	4.40	4.41	4.51	4.38
4 Nov. 1958	4.49	4.51	4.51	4.50	4.39	4.43	4.38	4.41	4.39	4.41	4.42	4.54

Arithmetic Mean	4.30	4.30	4.33	4.31	4.24	4.24	4.24	4.24	4.23	4.21	4.27	4.27
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1920

NEW YORK STATE

4½ Jan. 1964	4.05	4.15	4.27	4.36	4.27	4.27	4.27	4.50	4.50	4.30	4.42	4.45
4 Mar. 1960	4.10	4.26	4.18	4.26	4.25	4.49	4.46	4.43	4.43	4.29	4.40	4.52

NEW YORK CITY

4½ May 1957	4.54	4.74	4.57	4.83	4.96	4.95	5.00	5.04	4.94	4.74	4.91	4.98
4 Nov. 1958	4.60	4.52	4.62	4.89	5.07	4.95	5.09	4.56	4.80	4.64	4.95	5.00

Arithmetic Mean	4.32	4.42	4.40	4.59	4.64	4.67	4.70	4.63	4.67	4.49	4.67	4.74
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	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	<u>1912</u>											
A.T. & S.F.	99.25	99.6875	99.625	99.375	99.1875	98.4375	97.6875	96.9375	97.375	97.75	97.1875	96.875
A.C.L.	95.875	96.25	95.375	95.25	95.25	94.9375	94.5625	94.875	94.8125	94.9375	95.1875	95.1875
C. of N.J.	122.25	122.5	122.125	121.75	121.3125	120.375	120.5	120.125	118.625	118.625	118.4375	118.25
C.B. & Q.	100.	99.875	99.75	99.375	98.875	99.125	99.4375	99.1875	98.125	98.4375	98.0625	98.0625
N.Y.C.	87.5625	88.125	87.5	86.875	86.9375	87.375	87.1875	86.25	85.675	86.0625	86.5	85.8125
N.P.	100.25	100.25	99.8125	99.625	99.5625	99.3125	98.875	97.9375	97.9375	98.25	98.25	98.
Penn.	103.4375	103.875	103.	103.25	103.5625	103.8125	103.75	103.	102.875	101.5	102.5	101.875
Reading	98.75	98.5	98.25	98.1875	98.1875	97.9375	97.5	97.	96.375	96.6875	96.8125	96.5
S.P.	96.75	96.8125	96.5	95.75	95.8125	96.25	95.375	94.75	94.625	95.125	95.	94.5
U.P.	100.6875	100.5625	100.6875	101.625	101.3125	100.375	100.3125	99.6875	99.25	99.875	99.6875	99.

	<u>1913</u>											
A.T. & S.F.	97.5	97.3125	95.9375	94.375	93.875	93.3125	94.5625	95.125	94.8125	93.75	92.8125	92.5625
A.C.L.	95.	94.625	91.625	91.5	89.75	89.25	88.4375	90.9375	91.5	91.	89.625	90.5
C. of N.J.	118.625	118.8125	117.5625	116.5	114.9375	114.3125	113.75	113.875	114.5	113.8125	113.375	113.8125
C.B. & Q.	98.1875	98.125	96.1875	95.	94.5	94.25	94.5625	94.375	95.	95.	94.4375	93.
N.Y.C.	86.625	85.375	84.5	84.875	84.5	83.6875	81.75	82.75	84.25	82.75	81.5	81.
N.P.	98.3125	97.6875	96.125	94.6875	93.75	92.9375	92.1875	94.1875	94.75	94.9375	93.8125	92.3125
Penn.	102.	101.875	100.875	99.9375	99.375	99.375	99.5625	99.6875	100.	99.875	98.6875	98.875
Reading	97.125	96.9375	96.1875	95.625	94.5625	93.125	94.5625	94.9375	95.	94.4375	93.4375	91.9375
S.P.	95.625	95.375	93.5625	92.25	91.375	90.75	91.5625	93.	93.0625	91.4375	90.5	90.8125
U.P.	99.0625	98.9375	96.9375	96.25	96.25	95.875	95.625	96.125	97.625	96.3125	94.75	95.

	<u>1914</u>											
A.T. & S.F.	94.5	95.375	95.3125	95.875	95.75	95.6875	93.75				90.375	91.3125
A.C.L.	92.75	93.75	93.5	94.25	94.375	93.75	92.875				87.9375	86.3125
C. of N.J.	115.	116.5	116.5625	117.375	117.25	117.25	116.9375				112.	112.5
C.B. & Q.	94.3125	95.375	94.8125	95.375	95.25	95.3125	95.375					93.9375
N.Y.C.	83.	83.0625	82.125	82.875	83.125	83.	81.1875				78.25	80.125
N.P.	94.	95.25	95.0625	95.375	95.125	95.1875	93.75				89.25	89.1875
Penn.	99.75	100.4375	101.625	101.3125	101.8125	100.6875	100.				98.5	97.875
Reading	93.75	95.0625	95.125	94.9375	95.	95.125	94.3125				92.3125	92.6875
S.P.	91.6875	92.625	91.375	90.8125	90.5625	90.25	87.5625				83.5	83.375
U.P.	96.625	97.125	97.0625	97.	96.9375	97.375	97.75				94.125	94.875

Quotations for November are based on two days' trading, November 28 and 30.

	<u>1915</u>											
A.T. & S.F.	93.6875	92.875	92.25	94.0625	93.1875	91.875	90.4375	90.9375	91.	^s 92.5	94.125	94.
A.C.L.	89.75	91.75	90.75	91.25	91.25	90.625	89.5	87.375	85.625	89.4375	93.	92.75
C. of N.J.	113.75	114.75	114.625	115.	114.625	113.5	112.5	112.25	111.75	113.	114.5625	116.75
C.B. & Q.	93.8125	93.875	94.3125	94.3125	94.125	93.125	92.3125	92.75	93.1875	93.3125	94.875	95.875
N.Y.C.	80.375	80.	79.75	80.25	79.875	79.75	77.75	77.25	77.5	79.125	82.	82.75
N.P.	91.125	90.625	91.1875	92.6875	91.875	90.875	90.4375	89.6875	90.125	^s 91.6875	93.1875	94.
Penn.	97.875	97.8125	98.	97.625	97.875	97.75	98.4375	97.	97.	98.5	99.6875	99.5
Reading	93.625	93.	93.	94.3125	93.5	92.25	92.	92.625	92.	93.	94.875	94.75
S.P.	88.125	87.25	87.25	88.625	88.	87.25	86.0625	84.625	84.75	^s 86.875	^s 89.5625	90.4375
U.P.	95.9375	95.5	94.875	95.75	95.875	95.5625	94.	93.3125	94.25	94.75	96.9375	97.3125

^s = option sale

	<u>1916</u>											
A.T. & S.F.	94.5	94.8125	94.375	95.3125	93.25	93.	92.8125	92.6875	92.6875	93.8125	94.5	94.5
A.C.L.	93.5625	92.75	92.375	92.6875	91.75	91.6875	92.25	92.3125	92.	93.	93.6875	93.75
C. of N.J.	117.125	117.625	117.875	117.375	117.25	117.4375	116.375	116.125	116.1875	116.8125	117.4375	117.5625
C.B. & Q.	95.4375	95.25	95.	95.375	95.5	95.9375	94.875	94.375	94.375	94.75	96.25	96.3125
N.Y.C.	83.	83.0625	82.6875	82.375	82.375	82.5	82.5	82.375	82.5	83.9375	85.125	85.5
N.P.	93.5	93.875	93.5	92.6875	92.4375	92.25	92.0625	91.5625	92.125	93.1875	94.125	94.4375
Penn.	99.6875	99.1875	99.	99.5	99.5	99.5625	99.375	98.75	98.5625	99.75	99.375	99.6875
Reading	95.3125	95.3125	94.8125	94.	94.3125	95.5	95.375	95.0625	95.25	95.9375	95.5625	95.3125
S.P.	90.5	90.625	90.5	89.5	89.25	89.125	88.625	87.9375	89.125	90.0625	90.5625	91.
U.P.	97.625	97.625	97.375	96.6875	96.6875	97.1875	96.875	96.6875	96.4375	97.75	99.125	98.625

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	<u>1 9 1 7</u>											
A.T. & S.F.	^s 95.5625	94.75	94.0625	92.1875	91.25	89.625	88.25	87.4375	85.875	85.875	82.875	82.0625
A.C.L.	95.3125	93.125	91.9375	90.5625	88.625	87.8125	88.125	87.875	85.9375	82.	82.	81.25
C. of N.J.	119.75	117.625	117.25	115.5	113.5	109.	109.75	109.5	109.5	106.4375	102.	101.5625
C.B. & Q.	97.1875	96.4375	95.	93.3125	91.	90.	89.5	89.5	88.0625	86.0625	84.	83.5
N.Y.C.	86.25	83.	83.75	81.	80.0625	79.5	78.6875	77.5	75.4375	74.8125	72.	69.8125
N.P.	95.6875	94.75	93.625	91.5625	89.8125	87.75	87.3125	86.375	84.8125	84.	82.	82.6875
Penn.	100.1875	100.375	99.5625	99.25	96.25	94.75	92.625	92.125	91.875	92.25	89.	89.
Reading	96.	95.1875	94.1875	92.625	92.	90.8125	90.25	89.3125	88.5	88.5	85.125	82.75
S.P.	92.875	90.625	89.75	87.3125	86.6875	84.6875	83.25	83.	81.	80.5625	79.75	78.5
U.P.	99.3125	97.5	97.375	96.4375	93.375	92.75	91.625	90.8125	89.8125	90.375	88.75	86.5

s = option sale.

	<u>1 9 1 8</u>											
A.T. & S.F.	84.125	83.9375	81.5	80.8125	81.4375	80.6875	80.875	81.	80.	82.875	87.	85.375
A.C.L.	83.3125	84.	83.	82.5625	82.25	80.0625	78.5	79.4375	79.5625	81.8125	86.625	84.5
C. of N.J.	102.5	103.5	103.5	103.5	101.5	101.625	101.0625	100.6875	101.5	101.5625	107.3125	103.5
C.B. & Q.	83.5	85.75	82.9375	85.5	85.125	83.	82.375	81.1875	80.0625	83.	87.0625	87.
N.Y.C.	72.5625	72.125	71.625	70.5	70.625	70.	70.8125	70.375	69.75	71.375	75.5	73.375
N.P.	84.0625	83.375	80.6875	80.25	81.0625	80.6875	80.875	80.9375	80.5625	82.5	86.9375	86.125
Penn.	89.	87.625	86.625	85.125	86.	x	84.8125	84.5	84.	83.875	92.0625	89.
Reading	84.5	84.5	83.125	82.	83.375	82.8125	83.75	82.8125	81.625	83.125	88.0625	86.75
S.P.	80.	80.8125	80.3125	78.875	80.875	79.875	78.3125	78.0625	76.5	79.3125	85.	83.25
U.P.	88.	87.375	86.6875	86.5625	87.875	85.625	85.	86.1875	86.	86.6875	89.125	86.3125

x - no trading.

	<u>1 9 1 9</u>											
A.T. & S.F.	84.5	82.75	82.6875	81.4375	82.5	81.6875	80.25	77.75	78.5	79.6875	77.75	79.125
A.C.L.	84.5	83.1875	82.75	81.0625	82.	81.8125	80.5	77.625	78.375	80.1875	78.375	78.0625
C. of N.J.	103.5	102.5625	102.5625	102.5	102.25	102.625	102.25	100.875	100.75	101.375	101.	101.
C.B. & Q.	85.4375	83.8125	83.8125	83.5	84.5	84.	83.125	81.6875	82.25	83.5	82.4375	82.25
N.Y.C.	71.875	72.	72.	70.9375	71.5	71.375	70.875	70.125	69.125	71.	69.	67.5625
N.P.	84.875	84.5625	83.5	82.5	83.0625	82.0625	80.25	78.	77.25	79.	76.8125	78.125
Penn.	87.25	88.	89.5	86.625	86.5	86.1875	87.25	84.875	83.5	86.25	84.375	x 83.
Reading	86.125	85.	84.375	82.875	83.75	83.5	82.3125	81.	82.	82.75	81.375	79.5
S.P.	81.5	80.4375	79.	79.0625	80.	79.625	77.5	74.375	75.625	77.1875	75.	76.25
U.P.	88.	86.5625	86.0625	86.5	86.5	86.	85.0625	84.375	83.875	85.5	84.4375	83.625

x - Supplied from quotations given weekly in the Chronicle.

	<u>1 9 2 0</u>											
A.T. & S.F.	79.625	76.375	77.	73.25	71.625	72.25	72.5	75.25	76.0625	77.25	76.6875	74.5
A.C.L.	78.0625	75.25	75.375	74.0625	72.1875	72.	71.1875	73.5	75.5	77.9375	77.9375	75.875
C. of N.J.	100.125	99.125	99.0625	97.0625	93.5	90.75	92.875	94.25	97.125	98.25	99.4375	96.5
C.B. & Q.	82.5	79.875	79.9375	79.0625	77.0625	74.	75.625	76.5	79.125	81.5	81.125	79.0625
N.Y.C.	67.6875	67.25	65.5625	65.25	63.	63.375	63.375	65.	67.5	69.4375	69.125	66.625
N.P.	77.5625	74.1875	75.	72.	x 71.1875	70.9375	72.625	74.5625	76.	78.5	77.625	73.875
Penn.	84.75	82.25	81.625	82.25	78.9375	76.75	76.3125	78.	80.3125	82.125	81.875	81.5
Reading	80.0625	79.	78.375	76.75	77.75	76.8125	77.	79.75	80.5	83.3125	85.25	78.875
S.P.	75.4375	71.5	72.75	68.3125	67.8125	68.875	69.25	70.0625	73.125	74.5	73.125	72.375
U.P.	83.375	81.375	82.0625	80.375	76.	78.375	79.375	80.25	80.625	81.3125	80.625	79.125

x - What was evidently a printer's error in the Review quotations has been corrected by reference to the Chronicle's weekly figures.

	<u>1 9 2 1</u>											
A.T. & S.F.	77.4375	77.8125	77.3125	76.6875	76.4375	74.5	77.1875	77.625	78.3125	78.5625	83.	85.5
A.C.L.	78.875	78.	76.875	76.	75.8125	74.5	77.3125	78.	79.875	79.1875	82.25	84.5625
C. of N.J.	97.	98.3125	96.4375	95.9375	94.5	93.6875	95.	95.8125	97.1875	96.8125	100.25	103.25
C.B. & Q.	81.	81.9375	80.75	80.1875	80.1875	78.875	81.875	82.3125	82.4375	81.8125	84.875	87.
N.Y.C.	68.5625	67.375	67.8125	67.8125	66.0625	64.125	65.875	66.5625	67.1875	68.3125	71.3125	74.6875
N.P.	77.375	76.5	75.5	75.75	75.0625	74.	76.9375	77.0625	77.5	77.3125	81.5	84.125
Penn.	83.125	83.125	80.	78.8125	78.75	78.5625	78.5	81.3125	80.75	82.5	83.9375	86.4375
Reading	80.	83.125	80.75	78.3125	76.25	73.375	74.8125	75.875	76.3125	77.	80.5	81.75
S.P.	73.8125	72.5	72.1875	72.875	73.125	71.1875	72.625	73.6875	75.5625	76.25	80.	81.875
U.P.	82.1875	81.5	80.5	80.3125	80.5	78.875	81.375	81.5625	82.375	82.25	87.9375	87.5625

INDIVIDUAL YIELDS ON TEN RAILROAD BONDS
AND THEIR GEOMETRIC MEANS
MONTHLY, 1908-1921

Atchison Topeka and Santa Fe general gold 4s of 1995
Atlantic Coast Line first consolidated gold 4s of 1952
Central Railroad of New Jersey general gold 5s of 1987
Chicago Burlington and Quincy Illinois Division first gold 4s of 1949
New York Central and Hudson River refunding gold 3½s of 1997
Northern Pacific prior lien gold 4s of 1997
Pennsylvania Railroad consolidated sterling and dollar 4s of 1948
Reading general gold 4s of 1997
Southern Pacific - Central Pacific collateral gold 4s of 1949
Union Pacific railroad and land grant 4s of 1997

	<u>1908</u>												<u>1909</u>												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
A.T.& S.F.	4.10	4.10	4.15	4.12	4.12	4.11	4.12	4.07	4.03	4.01	4.00	3.99	3.97	3.95	3.96	3.96	3.96	3.96	3.94	3.97	3.98	3.98	4.01	4.01	
A.C.L.	4.68	4.95	4.79	4.80	4.54	4.50	4.48	4.35	4.31	4.30	4.28	4.26	4.23	4.14	4.15	4.13	4.15	4.19	4.20	4.19	4.24	4.24	4.25	4.25	
C. of N.J.	4.15	4.09	4.06	4.08	4.05	4.07	4.07	4.08	4.09	3.99	3.96	3.88	3.88	3.86	3.86	3.84	3.84	3.88	3.87	3.88	3.89	3.92	3.96	3.96	
C.B.& Q.	4.04	4.00	4.09	4.07	4.04	4.02	4.01	3.99	3.94	3.94	3.92	3.88	3.75	3.76	3.77	3.76	3.75	3.77	3.79	3.83	3.83	3.85	3.88	3.84	
N.Y.C.	3.94	3.97	3.98	3.96	3.96	3.90	3.82	3.86	3.84	3.84	3.81	3.77	3.88	3.86	3.87	3.88	3.89	3.89	3.89	3.87	3.90	3.91	3.91	3.89	
N.P.	4.06	4.00	4.03	4.01	3.98	3.97	3.93	3.91	3.90	3.92	3.88	3.89	3.78	3.78	3.78	3.76	3.75	3.76	3.78	3.78	3.81	3.80	3.78	3.79	
Penn.					3.97 ^x	3.97	3.94 ^x	3.89	3.89	3.85	3.85	3.81	4.03	3.99 ^x	3.99	4.00	4.01 ^x	4.01 ^x	3.98	3.98	3.98	4.01	4.02	4.04	4.03
Reading	4.21	4.26	4.28	4.21	4.15	4.14	4.11	4.10	4.07	4.06	4.06	4.03	4.12	4.09	4.12	4.12 ^x	4.13	4.15	4.13	4.14	4.13	4.15	4.15	4.16	4.17
S.P.	4.28	4.21	4.27	4.26	4.25	4.22	4.22	4.21	4.21	4.17	4.17	4.15	3.87	3.82	3.85	3.86	3.85	3.85	3.79	3.82	3.86	3.86	3.85	3.90	
U.P.	3.98	4.01	4.06	4.05	4.03	3.99	3.95	3.91	3.92	3.93	3.91	3.88	3.93	3.91	3.92	3.92	3.92	3.93	3.93	3.94	3.96	3.97	3.98	3.98	
Mean	4.16	4.17	4.18	4.17	4.12 ^m	4.11 ⁿ	4.09	4.06	4.03	4.02	4.00	3.98	3.95												

x. Indeterminate in the second decimal place. See p. 31 infra.
m. Mean for nine bonds not including the Pennsylvania.
n. Mean for ten bonds.

	<u>1910</u>												<u>1911</u>											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	3.98	3.99	4.02	4.05	4.05 ^x	4.05	4.06	4.08	4.05	4.04	4.07	4.04	4.04	4.04	4.06	4.04	4.04	4.05	4.05	4.04	4.06	4.04	4.03	4.03
A.C.L.	4.26	4.20	4.22	4.29	4.31	4.35	4.35	4.37	4.27	4.20	4.26	4.30	4.29	4.31	4.32	4.27 ^x	4.23	4.23	4.26	4.23	4.23	4.26	4.22	4.23
C. of N.J.	3.96 ^x	3.96	3.98	3.99	3.98	4.05 ^x	4.10 ^x	4.09	4.03	4.02	4.04	4.05 ^x	4.04	4.03	4.04 ^x	4.03	4.03	4.05	4.06	4.09	4.03	4.11	4.06	4.07
C.B.& Q.	3.98	3.99	4.01	4.04	4.05	4.06	4.06	4.06	4.00	3.96	3.99	3.99	3.93	3.98 ^x	3.99	3.97	3.97	4.00	4.01	4.00	4.02	4.00	3.98	3.99
N.Y.C.	3.84	3.88	3.91	3.93	3.95 ^x	3.98	4.01	3.99	3.97	3.93	3.97	3.95	4.00	3.98 ^x	4.01	4.00	4.00	4.02	4.02	4.04	4.03	4.00	4.00	4.02
N.P.	3.92	3.96	3.96	3.99	3.97 ^x	3.97	4.01	4.02	3.96	3.98	4.01	4.00	3.82	3.80 ^x	3.82	3.83	3.81	3.83	3.82	3.87	3.88 ^x	3.85	3.86	3.84
Penn.	3.78	3.77	3.79	3.82	3.84	3.86	3.87	3.90	3.88	3.84	3.83	3.82	4.09	4.11	4.13	4.11	4.09	4.09	4.08	4.08	4.11	4.09	4.07	4.07
Reading	4.02	4.02	4.05	4.06	4.09	4.09	4.11	4.09	4.07	4.05	4.07	4.09	4.16	4.18	4.20	4.20 ^x	4.14	4.15	4.16	4.16	4.17 ^x	4.16 ^x	4.14 ^x	4.18
S.P.	4.14	4.14	4.16	4.18	4.19	4.21	4.24	4.20	4.17	4.11 ^a	4.15 ^a	4.17	3.96	3.97	3.97	3.93	3.92	3.93	3.94	3.94 ^x	3.97	3.95	3.94	3.95
U.P.	3.93	3.94	3.96	3.99	3.96	3.96	3.97	3.97	3.93	3.92	3.94	3.95	4.03	4.04	4.05	4.04	4.02	4.04	4.04	4.05	4.06	4.05	4.03	4.04
Mean	3.98	3.98	4.00	4.03	4.04	4.06	4.08	4.08	4.03	4.00	4.03	4.03												

a. Prices for these months were obtained from weekly data. See p. 30 infra.

	1912												1913												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
A.T.& S.F.	4.03	4.01	4.02	4.03	4.03	4.07	4.10	4.13	4.11	4.10	x	4.12	4.13	4.11	4.11	4.18	4.25	4.27	4.30	4.24	4.21	4.23	4.28	4.32	4.33
A.C.L.	4.21	4.19	4.24	4.25	4.25	4.26	4.29	4.27	4.27	4.27	x	4.25	4.25	4.26	4.28	4.45	4.46	4.56	4.59	4.64	4.49	4.46	4.49	4.57	4.52
C. of N.J.	4.05	4.04	4.06	x	4.07	4.09	4.12	4.11	4.13	4.19	4.19	4.19	4.20	4.19	4.18	4.22	4.26	4.33	4.35	4.37	4.37	4.34	4.37	4.39	4.37
C.B.& Q.	4.00	4.01	4.01	4.03	4.06	4.05	4.03	4.04	4.10	4.08	4.10	4.10	4.10	4.10	4.21	4.27	4.30	4.32	4.30	4.31	4.27	4.27	4.31	4.39	
N.Y.C.	4.02	3.99	4.02	4.05	4.05	4.03	4.04	4.08	4.11	4.09	4.07	4.10	4.06	4.12	4.17	4.15	4.17	4.21	4.31	4.26	4.18	4.26	4.32	4.35	
N.P.	3.99	3.99	4.01	4.02	4.02	4.03	4.05	4.09	4.09	4.07	4.07	4.08	4.07	4.10	4.17	4.23	4.27	4.31	4.35	4.25	4.23	4.22	4.27	4.34	
Penn.	3.82	3.80	3.85	3.83	3.82	3.80	3.81	3.84	3.85	3.92	3.97	3.90	3.90	3.90	3.95	4.00	4.03	4.03	4.02	4.02	4.00	4.01	4.07	4.06	
Reading	4.05	4.06	4.07	4.08	4.08	4.09	4.11	4.13	4.16	4.14	4.14	4.15	4.12	4.13	4.16	4.19	4.24	4.30	4.24	4.22	4.22	4.25	4.25	4.36	
S.P.	4.17	4.17	4.19	4.23	4.22	4.20	4.25	4.28	4.29	4.26	x	4.27	4.30	4.24	4.25	4.35	4.43	4.48	4.52	4.47	4.39	4.38	4.48	4.54	4.52
U.P.	3.96	3.97	3.96	3.91	3.93	3.98	3.98	4.02	4.04	4.01	4.02	4.05	4.05	4.06	4.17	4.21	4.21	4.23	4.24	4.21	4.13	4.20	4.30	x	4.28
Mean	4.03	4.02	4.04	4.05	4.05	4.06	4.08	4.10	4.12	4.11	4.11	4.13	4.11	4.12	4.20	4.24	4.28	4.31	4.32	4.27	4.24	4.28	4.33	4.35	

	1914												1915											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	4.24	4.20	4.20	4.18	4.18	4.19	4.28					4.39	4.28	4.32	4.35	4.26	4.30	4.37	4.44	4.41	4.41	4.34	4.26	4.26
A.C.L.	4.39	4.34	4.35	4.31	4.30	4.34	4.39					4.79	4.57	4.45	4.51	4.48	4.49	4.52	4.59	4.73	4.84	4.60	4.39	4.40
C. of N.J.	4.32	4.26	4.26	4.23	4.23	4.23	4.25					4.42	4.37	4.33	4.34	4.32	4.33	4.38	4.42	4.43	4.45	4.40	4.33	4.25
C.B.& Q.	4.31	4.25	4.29	4.25	4.26	4.26	4.25					4.34	4.33	4.34	4.32	4.32	4.33	4.39	4.44	4.41	4.39	4.38	4.29	4.23
N.Y.C.	4.24	4.24	4.29	4.25	4.24	4.24	4.34					4.40	4.39	4.41	4.42	4.39	4.41	4.42	4.54	4.57	4.55	4.46	4.30	4.26
N.P.	4.26	4.21	4.21	4.20	4.21	4.21	4.28					4.50	4.40	4.43	4.40	4.33	4.37	4.41	4.44	4.47	4.45	4.37	4.30	4.26
Penn.	4.01	3.98	3.91	3.93	3.90	3.96	4.00					4.16	4.12	4.12	4.11	4.13	4.12	4.12	4.09	4.17	4.17	4.08	4.02	4.03
Reading	4.28	4.21	4.21	4.22	4.22	4.21	4.25					4.33	4.28	4.31	4.31	4.25	4.29	4.35	4.36	4.33	4.36	4.31	4.22	4.23
S.P.	4.47	4.41	4.49	4.52	4.54	4.56	4.73					5.01	4.70	4.76	4.76	4.67	4.71	4.76	4.84	4.92	4.93	4.79	4.61	4.56
U.P.	4.19	4.16	4.16	4.17	4.17	4.15	4.14					4.29	4.23	4.26	4.30	4.24	4.24	4.25	4.35	4.39	4.33	4.30	4.18	4.15
Mean	4.27	4.23	4.24	4.22	4.22	4.23	4.29					4.46	4.36	4.37	4.38	4.34	4.36	4.39	4.45	4.48	4.48	4.40	4.29	4.26

s. Prices for these months were quoted from option sales.

	1916												1917											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	4.24	4.23	4.25	4.20	4.30	4.31	4.32	4.33	4.33	4.27	4.24	4.24	4.19	4.23	4.26	4.35	4.40	4.48	4.55	4.59	4.68	4.68	4.85	4.90
A.C.L.	4.35	4.40	4.42	4.41	4.46	4.47	4.43	4.43	4.45	4.39	4.35	4.35	4.26	4.38	4.45	4.54	4.66	4.71	4.69	4.71	4.84	5.11	5.11	5.17
C. of N.J.	4.24	4.22	4.21	4.23	4.23	4.22	4.26	4.27	4.27	4.25	4.22	4.22	4.13	4.22	4.23	4.30	4.38	4.57	4.54	4.55	4.55	4.69	4.90	4.92
C.B.& Q.	4.26	4.27	4.28	4.26	4.25	4.23	4.29	4.32	4.32	4.30	4.21	4.21	4.16	4.20	4.29	4.39	4.53	4.60	4.63	4.63	4.73	4.87	5.01	5.05
N.Y.C.	4.25	4.24	4.26	4.28	4.28	4.27	4.27	4.28	4.27	4.20	4.14	4.12	4.08	4.25	4.21	4.35	4.41	4.44	4.48	4.55	4.68	4.72	4.90	5.06
N.P.	4.29	4.27	4.29	4.33	4.34	4.35	4.36	4.38	4.35	4.30	4.26	4.24	4.19	4.23	4.28	4.38	4.47	4.58	4.60	4.65	4.74	4.78	4.90	4.86
Penn.	4.02	4.05	4.06	4.03	4.03	4.02	4.04	4.07	4.08	4.01	4.04	4.02	3.99	3.98	4.02	4.04	4.22	4.31	4.44	4.47	4.49	4.47	4.68	4.68
Reading	4.20	4.20	4.23	4.26	4.25	4.20	4.20	4.22	4.21	4.18	4.19	4.20	4.17	4.21	4.26	4.33	4.36	4.42	4.45	4.49	4.54	4.54	4.72	4.86
S.P.	4.56	4.55	4.56	4.62	4.64	4.65	4.68	4.73	4.65	4.59	4.56	4.53	4.41	4.56	4.61	4.77	4.82	4.96	5.06	5.08	5.23	5.27	5.33	5.43
U.P.	4.14	4.14	4.15	4.19	4.19	4.16	4.18	4.19	4.21	4.13	4.05	4.08	4.04	4.15	4.15	4.21	4.40	4.44	4.51	4.57	4.63	4.60	4.70	4.87
Mean	4.25	4.26	4.27	4.28	4.29	4.29	4.30	4.32	4.31	4.26	4.22	4.22	4.16	4.24	4.27	4.36	4.46	4.55	4.59	4.63	4.71	4.77	4.91	4.98

1918

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	4.78	4.79	4.93	4.98	4.94	4.98	4.97	4.97	5.03	4.85	4.62	4.71
A.C.L.	5.02	4.97	5.05	5.08	5.10	5.26	5.38	5.31	5.31 ^x	5.13	4.80 ^x	4.95
C. of N.J.	4.87	4.82	4.82	4.82	4.92	4.92	4.95	4.96 ^x	4.92	4.92	4.65	4.82
C.B.& Q.	5.05 ^x	4.89	5.10	4.91	4.94	5.10 ^x	5.04	5.23 ^x	5.32	5.10	4.81	4.82
N.Y.C.	4.87	4.89	4.93	5.01 ^x	5.00	5.04	4.98	5.02	5.06	4.95	4.68	4.81
N.P.	4.78	4.82	4.98	5.01	4.96	4.98	4.97	4.97	4.99	4.87	4.62	4.67 ^x
Penn.	4.69	4.79 ^x	4.85 ^x	4.96	4.90	4.98 ⁱ	4.99	5.01 ^x	5.05 ^x	5.06 ^x	4.49	4.69
Reading	4.75	4.75	4.83 ^x	4.90	4.82	4.85	4.80	4.85	4.93 ^x	4.84	4.56 ^x	4.63
S.P.	5.31	5.25	5.29 ^x	5.40 ^x	5.26 ^x	5.33	5.46	5.48	5.61 ^x	5.38 ^x	4.96 ^x	5.08
U.P.	4.76	4.81	4.86 ^x	4.87 ^x	4.77 ^x	4.94	4.98	4.90	4.91 ^x	4.86 ^x	4.70	4.75 ^x
Mean	4.89	4.88	4.96	4.99	4.96	5.04	5.05	5.07	5.11	4.99	4.69	4.79

i. Interpolated. See p. 30 infra.

1919

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	4.76	4.86	4.86 ^x	4.94	4.88	4.92 ^x	5.01 ^x	5.18 ^x	5.13	5.04 ^x	5.18	5.09
A.C.L.	4.95	5.05 ^x	5.08	5.20	5.13 ^x	5.15	5.25 ^x	5.47 ^x	5.41	5.28	5.42	5.44 ^x
C. of N.J.	4.82	4.87	4.87	4.87	4.89 ^x	4.87	4.89 ^x	4.96 ^x	4.96	4.93	4.95	4.95
C.B.& Q.	4.93	5.05 ^x	5.05 ^x	5.07	5.00	5.04	5.10 ^x	5.22	5.17 ^x	5.08	5.16	5.18
N.Y.C.	4.91	4.91 ^x	4.91 ^x	4.98	4.94	4.95	4.98	5.04	5.11	4.97	5.12	5.23
N.P.	4.74 ^x	4.75	4.81	4.87	4.84	4.90	5.01	5.16	5.21	5.09	5.24	5.15
Penn.	4.82	4.77 ^x	4.66	4.87 ^x	4.87	4.90	4.82	5.00 ^x	5.10	4.90	5.04	5.14
Reading	4.67	4.73	4.76	4.85	4.80	4.81	4.89 ^x	4.96	4.90	4.86	4.94	5.06
S.P.	5.22	5.30 ^x	5.42 ^x	5.41	5.34 ^x	5.37 ^x	5.55 ^x	5.82 ^x	5.71	5.58 ^x	5.76 ^x	5.66
U.P.	4.77	4.88 ^x	4.92 ^x	4.89 ^x	4.89 ^x	4.93 ^x	5.00 ^x	5.05	5.09	4.97 ^x	5.05 ^x	5.12 ^x
Mean	4.86	4.91	4.93	4.99	4.96	4.98	5.05	5.18	5.18	5.07	5.18	5.20

1920

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	5.06 ^x	5.27	5.23	5.50	5.62	5.57	5.55	5.35	5.30	5.21	5.25	5.40
A.C.L.	5.45 ^x	5.68	5.67	5.78	5.95	5.97	6.04	5.84	5.67	5.47	5.47	5.81
C. of N.J.	4.99	5.05	5.05 ^x	5.16	5.36	5.53 ^x	5.40	5.32 ^x	5.15	5.09	5.03	5.19
C.B.& Q.	5.16	5.37	5.37 ^x	5.44	5.61	5.88	5.73	5.66	5.42	5.25 ^x	5.29	5.45 ^x
N.Y.C.	5.22	5.25	5.39 ^x	5.41	5.60	5.57	5.57	5.43	5.23 ^x	5.09	5.11	5.30
N.P.	5.19	5.42	5.37 ^x	5.59	5.65	5.67	5.54	5.40	5.30 ^x	5.13	5.18 ^x	5.45 ^x
Penn.	5.01	5.21	5.26	5.21	5.48	5.67	5.71	5.57 ^x	5.37	5.23	5.25	5.39 ^x
Reading	5.02 ^x	5.09	5.13	5.24	5.18 ^x	5.24	5.23 ^x	5.04	5.00	4.83	4.72	5.10
S.P.	5.73 ^x	6.09 ^x	5.98	6.41	6.46	6.36	6.32 ^x	6.25	5.96	5.84 ^x	5.97	6.04
U.P.	5.14	5.30 ^x	5.24	5.38	5.76	5.55	5.47	5.40	5.36	5.32	5.38	5.50 ^x
Mean	5.19	5.37	5.36	5.50	5.66	5.69	5.65	5.52	5.37	5.24	5.26	5.45

c. Prices for this month were corrected by reference to weekly data. See p. 31 infra.

1921

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A.T.& S.F.	5.20	5.17	5.21	5.25	5.27	5.41 ^x	5.22	5.19	5.14	5.13	4.85	4.70 ^x
A.C.L.	5.40	5.47	5.57	5.64	5.66	5.77	5.54	5.48	5.34	5.39	5.16	4.99 ^x
C. of N.J.	5.16	5.09	5.19	5.22	5.30	5.35	5.27	5.23	5.15	5.17	4.99	4.84 ^x
C.B.& Q.	5.30	5.23	5.32	5.37	5.37	5.48	5.24 ^x	5.21	5.20	5.25	5.02	4.86 ^x
N.Y.C.	5.16	5.25	5.21	5.21	5.35	5.51	5.37 ^x	5.31	5.26	5.18 ^x	4.96	4.73 ^x
N.P.	5.20	5.26	5.33 ^x	5.31	5.36	5.44	5.23	5.22	5.19	5.20 ^x	4.94	4.78
Penn.	5.16	5.16	5.41 ^x	5.53	5.52	5.54	5.55	5.32	5.36	5.22 ^x	5.12	4.92
Reading	5.03	4.84	4.96 ^x	5.14	5.28	5.49 ^x	5.38	5.31 ^x	5.27 ^x	5.23	5.00	4.92
S.P.	5.91	6.03	6.06 ^x	6.00	5.98	6.17	6.04	5.94	5.77	5.71	5.40	5.25
U.P.	5.25	5.31	5.40 ^x	5.41	5.41	5.54	5.33	5.32	5.25 ^x	5.27	4.83	4.86
Mean	5.27	5.27	5.36	5.40	5.45	5.57	5.41	5.35	5.29	5.27	5.03	4.88

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