

MARK E. ELLIS

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SUMMARY

Mark E. Ellis is a former utility executive now working as an independent consultant and testifying expert in finance and economics in utility regulatory proceedings. He is currently serving as a rate of return expert in California and New Hampshire. He recently testified on behalf of TURN (The Utility Reform Network) in a \$7.5-billion wildfire cost securitization case in California and advised various government officials and consumer groups on the City of San Diego's utility franchise agreement renewal.

Before establishing his own consultancy, Mark led the strategy function at Sempra Energy (parent of SDG&E and SoCalGas) for fifteen years. Previously, he worked as a consultant in McKinsey's energy practice, in international project development for ExxonMobil, and in industrial demand-side management for Southern California Edison. He has an MS from MIT's Technology and Policy Program, where he focused on utility policy and conducted research in the MIT Energy Lab, and a BS in mechanical engineering from Harvard.

EXPERT TESTIMONY

Client	Utility	Description	Docket No.	Date
The Utility Reform Network	Pacific Gas & Electric	Wildfire liability self-insurance	TBD	11/21-ongoing
Protect Our Communities Foundation	Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison	Extraordinary rate of return	A.21-08-015, A.21-08-014, A.21-08-013	11/21-ongoing
New Hampshire Department of Energy	Aquarion Water Company of New Hampshire	Rate of return	DW 20-184	6/21-ongoing
The Utility Reform Network	Pacific Gas & Electric	\$7.5-billion wildfire cost securitization	A.20-04-023	6/20-2/21

EDUCATION

Institution	Degree	Date
Massachusetts Institute of Technology	MS, Technology and Policy	1996
Harvard University	BS, <i>magna cum laude</i> , Mechanical and Materials Sciences and Engineering	1992

EMPLOYMENT

Company	Title	Location	Date
Self-employed	Independent consultant and testifying expert	La Jolla, CA	2019-present
Sempra Energy	Chief of Corporate Strategy	San Diego, CA	2004-2019
McKinsey & Company	Engagement Manager	Houston, TX	2000-03
ExxonMobil	Venture Development Advisor	Houston, TX	1996-2000
MIT Energy Laboratory	Research Assistant	Cambridge, MA	1994-96
Southern California Edison	Staff Engineer	Irwindale, CA	1994
Sanyo Electric Company	Research Engineer	Osaka, Japan	1992-93
Los Angeles Department of Water & Power	Seasonal Waterworks Laborer	Chatsworth, CA	1988

MARK E. ELLIS

Independent consultant and testifying expert in utility finance and economics

START-UP

Organization	Title	Description	Date
Gridware	Advisor	Y Combinator graduate developing wildfire prevention technology for electric utilities	2021-present
GATEMatrices	CEO & Founder	Created iOS app to prepare elementary-school children for gifted-and-talented education program admission tests	2013-present
Apertur	CEO & Founder	Created a technology-enabled professional development platform of workshops, assessments, toolkit, and apps to help organizations improve their culture and decision-making by reducing cognitive bias	2013-2020
Climate Policy Initiative	Power Program Director	Climate change policy advisory non-profit funded by George Soros	2010-13

NON-PROFIT BOARD

Organization	Date	Organization	Date
Harvard Club of San Diego	2015-17	Chabad Hebrew Academy	2007-14
Congregation Adat Yeshurun	2005-12	San Diego Agency for Jewish Education	2005-07

64 S.Ct. 281
51 P.U.R.(NS) 193, 320 U.S. 591, 64 S.Ct. 281, 88 L.Ed. 333
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Supreme Court of the United States
FEDERAL POWER COMMISSION et al.

v.

HOPE NATURAL GAS CO.
CITY OF CLEVELAND

v.

SAME.

Nos. 34 and 35.

Argued Oct. 20, 21, 1943.
Decided Jan. 3, 1944.

Separate proceedings before the Federal Power Commission by such Commission, by the City of Cleveland and the City of Akron, and by Pennsylvania Public Utility Commission wherein the State of West Virginia and its Public Service Commission were permitted to intervene concerning rates charged by Hope Natural Gas Company which were consolidated for hearing. An order fixing rates was reversed and remanded with directions by the Circuit Court of Appeals, [134 F.2d 287](#), and Federal Power Commission, City of Akron and Pennsylvania Public Utility Commission in one case and the City of Cleveland in another bring certiorari.

Reversed.

Mr. Justice REED, Mr. Justice FRANKFURTER and Mr. Justice JACKSON, dissenting.

On Writs of Certiorari to the United States Circuit Court of Appeals for the Fourth Circuit.

West Headnotes

[\[1\]](#) **Public Utilities 317A** **120**

[317A](#) Public Utilities

[317AII](#) Regulation

[317Ak119](#) Regulation of Charges

[317Ak120](#) k. Nature and Extent in General.

[Most Cited Cases](#)

(Formerly 317Ak7.1, 317Ak7)

Rate-making is only one species of price-fixing which, like other applications of the police power, may reduce the value of the property regulated, but that does not render the regulation invalid.

[\[2\]](#) **Public Utilities 317A** **123**

[317A](#) Public Utilities

[317AII](#) Regulation

[317Ak119](#) Regulation of Charges

[317Ak123](#) k. Reasonableness of Charges in General. [Most Cited Cases](#)

(Formerly 317Ak7.4, 317Ak7)

Rates cannot be made to depend upon fair value, which is the end product of the process of rate-making and not the starting point, when the value of the going enterprise depends on earnings under whatever rates may be anticipated.

[\[3\]](#) **Gas 190** **14.3(2)**

[190](#) Gas

[190k14](#) Charges

[190k14.3](#) Administrative Regulation

[190k14.3\(2\)](#) k. Federal Power Commission.

[Most Cited Cases](#)

(Formerly 190k14(1))

The rate-making function of the Federal Power Commission under the Natural Gas Act involves the making of pragmatic adjustments, and the Commission is not bound to the use of any single formula or combination of formulae in determining rates. Natural Gas Act, § § 4(a), 5(a), 6, [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e](#).

[\[4\]](#) **Gas 190** **14.5(6)**

[190](#) Gas

[190k14](#) Charges

[190k14.5](#) Judicial Review and Enforcement of Regulations

[190k14.5\(6\)](#) k. Scope of Review and Trial

De Novo. [Most Cited Cases](#)

(Formerly 190k14(1))

When order of Federal Power Commission fixing natural gas rates is challenged in the courts, the question is whether order viewed in its entirety meets the requirements of the Natural Gas Act. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[\[5\]](#) **Gas 190** **14.4(1)**

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

[190k14.4\(1\)](#) k. In General. [Most Cited Cases](#)

(Formerly 190k14(1))

Under the statutory standard that natural gas rates shall be “just and reasonable” it is the result reached and not the method employed that is controlling. Natural Gas Act § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[\[6\] Gas 190](#)  [14.5\(6\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.5](#) Judicial Review and Enforcement of Regulations

[190k14.5\(6\)](#) k. Scope of Review and Trial De Novo. [Most Cited Cases](#)

(Formerly 190k14(1))

If the total effect of natural gas rates fixed by Federal Power Commission cannot be said to be unjust and unreasonable, judicial inquiry under the Natural Gas Act is at an end. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[\[7\] Gas 190](#)  [14.5\(7\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.5](#) Judicial Review and Enforcement of Regulations

[190k14.5\(7\)](#) k. Presumptions. [Most Cited Cases](#)

(Formerly 190k14(1))

An order of the Federal Power Commission fixing rates for natural gas is the product of expert judgment, which carries a presumption of validity, and one who would upset the rate must make a convincing showing that it is invalid because it is unjust and unreasonable in its consequences. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[\[8\] Gas 190](#)  [14.4\(1\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(1\)](#) k. In General. [Most Cited Cases](#)

(Formerly 190k14(1))

The fixing of just and reasonable rates for natural gas by the Federal Power Commission involves a balancing of the investor and the consumer interests.

Natural Gas Act, § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[\[9\] Gas 190](#)  [14.4\(9\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(9\)](#) k. Depreciation and Depletion.

[Most Cited Cases](#)

(Formerly 190k14(1))

As respects rates for natural gas, from the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business, which includes service on the debt and dividends on stock, and by such standard the return to the equity owner should be commensurate with the terms on investments in other enterprises having corresponding risks, and such returns should be sufficient to assure confidence in the financial integrity of the enterprise so as to maintain its credit and to attract capital. Natural Gas Act, § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[\[10\] Gas 190](#)  [14.4\(9\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(9\)](#) k. Depreciation and Depletion.

[Most Cited Cases](#)

(Formerly 190k14(1))

The fixing by the Federal Power Commission of a rate of return that permitted a natural gas company to earn \$2,191,314 annually was supported by substantial evidence. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[\[11\] Gas 190](#)  [14.4\(9\)](#)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(9\)](#) k. Depreciation and Depletion.

[Most Cited Cases](#)

(Formerly 190k14(1))

Rates which enable a natural gas company to operate successfully, to maintain its financial integrity, to attract capital and to compensate its investors for the risks assumed cannot be condemned as invalid, even though they might produce only a meager return on the so-called “fair value” rate base. Natural Gas Act,

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

§ § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[12] Gas 190 🔑14.4(4)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(4\)](#) k. Method of Valuation. [Most Cited Cases](#)

(Formerly 190k14(1))

A return of only 3 27/100 per cent. on alleged rate base computed on reproduction cost new to natural gas company earning an annual average return of about 9 per cent. on average investment and satisfied with existing gas rates suggests an inflation of the base on which the rate had been computed, and justified Federal Power Commission in rejecting reproduction cost as the measure of the rate base. Natural Gas Act, § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[13] Gas 190 🔑14.4(9)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(9\)](#) k. Depreciation and Depletion.

[Most Cited Cases](#)

(Formerly 190k14(1))

There is no constitutional requirement that owner who engages in a wasting-asset business of limited life shall receive at the end more than he has put into it, and such rule is applicable to a natural gas company since the ultimate exhaustion of its supply of gas is inevitable. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[14] Gas 190 🔑14.4(9)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(9\)](#) k. Depreciation and Depletion.

[Most Cited Cases](#)

(Formerly 190k14(1))

In fixing natural gas rate the basing of annual depreciation on cost is proper since by such procedure the utility is made whole and the integrity of its investment is maintained, and no more is required. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[15] Gas 190 🔑14.3(4)

[190](#) Gas

[190k14](#) Charges

[190k14.3](#) Administrative Regulation

[190k14.3\(4\)](#) k. Findings and Orders. [Most Cited Cases](#)

(Formerly 190k14(1))

There are no constitutional requirements more exacting than the standards of the Natural Gas Act which are that gas rates shall be just and reasonable, and a rate order which conforms with the act is valid. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), [15 U.S.C.A. § § 717c\(a\), 717d\(a\), 717e, 717r\(b\)](#).

[16] Commerce 83 🔑62.2

[83](#) Commerce

[83II](#) Application to Particular Subjects and Methods of Regulation

[83II\(B\)](#) Conduct of Business in General

[83k62.2](#) k. Gas. [Most Cited Cases](#)

(Formerly 83k13)

The purpose of the Natural Gas Act was to provide through the exercise of the national power over interstate commerce an agency for regulating the wholesale distribution to public service companies of natural gas moving in interstate commerce not subject to certain types of state regulation, and the act was not intended to take any authority from state commissions or to usurp state regulatory authority. Natural Gas Act, § 1 et seq., [15 U.S.C.A. § 717](#) et seq.

[17] Mines and Minerals 260 🔑92.5(3)

[260](#) Mines and Minerals

[260III](#) Operation of Mines, Quarries, and Wells

[260III\(A\)](#) Statutory and Official Regulations

[260k92.5](#) Federal Law and Regulations

[260k92.5\(3\)](#) k. Oil and Gas. [Most Cited Cases](#)

(Formerly 260k92.7, 260k92)

Under the Natural Gas Act, the Federal Power Commission has no authority over the production or gathering of natural gas. Natural Gas Act, § 1(b), [15 U.S.C.A. § 717\(b\)](#).

[18] Gas 190 🔑14.1(1)

[190](#) Gas

[190k14](#) Charges

[190k14.1](#) In General

[190k14.1\(1\)](#) k. In General; Amount and

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

Regulation. [Most Cited Cases](#)

(Formerly 190k14(1))

The primary aim of the Natural Gas Act was to protect consumers against exploitation at the hands of natural gas companies and holding companies owning a majority of the pipe-line mileage which moved gas in interstate commerce and against which state commissions, independent producers and communities were growing quite helpless. Natural Gas Act, § § 4, 6-10, 14, [15 U.S.C.A. § § 717c, 717e-717i, 717m](#).

[19] Gas 190  14.1(1)

[190](#) Gas

[190k14](#) Charges

[190k14.1](#) In General

[190k14.1\(1\)](#) k. In General; Amount and

Regulation. [Most Cited Cases](#)

(Formerly 190k14(1))

Apart from the express exemptions contained in § 7 of the Natural Gas Act considerations of conservation are material where abandonment or extensions of facilities or service by natural gas companies are involved, but exploitation of consumers by private operators through maintenance of high rates cannot be continued because of the indirect benefits derived therefrom by a state containing natural gas deposits. Natural Gas Act, § § 4, 5, and § 7 as amended [15 U.S.C.A. § § 717c, 717d, 717f](#).

[20] Commerce 83  62.2

[83](#) Commerce

[83II](#) Application to Particular Subjects and Methods of Regulation

[83II\(B\)](#) Conduct of Business in General

[83k62.2](#) k. Gas. [Most Cited Cases](#)

(Formerly 83k13)

A limitation on the net earnings of a natural gas company from its interstate business is not a limitation on the power of the producing state, either to safeguard its tax revenues from such industry, or to protect the interests of those who sell their gas to the interstate operator, particularly where the return allowed the company by the Federal Power Commission was a net return after all such charges. Natural Gas Act, § § 4, 5, and § 7, as amended, [15 U.S.C.A. § § 717c, 717d, 717f](#).

[21] Gas 190  14.4(1)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(1\)](#) k. In General. [Most Cited](#)

[Cases](#)

(Formerly 190k14(1))

The Natural Gas Act granting Federal Power Commission power to fix “just and reasonable rates” does not include the power to fix rates which will disallow or discourage resales for industrial use. Natural Gas Act, § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[22] Gas 190  14.4(1)

[190](#) Gas

[190k14](#) Charges

[190k14.4](#) Reasonableness of Charges

[190k14.4\(1\)](#) k. In General. [Most Cited](#)

[Cases](#)

(Formerly 190k14(1))

The wasting-asset nature of the natural gas industry does not require the maintenance of the level of rates so that natural gas companies can make a greater profit on each unit of gas sold. Natural Gas Act, § § 4(a), 5(a), [15 U.S.C.A. § § 717c\(a\), 717d\(a\)](#).

[23] Federal Courts 170B  452

[170B](#) Federal Courts

[170BVII](#) Supreme Court

[170BVII\(B\)](#) Review of Decisions of Courts of Appeals

[170Bk452](#) k. Certiorari in General. [Most Cited Cases](#)

(Formerly 106k383(1))

Where the Federal Power Commission made no findings as to any discrimination or unreasonable differences in rates, and its failure was not challenged in the petition to review, and had not been raised or argued by any party, the problem of discrimination was not open to review by the Supreme Court on certiorari. Natural Gas Act, § 4(b), [15 U.S.C.A. § 717c\(b\)](#).

[24] Constitutional Law 92  74

[92](#) Constitutional Law

[92III](#) Distribution of Governmental Powers and Functions

[92III\(B\)](#) Judicial Powers and Functions

[92k71](#) Encroachment on Executive

[92k74](#) k. Powers, Duties, and Acts Under

Legislative Authority. [Most Cited Cases](#)

(Formerly 15Ak226)

Congress has entrusted the administration of the

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Natural Gas Act to the Federal Power Commission and not to the courts, and apart from the requirements of judicial review, it is not for the Supreme Court to advise the Commission how to discharge its functions. Natural Gas Act, § 1 et seq., 19(b), [15 U.S.C.A. § 717](#) et seq., [717r\(b\)](#).

[\[25\]](#) Gas 190  14.5(3)

[190](#) Gas

[190k14](#) Charges

[190k14.5](#) Judicial Review and Enforcement of Regulations

[190k14.5\(3\)](#) k. Decisions Reviewable. [Most Cited Cases](#)

(Formerly 190k14(1))

Under the Natural Gas Act, where order sought to be reviewed does not of itself adversely affect complainant but only affects his rights adversely on the contingency of future administrative action, the order is not reviewable, and resort to the courts in such situation is either premature or wholly beyond the province of such courts. Natural Gas Act, § 19(b), [15 U.S.C.A. § 717r\(b\)](#).

[\[26\]](#) Gas 190  14.5(4)

[190](#) Gas

[190k14](#) Charges

[190k14.5](#) Judicial Review and Enforcement of Regulations

[190k14.5\(4\)](#) k. Persons Entitled to Relief; Parties. [Most Cited Cases](#)

(Formerly 190k14(1))

Findings of the Federal Power Commission on lawfulness of past natural gas rates, which the Commission was without power to enforce, were not reviewable under the Natural Gas Act giving any "party aggrieved" by an order of the Commission the right of review. Natural Gas Act, § 19(b), [15 U.S.C.A. § 717r\(b\)](#).

****283 *592** Mr. Francis M. Shea, Asst. Atty. Gen., for petitioners Federal Power Com'n and others.

***593** Mr. Spencer W. Reeder, of Cleveland, Ohio, for petitioner City of Cleveland.

Mr. William B. Cockley, of Cleveland, Ohio, for respondent.

Mr. M. M. Neeley, of Charleston, W. Va., for State of West Virginia, as amicus curiae by special leave of Court.

Mr. Justice DOUGLAS delivered the opinion of the

Court.

The primary issue in these cases concerns the validity under the Natural Gas Act of 1938, 52 Stat. 821, [15 U.S.C. s 717](#) et seq., [15 U.S.C.A. s 717](#) et seq., of a rate order issued by the Federal Power Commission reducing the rates chargeable by Hope Natural Gas Co., 44 P.U.R.,N.S., 1. On a petition for review of the order made pursuant to s 19(b) of the Act, the ***594** Circuit Court of Appeals set it aside, one judge dissenting. [4 Cir., 134 F.2d 287](#). The cases ****284** are here on petitions for writs of certiorari which we granted because of the public importance of the questions presented. [City of Cleveland v. Hope Natural Gas Co., 319 U.S. 735, 63 S.Ct. 1165](#).

Hope is a West Virginia corporation organized in 1898. It is a wholly owned subsidiary of Standard Oil Co. (N.J.). Since the date of its organization, it has been in the business of producing, purchasing and marketing natural gas in that state. ^{[FN1](#)} It sells some of that gas to local consumers in West Virginia. But the great bulk of it goes to five customer companies which receive it at the West Virginia line and distribute it in Ohio and in Pennsylvania. ^{[FN2](#)} In July, 1938, the cities of Cleveland and Akron filed complaints with the Commission charging that the rates collected by Hope from East Ohio Gas Co. (an affiliate of Hope which distributes gas in Ohio) were excessive and unreasonable. Later in 1938 the Commission on its own motion instituted an investigation to determine the reasonableness of all of Hope's interstate rates. In March ***595** 1939 the Public Utility Commission of Pennsylvania filed a complaint with the Commission charging that the rates collected by Hope from Peoples Natural Gas Co. (an affiliate of Hope distributing gas in Pennsylvania) and two non-affiliated companies were unreasonable. The City of Cleveland asked that the challenged rates be declared unlawful and that just and reasonable rates be determined from June 30, 1939 to the date of the Commission's order. The latter finding was requested in aid of state regulation and to afford the Public Utilities Commission of Ohio a proper basis for disposition of a fund collected by East Ohio under bond from Ohio consumers since June 30, 1939. The cases were consolidated and hearings were held.

^{[FN1](#)} Hope produces about one-third of its annual gas requirements and purchases the rest under some 300 contracts.

^{[FN2](#)} These five companies are the East Ohio Gas Co., the Peoples Natural Gas Co., the

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River Gas Co., the Fayette County Gas Co.,
and the Manufacturers Light & Heat Co.
The first three of these companies are, like
Hope, subsidiaries of Standard Oil Co.

(N.J.). East Ohio and River distribute gas in
Ohio, the other three in Pennsylvania.
Hope's approximate sales in m.c.f. for 1940
may be classified as follows:

Local West Virginia.

sales.	11,000,000
East Ohio.	40,000,000
Peoples.	10,000,000
River.	400,000
Fayette.	860,000
Manufacturers.	2,000,000

Local West Virginia

Hope's natural gas is processed by Hope Construction & Refining Co., an affiliate, for the extraction of gasoline and butane. Domestic Coke Corp., another affiliate, sells coke-oven gas to Hope for boiler fuel.

On May 26, 1942, the Commission entered its order and made its findings. Its order required Hope to decrease its future interstate rates so as to reflect a reduction, on an annual basis of not less than \$3,609,857 in operating revenues. And it established 'just and reasonable' average rates per m.c.f. for each of the five customer companies. ^{FN3} In response to the prayer of the City of Cleveland the Commission also made findings as to the lawfulness of past rates, although concededly it had no authority under the Act to fix past rates or to award reparations. 44 P.U.R.,U.S., at page 34. It found that the rates collected by Hope from East Ohio were unjust, unreasonable, excessive and therefore unlawful, by \$830,892 during 1939, \$3,219,551 during 1940, and \$2,815,789 on an annual basis since 1940. It further found that just, reasonable, and lawful rates for gas sold by Hope to East Ohio for resale for ultimate public consumption were those required *596 to produce \$11,528,608 for 1939, \$11,507,185 for 1940 and \$11.910,947 annually since 1940.

^{FN3} These required minimum reductions of 7¢ per m.c.f. from the 36.5¢ and 35.5¢ rates previously charged East Ohio and Peoples, respectively, and 3¢ per m.c.f. from the 31.5¢ rate previously charged Fayette and Manufacturers.

The Commission established an interstate rate base of \$33,712,526 which, it found, represented the 'actual legitimate cost' of the company's interstate property less depletion and depreciation and plus unoperated acreage, working capital and future net capital additions. The Commission, beginning with book cost, made **285

certain adjustments not necessary to relate here and found the 'actual legitimate cost' of the plant in interstate service to be \$51,957,416, as of December 31, 1940. It deducted accrued depletion and depreciation, which it found to be \$22,328,016 on an 'economic-service-life' basis. And it added \$1,392,021 for future net capital additions, \$566,105 for useful unoperated acreage, and \$2,125,000 for working capital. It used 1940 as a test year to estimate future revenues and expenses. It allowed over \$16,000,000 as annual operating expenses-about \$1,300,000 for taxes, \$1,460,000 for depletion and depreciation, \$600,000 for exploration and development costs, \$8,500,000 for gas purchased. The Commission allowed a net increase of \$421,160 over 1940 operating expenses, which amount was to take care of future increase in wages, in West Virginia property taxes, and in exploration and development costs. The total amount of deductions allowed from interstate revenues was \$13,495,584.

Hope introduced evidence from which it estimated reproduction cost of the property at \$97,000,000. It also presented a so-called trended 'original cost' estimate which exceeded \$105,000,000. The latter was designed 'to indicate what the original cost of the property would have been if 1938 material and labor prices had prevailed throughout the whole period of the piece-meal construction of the company's property since 1898.' 44 P.U.R.,N.S., at pages 8, 9. Hope estimated by the 'percent condition' method accrued depreciation at about 35% of *597 reproduction cost new. On that basis Hope contended for a rate base of \$66,000,000. The Commission refused to place any reliance on reproduction cost new, saying that it was 'not predicated upon facts' and was 'too conjectural and illusory to be given any weight in these proceedings.' Id., 44 P.U.R.,U.S., at page 8. It likewise refused to give any 'probative value' to trended 'original cost' since it was 'not founded in fact' but was 'basically erroneous' and produced 'irrational results.' Id., 44 P.U.R., N.S., at page 9. In determining the amount of accrued depletion and depreciation the Commission, following [Lindheimer v. Illinois Bell](#)

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[Telephone Co., 292 U.S. 151, 167-169, 54 S.Ct. 658, 664-666, 78 L.Ed. 1182; Federal Power Commission v. Natural Gas Pipeline Co., 315 U.S. 575, 592, 593, 62 S.Ct. 736, 745, 746, 86 L.Ed. 1037](#), based its computation on 'actual legitimate cost'. It found that Hope during the years when its business was not under regulation did not observe 'sound depreciation and depletion practices' but 'actually accumulated an excessive reserve' ^{FN4} of about \$46,000,000. Id., 44 P.U.R.,N.S., at page 18. One member of the Commission thought that the entire amount of the reserve should be deducted from 'actual legitimate cost' in determining the rate base. ^{FN5} The majority of the *598 Commission concluded, however, that where, as here, a business is brought under regulation for the first time and where incorrect depreciation and depletion practices have prevailed, the deduction of the reserve requirement (actual existing depreciation and depletion) rather than the excessive reserve should be made so as to **286 lay 'a sound basis for future regulation and control of rates.' Id., 44 P.U.R.,N.S., at page 18. As we have pointed out, it determined accrued depletion and depreciation to be \$22,328,016; and it allowed approximately \$1,460,000 as the annual operating expense for depletion and depreciation. ^{FN6}

^{FN4} The book reserve for interstate plant amounted at the end of 1938 to about \$18,000,000 more than the amount determined by the Commission as the proper reserve requirement. The Commission also noted that 'twice in the past the company has transferred amounts aggregating \$7,500,000 from the depreciation and depletion reserve to surplus. When these latter adjustments are taken into account, the excess becomes \$25,500,000, which has been exacted from the ratepayers over and above the amount required to cover the consumption of property in the service rendered and thus to keep the investment unimpaired.' 44 P.U.R.,N.S., at page 22.

^{FN5} That contention was based on the fact that 'every single dollar in the depreciation and depletion reserves' was taken 'from gross operating revenues whose only source was the amounts charged customers in the past for natural gas. It is, therefore, a fact that the depreciation and depletion reserves have been contributed by the customers and do not represent any investment by Hope.' Id., 44 P.U.R.,N.S., at page 40. And see [Railroad Commission v. Cumberland Tel. & T. Co., 212 U.S. 414, 424, 425, 29 S.Ct. 357, 361, 362, 53 L.Ed. 577; 2 Bonbright, Valuation of Property](#)

(1937), p. 1139.

^{FN6} The Commission noted that the case was 'free from the usual complexities involved in the estimate of gas reserves because the geologists for the company and the Commission presented estimates of the remaining recoverable gas reserves which were about one per cent apart.' 44 P.U.R.,N.S., at pages 19, 20.

The Commission utilized the 'straight-line-basis' for determining the depreciation and depletion reserve requirements. It used estimates of the average service lives of the property by classes based in part on an inspection of the physical condition of the property. And studies were made of Hope's retirement experience and maintenance policies over the years. The average service lives of the various classes of property were converted into depreciation rates and then applied to the cost of the property to ascertain the portion of the cost which had expired in rendering the service.

The record in the present case shows that Hope is on the lookout for new sources of supply of natural gas and is contemplating an extension of its pipe line into Louisiana for that purpose. The Commission recognized in fixing the rates of depreciation that much material may be used again when various present sources of gas supply are exhausted, thus giving that property more than scrap value at the end of its present use.

Hope's estimate of original cost was about \$69,735,000-approximately \$17,000,000 more than the amount found by the Commission. The item of \$17,000,000 was made up largely of expenditures which prior to December 31, 1938, were charged to operating expenses. Chief among those expenditures was some \$12,600,000 expended *599 in well-drilling prior to 1923. Most of that sum was expended by Hope for labor, use of drilling-rigs, hauling, and similar costs of well-drilling. Prior to 1923 Hope followed the general practice of the natural gas industry and charged the cost of drilling wells to operating expenses. Hope continued that practice until the Public Service Commission of West Virginia in 1923 required it to capitalize such expenditures, as does the Commission under its present Uniform System of Accounts. ^{FN7} The Commission refused to add such items to the rate base stating that 'No greater injustice to consumers could be done than to allow items as operating expenses and at a later date include them in the rate base, thereby placing multiple charges upon the consumers.' Id., 44 P.U.R.,N.S., at page 12. For the same reason the Commission excluded from the rate base about \$1,600,000 of expenditures on properties which Hope acquired from other utilities, the latter having charged those payments to operating expenses. The Commission disallowed certain other overhead items amounting to

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over \$3,000,000 which also had been previously charged to operating expenses. And it refused to add some \$632,000 as interest during construction since no interest was in fact paid.

[FN7](#) See Uniform System of Accounts prescribed for Natural Gas Companies effective January 1, 1940, Account No. 332.1.

Hope contended that it should be allowed a return of not less than 8%. The Commission found that an 8% return would be unreasonable but that 6 1/2% was a fair rate of return. That rate of return, applied to the rate base of \$33,712,526, would produce \$2,191,314 annually, as compared with the present income of not less than \$5,801,171.

The Circuit Court of Appeals set aside the order of the Commission for the following reasons. (1) It held that the rate base should reflect the 'present fair value' of the ***600** property, that the Commission in determining the 'value' should have considered reproduction cost and trended original cost, and that 'actual legitimate cost' (prudent investment) was not the proper measure of 'fair value' where price levels had changed since the investment. (2) It concluded that the well-drilling costs and overhead items in the amount of some \$17,000,000 should have been included in the rate base. (3) It held that accrued depletion and depreciation and the annual allowance for that expense should be computed on the basis of 'present fair value' of the property not on the basis of 'actual legitimate cost'.

****287** The Circuit Court of Appeals also held that the Commission had no power to make findings as to past rates in aid of state regulation. But it concluded that those findings were proper as a step in the process of fixing future rates. Viewed in that light, however, the findings were deemed to be invalidated by the same errors which vitiated the findings on which the rate order was based.

Order Reducing Rates. Congress has provided in s 4(a) of the Natural Gas Act that all natural gas rates subject to the jurisdiction of the Commission 'shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.' Sec. 5(a) gives the Commission the power, after hearing, to determine the 'just and reasonable rate' to be thereafter observed and to fix the rate by order. Sec. 5(a) also empowers the Commission to order a 'decrease where existing rates are unjust * * * unlawful, or are not the lowest reasonable rates.' And Congress has provided in s 19(b) that on review of these rate orders the 'finding of the Commission as to the facts, if supported by substantial

evidence, shall be conclusive.' Congress, however, has provided no formula by which the 'just and reasonable' rate is to be determined. It has not filled in the ***601** details of the general prescription [FN8](#) of s 4(a) and s 5(a). It has not expressed in a specific rule the fixed principle of 'just and reasonable'.

[FN8](#). Sec. 6 of the Act comes the closest to supplying any definite criteria for rate making. It provides in subsection (a) that, 'The Commission may investigate the ascertain the actual legitimate cost of the property of every natural-gas company, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation and the fair value of such property.' Subsection (b) provides that every natural-gas company on request shall file with the Commission a statement of the 'original cost' of its property and shall keep the Commission informed regarding the 'cost' of all additions, etc.

[\[1\] \[2\]](#) When we sustained the constitutionality of the Natural Gas Act in the Natural Gas Pipeline Co. case, we stated that the 'authority of Congress to regulate the prices of commodities in interstate commerce is at least as great under the Fifth Amendment as is that of the states under the Fourteenth to regulate the prices of commodities in intrastate commerce.' [315 U.S. at page 582, 62 S.Ct. at page 741, 86 L.Ed. 1037](#). Rate-making is indeed but one species of price-fixing. [Munn v. Illinois, 94 U.S. 113, 134, 24 L.Ed. 77](#). The fixing of prices, like other applications of the police power, may reduce the value of the property which is being regulated. But the fact that the value is reduced does not mean that the regulation is invalid. [Block v. Hirsh, 256 U.S. 135, 155-157, 41 S.Ct. 458, 459, 460, 65 L.Ed. 865, 16 A.L.R. 165; Nebbia v. New York, 291 U.S. 502, 523-539, 54 S.Ct. 505, 509-517, 78 L.Ed. 940, 89 A.L.R. 1469](#), and cases cited. It does, however, indicate that 'fair value' is the end product of the process of rate-making not the starting point as the Circuit Court of Appeals held. The heart of the matter is that rates cannot be made to depend upon 'fair value' when the value of the going enterprise depends on earnings under whatever rates may be anticipated. [FN9](#)

[FN9](#) We recently stated that the meaning of the word 'value' is to be gathered 'from the purpose for which a valuation is being made. Thus the question in a valuation for rate making is how much a utility will be allowed to earn. The basic

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question in a valuation for reorganization purposes is how much the enterprise in all probability can earn.’ [Institutional Investors v. Chicago, M., St. P. & P.R. Co.](#), 318 U.S. 523, 540, 63 S.Ct. 727, 738.

602** [3] [4] [5] [6] [7] We held in *Federal Power Commission v. Natural Gas Pipeline Co.*, supra, that the Commission was not bound to the use of any single formula or combination of formulae in determining rates. Its rate-making function, moreover, involves the making of ‘pragmatic adjustments.’ *Id.*, 315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037. And when the Commission’s order is challenged in the courts, the question is whether that order ‘viewed in its entirety’ meets the requirements of the Act. *Id.*, 315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037. Under the statutory standard of ‘just and reasonable’ it is the result reached not the method employed which is controlling. Cf. *288** [Los Angeles Gas & Electric Corp. v. Railroad Commission](#), 289 U.S. 287, 304, 305, 314, 53 S.Ct. 637, 643, 644, 647, 77 L.Ed. 1180; [West Ohio Gas Co. v. Public Utilities Commission \(No. 1\)](#), 294 U.S. 63, 70, 55 S.Ct. 316, 320, 79 L.Ed. 761; [West v. Chesapeake & Potomac Tel. Co.](#), 295 U.S. 662, 692, 693, 55 S.Ct. 894, 906, 907, 79 L.Ed. 1640 (dissenting opinion). It is not theory but the impact of the rate order which counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end. The fact that the method employed to reach that result may contain infirmities is not then important. Moreover, the Commission’s order does not become suspect by reason of the fact that it is challenged. It is the product of expert judgment which carries a presumption of validity. And he who would upset the rate order under the Act carries the heavy burden of making a convincing showing that it is invalid because it is unjust and unreasonable in its consequences. Cf. [Railroad Commission v. Cumberland Tel. & T. Co.](#), 212 U.S. 414, 29 S.Ct. 357, 53 L.Ed. 577; [Lindheimer v. Illinois Bell Tel. Co.](#), supra, 292 U.S. at pages 164, 169, 54 S.Ct. at pages 663, 665, 78 L.Ed. 1182; [Railroad Commission v. Pacific Gas & E. Co.](#), 302 U.S. 388, 401, 58 S.Ct. 334, 341, 82 L.Ed. 319.

***603** [8] [9] The rate-making process under the Act, i.e., the fixing of ‘just and reasonable’ rates, involves a balancing of the investor and the consumer interests. Thus we stated in the *Natural Gas Pipeline Co.* case that ‘regulation does not insure that the business shall produce net revenues.’ 315 U.S. at page 590, 62 S.Ct. at page 745, 86 L.Ed. 1037. But such considerations aside, the investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. From the investor or company point of view it

is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. Cf. [Chicago & Grand Trunk R. Co. v. Wellman](#), 143 U.S. 339, 345, 346, 12 S.Ct. 400, 402, 36 L.Ed. 176. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. See [State of Missouri ex rel. South-western Bell Tel. Co. v. Public Service Commission](#), 262 U.S. 276, 291, 43 S.Ct. 544, 547, 67 L.Ed. 981, 31 A.L.R. 807 (Mr. Justice Brandeis concurring). The conditions under which more or less might be allowed are not important here. Nor is it important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at. For we are of the view that the end result in this case cannot be condemned under the Act as unjust and unreasonable from the investor or company viewpoint.

We have already noted that Hope is a wholly owned subsidiary of the Standard Oil Co. (N.J.). It has no securities outstanding except stock. All of that stock has been owned by Standard since 1908. The par amount presently outstanding is approximately \$28,000,000 as compared with the rate base of \$33,712,526 established by ***604** the Commission. Of the total outstanding stock \$11,000,000 was issued in stock dividends. The balance, or about \$17,000,000, was issued for cash or other assets. During the four decades of its operations Hope has paid over \$97,000,000 in cash dividends. It had, moreover, accumulated by 1940 an earned surplus of about \$8,000,000. It had thus earned the total investment in the company nearly seven times. Down to 1940 it earned over 20% per year on the average annual amount of its capital stock issued for cash or other assets. On an average invested capital of some \$23,000,000 Hope’s average earnings have been about 12% a year. And during this period it had accumulated in addition reserves for depletion and depreciation of about \$46,000,000. Furthermore, during 1939, 1940 and 1941, Hope paid dividends of 10% on its stock. And in the year 1942, during about half of which the lower rates were in effect, it paid dividends of 7 1/2%. From 1939-1942 its earned surplus increased from \$5,250,000 to about \$13,700,000, i.e., to almost half the par value of its outstanding stock.

As we have noted, the Commission fixed a rate of return which permits Hope to earn \$2,191,314 annually. In determining that amount it stressed the importance of maintaining the financial integrity of the ****289** company. It considered the financial history of Hope and a vast

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array of data bearing on the natural gas industry, related businesses, and general economic conditions. It noted that the yields on better issues of bonds of natural gas companies sold in the last few years were 'close to 3 per cent', 44 P.U.R.,N.S., at page 33. It stated that the company was a 'seasoned enterprise whose risks have been minimized' by adequate provisions for depletion and depreciation (past and present) with 'concurrent high profits', by 'protected established markets, through affiliated distribution companies, in populous and industrialized areas', and by a supply of gas locally to meet all requirements,*605 'except on certain peak days in the winter, which it is feasible to supplement in the future with gas from other sources.' Id., 44 P.U.R.,N.S., at page 33. The Commission concluded, 'The company's efficient management, established markets, financial record, affiliations, and its prospective business place it in a strong position to attract capital upon favorable terms when it is required.' Id., 44 P.U.R.,N.S., at page 33.

[10] [11] [12] In view of these various considerations we cannot say that an annual return of \$2,191,314 is not 'just and reasonable' within the meaning of the Act. Rates which enable the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risks assumed certainly cannot be condemned as invalid, even though they might produce only a meager return on the so-called 'fair value' rate base. In that connection it will be recalled that Hope contended for a rate base of \$66,000,000 computed on reproduction cost new. The Commission points out that if that rate base were accepted, Hope's average rate of return for the four-year period from 1937-1940 would amount to 3.27%. During that period Hope earned an annual average return of about 9% on the average investment. It asked for no rate increases. Its properties were well maintained and operated. As the Commission says such a modest rate of 3.27% suggests an 'inflation of the base on which the rate has been computed.' [Dayton Power & Light Co. v. Public Utilities Commission](#), 292 U.S. 290, 312, 54 S.Ct. 647, 657, 78 L.Ed. 1267. Cf. [Lindheimer v. Illinois Bell Tel. Co.](#), supra, 292 U.S. at page 164, 54 S.Ct. at page 663, 78 L.Ed. 1182. The incongruity between the actual operations and the return computed on the basis of reproduction cost suggests that the Commission was wholly justified in rejecting the latter as the measure of the rate base.

In view of this disposition of the controversy we need not stop to inquire whether the failure of the Commission to add the \$17,000,000 of well-drilling and other costs to *606 the rate base was consistent with the prudent investment theory as developed and applied in particular cases.

[13] [14] [15] Only a word need be added respecting depletion and depreciation. We held in the Natural Gas Pipeline Co. case that there was no constitutional requirement 'that the owner who embarks in a wasting-asset business of limited life shall receive at the end more than he has put into it.' [315 U.S. at page 593](#), [62 S.Ct. at page 746](#), [86 L.Ed. 1037](#). The Circuit Court of Appeals did not think that that rule was applicable here because Hope was a utility required to continue its service to the public and not scheduled to end its business on a day certain as was stipulated to be true of the Natural Gas Pipeline Co. But that distinction is quite immaterial. The ultimate exhaustion of the supply is inevitable in the case of all natural gas companies. Moreover, this Court recognized in [Lindheimer v. Illinois Bell Tel. Co.](#), supra, the propriety of basing annual depreciation on cost. ^{FN10} By such a procedure the **290 utility is made whole and the integrity of its investment maintained. ^{FN11} No more is required. ^{FN12} We cannot approve the contrary holding *607 of [United Railways & Electric Co. v. West](#), 280 U.S. 234, 253, 254, 50 S.Ct. 123, 126, 127, 74 L.Ed. 390. Since there are no constitutional requirements more exacting than the standards of the Act, a rate order which conforms to the latter does not run afoul of the former.

^{FN10} Chief Justice Hughes said in that case ([292 U.S. at pages 168, 169](#), [54 S.Ct. at page 665](#), [78 L.Ed. 1182](#)): 'If the predictions of service life were entirely accurate and retirements were made when and as these predictions were precisely fulfilled, the depreciation reserve would represent the consumption of capital, on a cost basis, according to the method which spreads that loss over the respective service periods. But if the amounts charged to operating expenses and credited to the account for depreciation reserve are excessive, to that extent subscribers for the telephone service are required to provide, in effect, capital contributions, not to make good losses incurred by the utility in the service rendered and thus to keep its investment unimpaired, but to secure additional plant and equipment upon which the utility expects a return.'

^{FN11} See Mr. Justice Brandeis (dissenting) in [United Railways & Electric Co. v. West](#), 280 U.S. 234, 259-288, 50 S.Ct. 123, 128-138, 74 L.Ed. 390, for an extended analysis of the problem.

^{FN12} It should be noted that the Act provides no specific rule governing depletion and depreciation. Sec. 9(a) merely states that the

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Commission 'may from time to time ascertain and determine, and by order fix, the proper and adequate rates of depreciation and amortization of the several classes of property of each natural-gas company used or useful in the production, transportation, or sale of natural gas.'

The Position of West Virginia. The State of West Virginia, as well as its Public Service Commission, intervened in the proceedings before the Commission and participated in the hearings before it. They have also filed a brief amicus curiae here and have participated in the argument at the bar. Their contention is that the result achieved by the rate order 'brings consequences which are unjust to West Virginia and its citizens' and which 'unfairly depress the value of gas, gas lands and gas leaseholds, unduly restrict development of their natural resources, and arbitrarily transfer their properties to the residents of other states without just compensation therefor.'

West Virginia points out that the Hope Natural Gas Co. holds a large number of leases on both producing and unoperated properties. The owner or grantor receives from the operator or grantee delay rentals as compensation for postponed drilling. When a producing well is successfully brought in, the gas lease customarily continues indefinitely for the life of the field. In that case the operator pays a stipulated gas-well rental or in some cases a gas royalty equivalent to one-eighth of the gas marketed. ^{FN13} Both the owner and operator have valuable property interests in the gas which are separately taxable under West Virginia law. The contention is that the reversionary interests in the leaseholds should be represented in the rate proceedings since it is their gas which is being sold in interstate ^{*608} commerce. It is argued, moreover, that the owners of the reversionary interests should have the benefit of the 'discovery value' of the gas leaseholds, not the interstate consumers. Furthermore, West Virginia contends that the Commission in fixing a rate for natural gas produced in that State should consider the effect of the rate order on the economy of West Virginia. It is pointed out that gas is a wasting asset with a rapidly diminishing supply. As a result West Virginia's gas deposits are becoming increasingly valuable. Nevertheless the rate fixed by the Commission reduces that value. And that reduction, it is said, has severe repercussions on the economy of the State. It is argued in the first place that as a result of this rate reduction Hope's West Virginia property taxes may be decreased in view of the relevance which earnings have under West Virginia law in the assessment of property for tax purposes. ^{FN14} Secondly, it is pointed out that West Virginia has a production tax ^{FN15} on the 'value' of the gas exported from the State. And we are told that

for purposes of that tax 'value' becomes under West Virginia law 'practically the substantial equivalent of market value.' Thus West Virginia argues that undervaluation of Hope's gas leaseholds will cost the State many thousands of dollars in taxes. The effect, it is urged, is to impair West Virginia's tax structure for the benefit of Ohio and Pennsylvania consumers. West Virginia emphasizes, moreover, its deep interest in the conservation of its natural resources including its natural gas. It says that a reduction of the value of these leasehold values will jeopardize these conservation policies in three respects: (1) ^{**291} exploratory development of new fields will be discouraged; (2) abandonment of lowyield high-cost marginal wells will be hastened; and (3) secondary recovery of oil will be hampered. ^{*609} Furthermore, West Virginia contends that the reduced valuation will harm one of the great industries of the State and that harm to that industry must inevitably affect the welfare of the citizens of the State. It is also pointed out that West Virginia has a large interest in coal and oil as well as in gas and that these forms of fuel are competitive. When the price of gas is materially cheapened, consumers turn to that fuel in preference to the others. As a result this lowering of the price of natural gas will have the effect of depreciating the price of West Virginia coal and oil.

^{FN13} See Simonton, The Nature of the Interest of the Grantee Under an Oil and Gas Lease (1918), 25 W.Va.L.Quar. 295.

^{FN14} [West Penn Power Co. v. Board of Review](#), 112 W.Va. 442, 164 S.E. 862.

^{FN15} W.Va.Rev.Code of 1943, ch. 11. Art. 13, ss 2a, 3a.

West Virginia insists that in neglecting this aspect of the problem the Commission failed to perform the function which Congress entrusted to it and that the case should be remanded to the Commission for a modification of its order. ^{FN16}

^{FN16} West Virginia suggests as a possible solution (1) that a 'going concern value' of the company's tangible assets be included in the rate base and (2) that the fair market value of gas delivered to customers be added to the outlay for operating expenses and taxes.

We have considered these contentions at length in view of the earnestness with which they have been urged upon us. We have searched the legislative history of the Natural

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Gas Act for any indication that Congress entrusted to the Commission the various considerations which West Virginia has advanced here. And our conclusion is that Congress did not.

[16] [17] We pointed out in Illinois Natural Gas Co. v. Central Illinois Public Service Co., 314 U.S. 498, 506, 62 S.Ct. 384, 387, 86 L.Ed. 371, that the purpose of the Natural Gas Act was to provide, 'through the exercise of the national power over interstate commerce, an agency for regulating the wholesale distribution to public service companies of natural gas moving interstate, which this Court had declared to be interstate commerce not subject to certain types of state regulation.' As stated in the House Report the 'basic purpose' of this legislation was 'to occupy' the field in which such cases as ***610**State of Missouri v. Kansas Natural Gas Co., 265 U.S. 298, 44 S.Ct. 544, 68 L.Ed. 1027, and Public Utilities Commission v. Attleboro Steam & Electric Co., 273 U.S. 83, 47 S.Ct. 294, 71 L.Ed. 549, had held the States might not act. H.Rep. No. 709, 75th Cong., 1st Sess., p. 2. In accomplishing that purpose the bill was designed to take 'no authority from State commissions' and was 'so drawn as to complement and in no manner usurp State regulatory authority.' Id., p. 2. And the Federal Power Commission was given no authority over the 'production or gathering of natural gas.' s 1(b).

[18] The primary aim of this legislation was to protect consumers against exploitation at the hands of natural gas companies. Due to the hiatus in regulation which resulted from the Kansas Natural Gas Co. case and related decisions state commissions found it difficult or impossible to discover what it cost interstate pipe-line companies to deliver gas within the consuming states; and thus they were thwarted in local regulation. H.Rep., No. 709, supra, p. 3. Moreover, the investigations of the Federal Trade Commission had disclosed that the majority of the pipe-line mileage in the country used to transport natural gas, together with an increasing percentage of the natural gas supply for pipe-line transportation, had been acquired by a handful of holding companies. ^{FN17} State commissions, independent producers, and communities having or seeking the service were growing quite helpless against these combinations. ^{FN18} These were the types of problems with which those participating in the hearings were pre-occupied. ^{FN19} Congress addressed itself to those specific evils.

^{FN17} S.Doc. 92, Pt. 84-A, ch. XII, Final Report, Federal Trade Commission to the Senate pursuant to S.Res.No. 83, 70th Cong., 1st Sess.

^{FN18} S.Doc. 92, Pt. 84-A, chs. XII, XIII, op.

cit., supra, note 17.

^{FN19} See Hearings on H.R. 11662, Subcommittee of House Committee on Interstate & Foreign Commerce, 74th Cong., 2d Sess.; Hearings on H.R. 4008, House Committee on Interstate & Foreign Commerce, 75th Cong., 1st Sess.

***611** The Federal Power Commission was given ***292** broad powers of regulation. The fixing of 'just and reasonable' rates (s 4) with the powers attendant thereto ^{FN20} was the heart of the new regulatory system. Moreover, the Commission was given certain authority by s 7(a), on a finding that the action was necessary or desirable 'in the public interest,' to require natural gas companies to extend or improve their transportation facilities and to sell gas to any authorized local distributor. By s 7(b) it was given control over the abandonment of facilities or of service. And by s 7(c), as originally enacted, no natural gas company could undertake the construction or extension of any facilities for the transportation of natural gas to a market in which natural gas was already being served by another company, or sell any natural gas in such a market, without obtaining a certificate of public convenience and necessity from the Commission. In passing on such applications for certificates of convenience and necessity the Commission was told by s 7(c), as originally enacted, that it was 'the intention of Congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest.' The latter provision was deleted from s 7(c) when that subsection was amended by the Act of February 7, 1942, 56 Stat. 83. By that amendment limited grandfather rights were granted companies desiring to extend their facilities and services over the routes or within the area which they were already serving. Moreover, s 7(c) was broadened so as to require certificates ***612** of public convenience and necessity not only where the extensions were being made to markets in which natural gas was already being sold by another company but in other situations as well.

^{FN20} The power to investigate and ascertain the 'actual legitimate cost' of property (s 6), the requirement as to books and records (s 8), control over rates of depreciation (s 9), the requirements for periodic and special reports (s 10), the broad powers of investigation (s 14) are among the chief powers supporting the rate making function.

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[19] These provisions were plainly designed to protect the consumer interests against exploitation at the hands of private natural gas companies. When it comes to cases of abandonment or of extensions of facilities or service, we may assume that, apart from the express exemptions [FN21](#) contained in s 7, considerations of conservation are material to the issuance of certificates of public convenience and necessity. But the Commission was not asked here for a certificate of public convenience and necessity under s 7 for any proposed construction or extension. It was faced with a determination of the amount which a private operator should be allowed to earn from the sale of natural gas across state lines through an established distribution system. Secs. 4 and 5, not s 7, provide the standards for that determination. We cannot find in the words of the Act or in its history the slightest intimation or suggestion that the exploitation of consumers by private operators through the maintenance of high rates should be allowed to continue provided the producing states obtain indirect benefits from it. That apparently was the Commission's view of the matter, for the same arguments advanced here were presented to the Commission and not adopted by it.

[FN21](#) Apart from the grandfather clause contained in s 7(c), there is the provision of s 7(f) that a natural gas company may enlarge or extend its facilities with the 'service area' determined by the Commission without any further authorization.

We do not mean to suggest that Congress was unmindful of the interests of the producing states in their natural gas supplies when it drafted the Natural Gas Act. As we have said, the Act does not intrude on the domain traditionally reserved for control by state commissions; and the Federal Power Commission was given no authority over ***613** 'the production or gathering of natural gas.' s 1(b). In addition, Congress recognized the legitimate interests of the States in the conservation of natural gas. By s 11 Congress instructed the Commission to make reports on compacts between two or more States dealing with the conservation, production and transportation of natural gas. [FN22](#) The Commission was also ****293** directed to recommend further legislation appropriate or necessary to carry out any proposed compact and 'to aid in the conservation of natural-gas resources within the United States and in the orderly, equitable, and economic production, transportation, and distribution of natural gas.' s 11(a). Thus Congress was quite aware of the interests of the producing states in their natural gas supplies. [FN23](#) But it left the protection of ***614** those interests to measures other than the maintenance of high

rates to private companies. If the Commission is to be compelled to let the stockholders of natural gas companies have a feast so that the producing states may receive crumbs from that table, the present Act must be redesigned. Such a project raises questions of policy which go beyond our province.

[FN22](#) See P.L. 117, approved July 7, 1943, 57 Stat. 383 containing an 'Interstate Compact to Conserve Oil and Gas' between Oklahoma, Texas, New Mexico, Illinois, Colorado, and Kansas.

[FN23](#) As we have pointed out, s 7(c) was amended by the Act of February 7, 1942, 56 Stat. 83, so as to require certificates of public convenience and necessity not only where the extensions were being made to markets in which natural gas was already being sold by another company but to other situations as well. Considerations of conservation entered into the proposal to give the Act that broader scope. H.Rep.No. 1290, 77th Cong. 1st Sess., pp. 2, 3. And see Annual Report, Federal Power Commission (1940) pp. 79, 80; Baum, The Federal Power Commission and State Utility Regulation (1942), p. 261.

The bill amending s 7(c) originally contained a subsection (h) reading as follows: 'Nothing contained in this section shall be construed to affect the authority of a State within which natural gas is produced to authorize or require the construction or extension of facilities for the transportation and sale of such gas within such State: Provided, however, That the Commission, after a hearing upon complaint or upon its own motion, may by order forbid any intrastate construction or extension by any natural-gas company which it shall find will prevent such company from rendering adequate service to its customers in interstate or foreign commerce in territory already being served.' See Hearings on H.R. 5249, House Committee on Interstate & Foreign Commerce, 77th Cong., 1st Sess., pp. 7, 11, 21, 29, 32, 33. In explanation of its deletion the House Committee Report stated, pp. 4, 5: 'The increasingly important problems raised by the desire of several States to regulate the use of the natural gas produced therein in the interest of consumers within such States, as against the Federal power to regulate interstate commerce in the interest of both interstate and intrastate consumers, are deemed by the committee to warrant further intensive study and probably a more retailed and comprehensive plan for the handling thereof than that which would have been provided by the stricken subsection.'

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[20] It is hardly necessary to add that a limitation on the net earnings of a natural gas company from its interstate business is not a limitation on the power of the producing state either to safeguard its tax revenues from that industry ^{FN24} or to protect the interests of those who sell their gas to the interstate operator. ^{FN25} The return which ****294** the Commission ***615** allowed was the net return after all such charges.

^{FN24} We have noted that in the annual operating expenses of some \$16,000,000 the Commission included West Virginia and federal taxes. And in the net increase of \$421,160 over 1940 operating expenses allowed by the Commission was some \$80,000 for increased West Virginia property taxes. The adequacy of these amounts has not been challenged here.

^{FN25} The Commission included in the aggregate annual operating expenses which it allowed some \$8,500,000 for gas purchased. It also allowed about \$1,400,000 for natural gas production and about \$600,000 for exploration and development.

It is suggested, however, that the Commission in ascertaining the cost of Hope's natural gas production plant proceeded contrary to s 1(b) which provides that the Act shall not apply to 'the production or gathering of natural gas'. But such valuation, like the provisions for operating expenses, is essential to the rate-making function as customarily performed in this country. Cf. Smith, The Control of Power Rates in the United States and England (1932), 159 The Annals 101. Indeed s 14(b) of the Act gives the Commission the power to 'determine the propriety and reasonableness of the inclusion in operating expenses, capital, or surplus of all delay rentals or other forms of rental or compensation for unoperated lands and leases.'

It is suggested that the Commission has failed to perform its duty under the Act in that it has not allowed a return for gas production that will be enough to induce private enterprise to perform completely and efficiently its functions for the public. The Commission, however, was not oblivious of those matters. It considered them. It allowed, for example, delay rentals and exploration and development costs in operating expenses. ^{FN26} No serious attempt has been made here to show that they are inadequate. We certainly cannot say that they are, unless we are to substitute our opinions for the expert judgment of the administrators to whom Congress entrusted the decision. Moreover, if in light of experience they turn out to be inadequate for development of new sources of supply, the doors of the Commission are open for

increased allowances. This is not an order for all time. The Act contains machinery for obtaining rate adjustments. s 4.

^{FN26} See note 25, supra.

[21] [22] But it is said that the Commission placed too low a rate on gas for industrial purposes as compared with gas for domestic purposes and that industrial uses should be discouraged. It should be noted in the first place that the rates which the Commission has fixed are Hope's interstate wholesale rates to distributors not interstate rates to industrial users ^{FN27} and domestic consumers. We hardly ***616** can assume, in view of the history of the Act and its provisions, that the resales intrastate by the customer companies which distribute the gas to ultimate consumers in Ohio and Pennsylvania are subject to the rate-making powers of the Commission. ^{FN28} But in any event those rates are not in issue here. Moreover, we fail to find in the power to fix 'just and reasonable' rates the power to fix rates which will disallow or discourage resales for industrial use. The Committee Report stated that the Act provided 'for regulation along recognized and more or less standardized lines' and that there was 'nothing novel in its provisions'. H.Rep.No.709, supra, p. 3. Yet if we are now to tell the Commission to fix the rates so as to discourage particular uses, we would indeed be injecting into a rate case a 'novel' doctrine which has no express statutory sanction. The same would be true if we were to hold that the wasting-asset nature of the industry required the maintenance of the level of rates so that natural gas companies could make a greater profit on each unit of gas sold. Such theories of rate-making for this industry may or may not be desirable. The difficulty is that s 4(a) and s 5(a) contain only the conventional standards of rate-making for natural gas companies. ^{FN29} The ***617** Act of February 7, 1942, by broadening s 7 gave the Commission some additional authority to deal with the conservation aspects of the problem. ^{FN30} But s 4(a) and s 5(a) were not changed. If the standard ****295** of 'just and reasonable' is to sanction the maintenance of high rates by a natural gas company because they restrict the use of natural gas for certain purposes, the Act must be further amended.

^{FN27} The Commission has expressed doubts over its power to fix rates on 'direct sales to industries' from interstate pipelines as distinguished from 'sales for resale to the industrial customers of distributing companies.' Annual Report, Federal Power Commission (1940), p. 11.

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[FN28](#) Sec. 1(b) of the Act provides: 'The provisions of this Act shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas.' And see s 2(6), defining a 'natural-gas company', and H.Rep.No. 709, supra, pp. 2, 3.

[FN29](#) The wasting-asset characteristic of the industry was recognized prior to the Act as requiring the inclusion of a depletion allowance among operating expenses. See [Columbus Gas & Fuel Co. v. Public Utilities Commission](#), 292 U.S. 398, 404, 405, 54 S.Ct. 763, 766, 767, 78 L.Ed. 1327, 91 A.L.R. 1403. But no such theory of rate-making for natural gas companies as is now suggested emerged from the cases arising during the earlier period of regulation.

[FN30](#) The Commission has been alert to the problems of conservation in its administration of the Act. It has indeed suggested that it might be wise to restrict the use of natural gas 'by functions rather than by areas.' Annual Report (1940) p. 79.

The Commission stated in that connection that natural gas was particularly adapted to certain industrial uses. But it added that the general use of such gas 'under boilers for the production of steam' is 'under most circumstances of very questionable social economy.' Ibid.

[\[23\]](#) [\[24\]](#) It is finally suggested that the rates charged by Hope are discriminatory as against domestic users and in favor of industrial users. That charge is apparently based on s 4(b) of the Act which forbids natural gas companies from maintaining 'any unreasonable difference in rates, charges, service, facilities, or in any other respect, either as between localities or as between classes of service.' The power of the Commission to eliminate any such unreasonable differences or discriminations is plain. s 5(a). The Commission, however, made no findings under s 4(b). Its failure in that regard was not challenged in the petition for review. And it has not been raised or argued here by any party. Hence the problem of discrimination has no proper place in the present decision. It will be time enough to pass on that issue when it is presented to us. Congress has entrusted the administration of the Act

to the Commission not to the courts. Apart from the requirements of judicial review it is not *618 for us to advise the Commission how to discharge its functions.

Findings as to the Lawfulness of Past Rates. As we have noted, the Commission made certain findings as to the lawfulness of past rates which Hope had charged its interstate customers. Those findings were made on the complaint of the City of Cleveland and in aid of state regulation. It is conceded that under the Act the Commission has no power to make reparation orders. And its power to fix rates admittedly is limited to those 'to be thereafter observed and in force.' s 5(a). But the Commission maintains that it has the power to make findings as to the lawfulness of past rates even though it has no power to fix those rates. [FN31](#) However that may be, we do not think that these findings were reviewable under s 19(b) of the Act. That section gives any party 'aggrieved by an order' of the Commission a review 'of such order' in the circuit court of appeals for the circuit where the natural gas company is located or has its principal place of business or in the United States Court of Appeals for the District of Columbia. We do not think that the findings in question fall within that category.

[FN31](#) The argument is that s 4(a) makes 'unlawful' the charging of any rate that is not just and reasonable. And s 14(a) gives the Commission power to investigate any matter 'which it may find necessary or proper in order to determine whether any person has violated' any provision of the Act. Moreover, s 5(b) gives the Commission power to investigate and determine the cost of production or transportation of natural gas in cases where it has 'no authority to establish a rate governing the transportation or sale of such natural gas.' And s 17(c) directs the Commission to 'make available to the several State commissions such information and reports as may be of assistance in State regulation of natural-gas companies.' For a discussion of these points by the Commission see 44 P.U.R.,N.S., at pages 34, 35.

[\[25\]](#) [\[26\]](#) The Court recently summarized the various types of administrative action or determination reviewable as orders under the Urgent Deficiencies Act of October 22, *619 1913, [28 U.S.C. ss 45](#), 47a, [28 U.S.C.A. ss 45](#), 47a, and kindred statutory provisions. [Rochester Tel. Corp. v. United States](#), 307 U.S. 125, 59 S.Ct. 754, 83 L.Ed. 1147. It was there pointed out that where 'the order sought to be reviewed does not of itself adversely affect complainant but only affects his rights adversely on the contingency of future administrative action', it is not

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reviewable. [Id.](#), 307 U.S. at page 130, 59 S.Ct. at page 757, 83 L.Ed. 1147. The Court said, 'In view of traditional conceptions of federal judicial power, resort to the courts in these situations is either premature or wholly beyond their province.' **296[Id.](#), 307 U.S. at page 130, 59 S.Ct. at page 757, 83 L.Ed. 1147. And see [United States v. Los Angeles s.l.r. c/o.](#), 273 U.S. 299, 309, 310, 47 S.Ct. 413, 414, 415, 71 L.Ed. 651; [Shannahan v. United States](#), 303 U.S. 596, 58 S.Ct. 732, 82 L.Ed. 1039. These considerations are apposite here. The Commission has no authority to enforce these findings. They are 'the exercise solely of the function of investigation.' [United States v. Los Angeles & S.L.R. Co.](#), *supra*, 273 U.S. at page 310, 47 S.Ct. at page 414, 71 L.Ed. 651. They are only a preliminary, interim step towards possible future action-action not by the Commission but by wholly independent agencies. The outcome of those proceedings may turn on factors other than these findings. These findings may never result in the respondent feeling the pinch of administrative action.

Reversed.

Mr. Justice ROBERTS took no part in the consideration or decision of this case.

Opinion of Mr. Justice BLACK and Mr. Justice MURPHY.

We agree with the Court's opinion and would add nothing to what has been said but for what is patently a wholly gratuitous assertion as to Constitutional law in the dissent of Mr. Justice FRANKFURTER. We refer to the statement that 'Congressional acquiescence to date in the doctrine of [Chicago, etc., R. Co. v. Minnesota](#), *supra* (134 U.S. 418, 10 S.Ct. 462, 702, 33 L.Ed. 970), may fairly be claimed.' That was the case in which a majority of this Court was finally induced to expand the meaning *620 of 'due process' so as to give courts power to block efforts of the state and national governments to regulate economic affairs. The present case does not afford a proper occasion to discuss the soundness of that doctrine because, as stated in Mr. Justice FRANKFURTER'S dissent, 'That issue is not here in controversy.' The salutary practice whereby courts do not discuss issues in the abstract applies with peculiar force to Constitutional questions. Since, however, the dissent adverts to a highly controversial due process doctrine and implies its acceptance by Congress, we feel compelled to say that we do not understand that Congress voluntarily has acquiesced in a Constitutional principle of government that courts, rather than legislative bodies, possess final authority over regulation of economic affairs. Even this Court has not always fully embraced that principle, and we wish to repeat that we have never acquiesced in it, and do not now. See [Federal Power Commission v. Natural Gas Pipeline Co.](#), 315 U.S. 575, 599-601, 62 S.Ct. 736,

[749, 750, 86 L.Ed. 1037.](#)

Mr. Justice REED, dissenting.

This case involves the problem of rate making under the Natural Gas Act. Added importance arises from the obvious fact that the principles stated are generally applicable to all federal agencies which are entrusted with the determination of rates for utilities. Because my views differ somewhat from those of my brethren, it may be of some value to set them out in a summary form.

The Congress may fix utility rates in situations subject to federal control without regard to any standard except the constitutional standards of due process and for taking private property for public use without just compensation. [Wilson v. New](#), 243 U.S. 332, 350, 37 S.Ct. 298, 302, 61 L.Ed. 755, L.R.A.1917E, 938, Ann.Cas.1918A, 1024. A Commission, however, does not have this freedom of action. Its powers are limited not only by the constitutional standards but also by the standards of the delegation. Here the standard added by the Natural Gas Act is that the rate be 'just *621 and reasonable.' [FN1](#) Section 6 [FN2](#) **297 throws additional light on the meaning of these words.

[FN1](#) Natural Gas Act, s 4(a), 52 Stat. 821, 822, 15 U.S.C. s 717c(a), 15 U.S.C.A. s 717c(a).

[FN2](#) 52 Stat. 821, 824, 15 U.S.C. s 717e, 15 U.S.C.A. s 717e:

'(a) The Commission may investigate and ascertain the actual legitimate cost of the property of every natural-gas company, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation and the fair value of such property.

'(b) Every natural-gas company upon request shall file with the Commission an inventory of all or any part of its property and a statement of the original cost thereof, and shall keep the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.'

When the phrase was used by Congress to describe allowable rates, it had relation to something ascertainable. The rates were not left to the whim of the Commission. The rates fixed would produce an annual return and that annual return was to be compared with a theoretical just and reasonable return, all risks considered, on the fair value of the property used and useful in the public service at the time of the determination.

Such an abstract test is not precise. The agency charged

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with its determination has a wide range before it could properly be said by a court that the agency had disregarded statutory standards or had confiscated the property of the utility for public use. Cf. [Chicago, M. & St. P.R. Co. v. Minnesota](#), 134 U.S. 418, 461-466, 10 S.Ct. 462, 702, 703-705, 33 L.Ed. 970, dissent. This is as Congress intends. Rates are left to an experienced agency particularly competent by training to appraise the amount required.

The decision as to a reasonable return had not been a source of great difficulty, for borrowers and lenders reached such agreements daily in a multitude of situations; and although the determination of fair value had been troublesome, its essentials had been worked out in fairness to investor and consumer by the time of the enactment*622 of this Act. Cf. [Los Angeles G. & E. Corp. v. Railroad Comm.](#), 289 U.S. 287, 304 et seq., 53 S.Ct. 637, 643 et seq., 77 L.Ed. 1180. The results were well known to Congress and had that body desired to depart from the traditional concepts of fair value and earnings, it would have stated its intention plainly. [Helvering v. Griffiths](#), 318 U.S. 371, 63 S.Ct. 636.

It was already clear that when rates are in dispute, 'earnings produced by rates do not afford a standard for decision.' 289 U.S. at page 305, 53 S.Ct. at page 644, 77 L.Ed. 1180. Historical cost, prudent investment and reproduction cost ^{FN3} were all relevant factors in determining fair value. Indeed, disregarding the pioneer investor's risk, if prudent investment and reproduction cost were not distorted by changes in price levels or technology, each of them would produce the same result. The realization from the risk of an investment in a speculative field, such as natural gas utilities, should be reflected in the present fair value. ^{FN4} The amount of evidence to be admitted on any point was of course in the agency's reasonable discretion, and it was free to give its own weight to these or other factors and to determine from all the evidence its own judgment as to the necessary rates.

^{FN3} 'Reproduction cost' has been variously defined, but for rate making purposes the most useful sense seems to be, the minimum amount necessary to create at the time of the inquiry a modern plant capable of rendering equivalent service. See I Bonbright, Valuation of Property (1937) 152. Reproduction cost as the cost of building a replica of an obsolescent plant is not of real significance.

'Prudent investment' is not defined by the Court. It may mean the sum originally put in the enterprise, either with or without additional amounts from excess earnings

reinvested in the business.

^{FN4} It is of no more than bookkeeping significance whether the Commission allows a rate of return commensurate with the risk of the original investment or the lower rate based on current risk and a capitalization reflecting the established earning power of a successful company and the probable cost of duplicating its services. Cf. [American T. & T. Co. v. United States](#), 299 U.S. 232, 57 S.Ct. 170, 81 L.Ed. 142. But the latter is the traditional method.

*623 I agree with the Court in not imposing a rule of prudent investment alone in determining the rate base. This leaves the Commission free, as I understand it, to use any available evidence for its finding of fair value, including both prudent investment and the cost of installing at the present time an efficient system for furnishing the needed utility service.

My disagreement with the Court arises primarily from its view that it makes no **298 difference how the Commission reached the rate fixed so long as the result is fair and reasonable. For me the statutory command to the Commission is more explicit. Entirely aside from the constitutional problem of whether the Congress could validly delegate its rate making power to the Commission, in toto and without standards, it did legislate in the light of the relation of fair and reasonable to fair value and reasonable return. The Commission must therefore make its findings in observance of that relationship.

The Federal Power Commission did not, as I construe their action, disregard its statutory duty. They heard the evidence relating to historical and reproduction cost and to the reasonable rate of return and they appraised its weight. The evidence of reproduction cost was rejected as unpersuasive, but from the other evidence they found a rate base, which is to me a determination of fair value. On that base the earnings allowed seem fair and reasonable. So far as the Commission went in appraising the property employed in the service, I find nothing in the result which indicates confiscation, unfairness or unreasonableness. Good administration of rate making agencies under this method would avoid undue delay and render revaluations unnecessary except after violent fluctuations of price levels. Rate making under this method has been subjected to criticism. But until Congress changes the standards for the agencies, these rate making bodies should continue the conventional theory of rate *624 making. It will probably be simpler to improve present methods than to devise new ones.

But a major error, I think was committed in the disregard

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by the Commission of the investment in exploratory operations and other recognized capital costs. These were not considered by the Commission because they were charged to operating expenses by the company at a time when it was unregulated. Congress did not direct the Commission in rate making to deduct from the rate base capital investment which had been recovered during the unregulated period through excess earnings. In my view this part of the investment should no more have been disregarded in the rate base than any other capital investment which previously had been recovered and paid out in dividends or placed to surplus. Even if prudent investment throughout the life of the property is accepted as the formula for figuring the rate base, it seems to me illogical to throw out the admittedly prudent cost of part of the property because the earnings in the unregulated period had been sufficient to return the prudent cost to the investors over and above a reasonable return. What would the answer be under the theory of the Commission and the Court, if the only prudent investment in this utility had been the seventeen million capital charges which are now disallowed?

For the reasons heretofore stated, I should affirm the action of the Circuit Court of Appeals in returning the proceeding to the Commission for further consideration and should direct the Commission to accept the disallowed capital investment in determining the fair value for rate making purposes.

Mr. Justice FRANKFURTER, dissenting.

My brother JACKSON has analyzed with particularity the economic and social aspects of natural gas as well as *625 the difficulties which led to the enactment of the Natural Gas Act, especially those arising out of the abortive attempts of States to regulate natural gas utilities. The Natural Gas Act of 1938 should receive application in the light of this analysis, and Mr. Justice JACKSON has, I believe, drawn relevant inferences regarding the duty of the Federal Power Commission in fixing natural gas rates. His exposition seems to me unanswered, and I shall say only a few words to emphasize my basic agreement with him.

For our society the needs that are met by public utilities are as truly public services as the traditional governmental functions of police and justice. They are not less so when these services are rendered by private enterprise under governmental regulation. Who ultimately determines the ways of regulation, is the decisive aspect in the public supervision of privately-owned utilities. Foreshadowed nearly sixty years ago, [Railroad Commission Cases \(Stone v. Farmers' Loan & Trust Co.\)](#), 116 U.S. 307, 331, 6 S.Ct. 334, 344, 388, 1191, 29 L.Ed. 636, it was decided more than fifty **299 years ago that the final say under

the Constitution lies with the judiciary and not the legislature. [Chicago, etc., R. Co. v. Minnesota](#), 134 U.S. 418, 10 S.Ct. 462, 702, 33 L.Ed. 970.

While legal issues touching the proper distribution of governmental powers under the Constitution may always be raised, Congressional acquiescence to date in the doctrine of *Chicago, etc., R. Co. v. Minnesota*, supra, may fairly be claimed. But in any event that issue is not here in controversy. As pointed out in the opinions of my brethren, Congress has given only limited authority to the Federal Power Commission and made the exercise of that authority subject to judicial review. The Commission is authorized to fix rates chargeable for natural gas. But the rates that it can fix must be 'just and reasonable'. s 5 of the Natural Gas Act, [15 U.S.C. s 717d](#), [15 U.S.C.A. s 717d](#). Instead of making the Commission's rate determinations final, Congress*626 specifically provided for court review of such orders. To be sure, 'the finding of the Commission as to the facts, if supported by substantial evidence' was made 'conclusive', s 19 of the Act, [15 U.S.C. s 717r](#); [15 U.S.C.A. s 717r](#). But obedience of the requirement of Congress that rates be 'just and reasonable' is not an issue of fact of which the Commission's own determination is conclusive. Otherwise, there would be nothing for a court to review except questions of compliance with the procedural provisions of the Natural Gas Act. Congress might have seen fit so to cast its legislation. But it has not done so. It has committed to the administration of the Federal Power Commission the duty of applying standards of fair dealing and of reasonableness relevant to the purposes expressed by the Natural Gas Act. The requirement that rates must be 'just and reasonable' means just and reasonable in relation to appropriate standards. Otherwise Congress would have directed the Commission to fix such rates as in the judgment of the Commission are just and reasonable; it would not have also provided that such determinations by the Commission are subject to court review.

To what sources then are the Commission and the courts to go for ascertaining the standards relevant to the regulation of natural gas rates? It is at this point that Mr. Justice JACKSON'S analysis seems to me pertinent. There appear to be two alternatives. Either the fixing of natural gas rates must be left to the unguided discretion of the Commission so long as the rates it fixes do not reveal a glaringly had prophecy of the ability of a regulated utility to continue its service in the future. Or the Commission's rate orders must be founded on due consideration of all the elements of the public interest which the production and distribution of natural gas involve just because it is natural gas. These elements are reflected in the Natural Gas Act, if that Act be applied as

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an entirety. See, for *627 instance, ss 4(a)(b)(c)(d), 6, and 11, [15 U.S.C. ss 717c\(a\)\(b\)\(c\)\(d\), 717e, and 717j](#), [15 U.S.C.A. ss 717c\(a-d\), 717e, 717j](#). Of course the statute is not concerned with abstract theories of ratemaking. But its very foundation is the 'public interest', and the public interest is a texture of multiple strands. It includes more than contemporary investors and contemporary consumers. The needs to be served are not restricted to immediacy, and social as well as economic costs must be counted.

It will not do to say that it must all be left to the skill of experts. Expertise is a rational process and a rational process implies expressed reasons for judgment. It will little advance the public interest to substitute for the hodge-podge of the rule in [Smyth v. Ames, 169 U.S. 466, 18 S.Ct. 418, 42 L.Ed. 819](#), an encouragement of conscious obscurity or confusion in reaching a result, on the assumption that so long as the result appears harmless its basis is irrelevant. That may be an appropriate attitude when state action is challenged as unconstitutional. Cf. [Driscoll v. Edison Light & Power Co., 307 U.S. 104, 59 S.Ct. 715, 83 L.Ed. 1134](#). But it is not to be assumed that it was the design of Congress to make the accommodation of the conflicting interests exposed in Mr. Justice JACKSON'S opinion the occasion for a blind clash of forces or a partial assessment of relevant factors, either before the Commission or here.

The objection to the Commission's action is not that the rates it granted were too low but that the range of its vision was too narrow. And since the issues before the Commission involved no less than the **300 total public interest, the proceedings before it should not be judged by narrow conceptions of common law pleading. And so I conclude that the case should be returned to the Commission. In order to enable this Court to discharge its duty of reviewing the Commission's order, the Commission should set forth with explicitness the criteria by which it is guided *628 in determining that rates are 'just and reasonable', and it should determine the public interest that is in its keeping in the perspective of the considerations set forth by Mr. Justice JACKSON.

By Mr. Justice JACKSON.

Certainly the theory of the court below that ties rate-making to the fair-value-reproduction-cost formula should be overruled as in conflict with Federal Power Commission v. Natural Gas Pipeline Co. ^{FN1} But the case should, I think, be the occasion for reconsideration of our rate-making doctrine as applied to natural gas and should be returned to the Commission for further consideration in the light thereof.

[FN1 315 U.S. 575, 62 S.Ct. 736, 86 L.Ed. 1037.](#)

The Commission appears to have understood the effect of the two opinions in the Pipeline case to be at least authority and perhaps direction to fix natural gas rates by exclusive application of the 'prudent investment' rate base theory. This has no warrant in the opinion of the Chief Justice for the Court, however, which released the Commission from subservience to 'any single formula or combination of formulas' provided its order, 'viewed in its entirety, produces no arbitrary result.' [315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037](#). The minority opinion I understood to advocate the 'prudent investment' theory as a sufficient guide in a natural gas case. The view was expressed in the court below that since this opinion was not expressly controverted it must have been approved. ^{FN2} I disclaim this imputed*629 approval with some particularity, because I attach importance at the very beginning of federal regulation of the natural gas industry to approaching it as the performance of economic functions, not as the performance of legalistic rituals.

[FN2](#) Judge Dobie, dissenting below, pointed out that the majority opinion in the Pipeline case 'contains no express discussion of the Prudent Investment Theory' and that the concurring opinion contained a clear one, and said, 'It is difficult for me to believe that the majority of the Supreme Court, believing otherwise, would leave such a statement unchallenged.' ([134 F.2d 287, 312.](#)) The fact that two other Justices had as matter of record in our books long opposed the reproduction cost theory of rate bases and had commented favorably on the prudent investment theory may have influenced that conclusion. See opinion of Mr. Justice Frankfurter in [Driscoll v. Edison Light & Power Co., 307 U.S. 104, 122, 59 S.Ct. 715, 724, 83 L.Ed. 1134](#), and my brief as Solicitor General in that case. It should be noted, however, that these statements were made, not in a natural gas case, but in an electric power case-a very important distinction, as I shall try to make plain.

I.

Solutions of these cases must consider eccentricities of the industry which gives rise to them and also to the Act of Congress by which they are governed.

The heart of this problem is the elusive, exhaustible, and irreplaceable nature of natural gas itself. Given sufficient money, we can produce any desired amount of railroad,

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bus, or steamship transportation, or communications facilities, or capacity for generation of electric energy, or for the manufacture of gas of a kind. In the service of such utilities one customer has little concern with the amount taken by another, one's waste will not deprive another, a volume of service and be created equal to demand, and today's demands will not exhaust or lessen capacity to serve tomorrow. But the wealth of Midas and the wit of man cannot produce or reproduce a natural gas field. We cannot even reproduce the gas, for our manufactured product has only about half the heating value per unit of nature's own. ^{FN3}

^{FN3} Natural gas from the Appalachian field averages about 1050 to 1150 B.T.U. content, while by-product manufactured gas is about 530 to 540. Moody's Manual of Public Utilities (1943) 1350; Youngberg, Natural Gas (1930) 7.

****301** Natural gas in some quantity is produced in twenty-four states. It is consumed in only thirty-five states, and is ***630** available only to about 7,600,000 consumers. ^{FN4} Its availability has been more localized than that of any other utility service because it has depended more on the caprice of nature.

^{FN4} Sen.Rep. No. 1162, 75th Cong., 1st Sess., 2.

The supply of the Hope Company is drawn from that old and rich and vanishing field that flanks the Appalachian mountains. Its center of production is Pennsylvania and West Virginia, with a fringe of lesser production in New York, Ohio, Kentucky, Tennessee, and the north end of Alabama. Oil was discovered in commercial quantities at a depth of only 69 1/2 feet near Titusville, Pennsylvania, in 1859. Its value then was about \$16 per barrel. ^{FN5} The oil branch of the petroleum industry went forward at once, and with unprecedented speed. The area productive of oil and gas was roughed out by the drilling of over 19,000 'wildcat' wells, estimated to have cost over \$222,000,000. Of these, over 18,000 or 94.9 per cent, were 'dry holes.' About five per cent, or 990 wells, made discoveries of commercial importance, 767 of them resulting chiefly in oil and 223 in gas only. ^{FN6} Prospecting for many years was a search for oil, and to strike gas was a misfortune. Waste during this period and even later is appalling. Gas was regarded as having no commercial value until about 1882, in which year the total yield was valued only at about \$75,000. ^{FN7} Since then, contrary to oil, which has become cheaper gas in this field has pretty steadily advanced in price.

^{FN5} Arnold and Kemnitzer, Petroleum in the United States and Possessions (1931) 78.

^{FN6} Id. at 62-63.

^{FN7} Id. at 61.

While for many years natural gas had been distributed on a small scale for lighting, ^{FN8} its acceptance was slow, ***631** facilities for its utilization were primitive, and not until 1885 did it take on the appearance of a substantial industry. ^{FN9} Soon monopoly of production or markets developed. ^{FN10} To get gas from the mountain country, where it was largely found, to centers of population, where it was in demand, required very large investment. By ownership of such facilities a few corporate systems, each including several companies, controlled access to markets. Their purchases became the dominating factor in giving a market value to gas produced by many small operators. Hope is the market for over 300 such operators. By 1928 natural gas in the Appalachian field commanded an average price of 21.1 cents per m.c.f. at points of production and was bringing 45.7 cents at points of consumption. ^{FN11} The companies which controlled markets, however, did not rely on gas purchases alone. They acquired and held in fee or leasehold great acreage in territory proved by 'wildcat' drilling. These large marketing system companies as well as many small independent owners and operators have carried on the commercial development of proved territory. The development risks appear from the estimate that up to 1928, 312,318 proved area wells had been sunk in the Appalachian field of which 48,962, or 15.7 per cent, failed to produce oil or gas in commercial quantity. ^{FN12}

^{FN8} At Fredonia, New York, in 1821, natural gas was conveyed from a shallow well to some thirty people. The lighthouse at Barcelona Harbor, near what is now Westfield, New York, was at about that time and for many years afterward lighted by gas that issued from a crevice. Report on Utility Corporations by Federal Trade Commission, Sen.Doc. 92, Pt. 84-A, 70th Cong., 1st Sess., 8-9.

^{FN9} In that year Pennsylvania enacted 'An Act to provide for the incorporation and regulation of natural gas companies.' Penn.Laws 1885, No. 32, 15 P.S. s 1981 et seq.

^{FN10} See Steptoe and Hoffheimer's Memorandum for Governor Cornwell of West Virginia (1917) 25 West Virginia Law Quarterly 257; see also Report on Utility Corporations by

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Federal Trade Commission, Sen.Doc. No. 92, Pt. 84-A, 70th Cong., 1st Sess.

[FN11](#) Arnold and Kemnitzer, Petroleum in the United States and Possessions (1931) 73.

[FN12](#). Id. at 63.

*632 With the source of supply thus tapped to serve centers of large demand, like Pittsburgh, Buffalo, Cleveland, Youngstown, Akron, and other industrial communities, the distribution of natural gas fast became big business. Its advantages as a **302 fuel and its price commended it, and the business yielded a handsome return. All was merry and the goose hung high for consumers and gas companies alike until about the time of the first. World War. Almost unnoticed by the consuming public, the whole Appalachian field passed its peak of production and started to decline. Pennsylvania, which to 1928 had given off about 38 per cent of the natural gas from this field, had its peak in 1905; Ohio, which had produced 14 per cent, had its peak in 1915; and West Virginia, greatest producer of all, with 45 per cent to its credit, reached its peak in 1917. [FN13](#)

[FN13](#). Id. at 64.

Western New York and Eastern Ohio, on the fringe of the field, had some production but relied heavily on imports from Pennsylvania and West Virginia. Pennsylvania, a producing and exporting state, was a heavy consumer and supplemented her production with imports from West Virginia. West Virginia was a consuming state, but the lion's share of her production was exported. Thus the interest of the states in the North Appalachian supply was in conflict.

Competition among localities to share in the failing supply and the helplessness of state and local authorities in the presence of state lines and corporate complexities is a part of the background of federal intervention in the industry. [FN14](#) West Virginia took the boldest measure. It legislated a priority in its entire production in favor of its own inhabitants. That was frustrated by an injunction*633 from this Court. [FN15](#) Throughout the region clashes in the courts and conflicting decisions evidenced public anxiety and confusion. It was held that the New York Public Service Commission did not have power to classify consumers and restrict their use of gas. [FN16](#) That Commission held that a company could not abandon a part of its territory and still serve the rest. [FN17](#) Some courts admonished the companies to take action to protect consumers. [FN18](#) Several courts held that companies, regardless of failing supply, must continue to

take on customers, but such compulsory additions were finally held to be within the Public Service Commission's discretion. [FN19](#) There were attempts to throw up franchises and quit the service, and municipalities resorted to the courts with conflicting results. [FN20](#) Public service commissions of consuming states were handicapped, for they had no control of the supply. [FN21](#)

[FN14](#) See Report on Utility Corporations by Federal Trade Commission, Sen.Doc. No. 92, Pt. 84-A, 70th Cong., 1st Sess.

[FN15](#) *Commonwealth of Pennsylvania v. West Virginia*, 262 U.S. 553, 43 S.Ct. 658, 67 L.Ed. 1117, 32 A.L.R. 300. For conditions there which provoked this legislation, see 25 West Virginia Law Quarterly 257.

[FN16](#) *People ex rel. Pavilion Natural Gas Co. v. Public Service Commission*, 188 App.Div. 36, 176 N.Y.S. 163.

[FN17](#) *Village of Falconer v. Pennsylvania Gas Company*, 17 State Department Reports, N.Y., 407.

[FN18](#) See, for example, *Public Service Commission v. Iroquois Natural Gas Co.*, 108 Misc. 696, 178 N.Y.S. 24; *Park Abbott Realty Co. v. Iroquois Natural Gas Co.*, 102 Misc. 266, 168 N.Y.S. 673; *Public Service Commission v. Iroquois Natural Gas Co.*, 189 App.Div. 545, 179 N.Y.S. 230.

[FN19](#) *People ex rel. Pennsylvania Gas Co. v. Public Service Commission*, 196 App.Div. 514, 189 N.Y.S. 478.

[FN20](#) *East Ohio Gas Co. v. Akron*, 81 Ohio St. 33, 90 N.E. 40, 26 L.R.A., N.S., 92, 18 Ann.Cas. 332; *Village of New-comerstown v. Consolidated Gas Co.*, 100 Ohio St. 494, 127 N.E. 414; *Gress v. Village of Ft. Laramie*, 100 Ohio St. 35, 125 N.E. 112, 8 A.L.R. 242; *City of Jamestown v. Pennsylvania Gas Co.*, D.C., 263 F. 437; *Id.*, D.C., 264 F. 1009. See, also, *United Fuel Gas Co. v. Railroad Commission*, 278 U.S. 300, 308, 49 S.Ct. 150, 152, 73 L.Ed. 390.

[FN21](#) The New York Public Service Commission said: 'While the transportation of natural gas through pipe lines from one state to another state is interstate commerce * * *, Congress has not taken over the regulation of

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that particular industry. Indeed, it has expressly excepted it from the operation of the Interstate Commerce Commissions Law (Interstate Commerce Commissions Law, section 1). It is quite clear, therefore, that this Commission can not require a Pennsylvania corporation producing gas in Pennsylvania to transport it and deliver it in the State of New York, and that the Interstate Commerce Commission is likewise powerless. If there exists such a power, and it seems that there does, it is a power vested in Congress and by it not yet exercised. There is no available source of supply for the Crystal City Company at present except through purchasing from the Porter Gas Company. It is possible that this Commission might fix a price at which the Potter Gas Company should sell if it sold at all, but as the Commission can not require it to supply gas in the State of New York, the exercise of such a power to fix the price, if such power exists, would merely say, sell at this price or keep out of the State.' Lane v. Crystal City Gas Co., 8 New York Public Service Comm.Reports, Second District, 210, 212.

****303 *634** Shortages during World War I occasioned the first intervention in the natural gas industry by the Federal Government. Under Proclamation of President Wilson the United States Fuel Administrator took control, stopped extensions, classified consumers and established a priority for domestic over industrial use. [FN22](#) After the war federal control was abandoned. Some cities once served with natural gas became dependent upon mixed gas of reduced heating value and relatively higher price. [FN23](#)

[FN22](#) Proclamation by the President of September 16, 1918; Rules and Regulations of H. A. Garfield, Fuel Administrator, September 24, 1918.

[FN23](#) For example, the Iroquois Gas Corporation which formerly served Buffalo, New York, with natural gas ranging from 1050 to 1150 b.t.u. per cu. ft., now mixes a by-product gas of between 530 and 540 b.t.u. in proportions to provide a mixed gas of about 900 b.t.u. per cu. ft. For space heating or water heating its charges range from 65 cents for the first m.c.f. per month to 55 cents for all above 25 m.c.f. per month. Moody's Manual of Public Utilities (1943) 1350.

Utilization of natural gas of highest social as well as economic return is domestic use for cooking and water

***635** heating, followed closely by use for space heating in homes. This is the true public utility aspect of the enterprise, and its preservation should be the first concern of regulation. Gas does the family cooking cheaper than any other fuel. [FN24](#) But its advantages do not end with dollars and cents cost. It is delivered without interruption at the meter as needed and is paid for after it is used. No money is tied up in a supply, and no space is used for storage. It requires no handling, creates no dust, and leaves no ash. It responds to thermostatic control. It ignites easily and immediately develops its maximum heating capacity. These incidental advantages make domestic life more liveable.

[FN24](#) The United States Fuel Administration made the following cooking value comparisons, based on tests made in the Department of Home Economics of Ohio State University:

Natural gas at 1.12 per M. is equivalent to coal at \$6.50 per ton.

Natural gas at 2.00 per M. is equivalent to gasoline at 27¢ per gal.

Natural gas at 2.20 per M. is equivalent to electricity at 3¢ per k.w.h.

Natural gas at 2.40 per M. is equivalent to coal oil at 15¢ per gal.

Use and Conservation of Natural Gas, issued by U.S. Fuel Administration (1918) 5.

Industrial use is induced less by these qualities than by low cost in competition with other fuels. Of the gas exported from West Virginia by the Hope Company a very substantial part is used by industries. This wholesale use speeds exhaustion of supply and displaces other fuels. Coal miners and the coal industry, a large part of whose costs are wages, have complained of unfair competition from low-priced industrial gas produced with relatively little labor cost. [FN25](#)

[FN25](#) See Brief on Behalf of Legislation Imposing an Excise Tax on Natural Gas, submitted to N.R.A. by the United Mine Workers of America and the National Coal Association.

Gas rate structures generally have favored industrial users. In 1932, in Ohio, the average yield on gas for domestic consumption was 62.1 cents per m.c.f. and on industrial, ***636** 38.7. In Pennsylvania, the figures were 62.9 against 31.7. West Virginia showed the least spread, domestic consumers paying 36.6 cents; and industrial, 27.7. [FN26](#) Although this spread is less than ****304** in other parts of the United States, [FN27](#) it can hardly be said to be

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self-justifying. It certainly is a very great factor in hastening decline of the natural gas supply.

[FN26](#) Brief of National Gas Association and

State.	Industrial	Domestic
Illinois.	29.2	1.678
Louisiana.	10.4	59.7
Oklahoma.	11.2	41.5
Texas.	13.1	59.7
Alabama.	17.8	1.227
Georgia.	22.9	1.043

About the time of World War I there were occasional and short-lived efforts by some hard-pressed companies to reverse this discrimination and adopt graduated rates, giving a low rate to quantities adequate for domestic use and graduating it upward to discourage industrial use. [FN28](#)
*637 These rates met opposition from industrial sources, of course, and since diminished revenues from industrial sources tended to increase the domestic price, they met little popular or commission favor. The fact is that neither the gas companies nor the consumers nor local regulatory bodies can be depended upon to conserve gas. Unless federal regulation will take account of conservation, its efforts seem, as in this case, actually to constitute a new threat to the life of the Appalachian supply.

[FN28](#) In Corning, New York, rates were initiated by the Crystal City Gas Company as follows: 70¢ for the first 5,000 cu. ft. per month; 80¢ from 5,000 to 12,000; \$1 for all over 12,000. The Public Service Commission rejected these rates and fixed a flat rate of 58¢ per m.c.f. Lane v. Crystal City Gas Co., 8 New York Public Service Comm. Reports, Second District, 210.

The Pennsylvania Gas Company (National Fuel Gas Company group) also attempted a sliding scale rate for New York consumers, net per month as follows: First 5,000 feet, 35¢ ; second 5,000 feet, 45¢ ; third 5,000 feet, 50¢ ; all above 15,000, 55¢ . This was eventually abandoned, however. The company's present scale in Pennsylvania appears to be reversed to the following net monthly rate; first 3 m.c.f., 75¢ ; next 4 m.c.f., 60¢ ; next 8 m.c.f., 55¢ ; over 15 m.c.f., 50¢ . Moody's Manual of Public Utilities (1943) 1350. In New York it now serves a mixed gas.

For a study of effect of sliding scale rates in reducing consumption see 11 Proceedings of Natural Gas Association of America (1919) 287.

United Mine Workers, supra, note 26, pp. 35, 36, compiled from Bureau of Mines Reports.

[FN27](#) From the source quoted in the preceding note the spread elsewhere is shown to be:

II.

Congress in 1938 decided upon federal regulation of the industry. It did so after an exhaustive investigation of all aspects including failing supply and competition for the use of natural gas intensified by growing scarcity. [FN29](#)
Pipelines from the Appalachian area to markets were in the control of a handful of holding company systems. [FN30](#)
This created a highly concentrated control of the producers' market and of the consumers' supplies. While holding companies dominated both production and distribution they segregated those activities in separate *638 subsidiaries, [FN31](#) the effect of which, if not the purpose, was to isolate **305 some end of the business from the reach of any one state commission. The cost of natural gas to consumers moved steadily upwards over the years, out of proportion to prices of oil, which, except for the element of competition, is produced under somewhat comparable conditions. The public came to feel that the companies were exploiting the growing scarcity of local gas. The problems of this region had much to do with creating the demand for federal regulation.

[FN29](#) See Report on Utility Corporations by Federal Trade Commission, Sen. Doc. 92, Pt. 84-A, 70th Cong., 1st Sess.

[FN30](#) Four holding company systems control over 55 per cent of all natural gas transmission lines in the United States. They are Columbia Gas and Electric Corporation, Cities Service Co., Electric Bond and Share Co., and Standard Oil Co. of New Jersey. Columbia alone controls nearly 25 per cent, and fifteen companies account for over 80 per cent of the total. Report on Utility Corporations by Federal Trade Commission, Sen. Doc. 92, Pt. 84-A, 70th Cong., 1st Sess., 28.

In 1915, so it was reported to the Governor of West

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Virginia, 87 per cent of the total gas production of that state was under control of eight companies. Steptoe and Hoffheimer, Legislative Regulation of Natural Gas Supply in West Virginia, 17 West Virginia Law Quarterly 257, 260. Of these, three were subsidiaries of the Columbia system and others were subsidiaries of larger systems. In view of inter-system sales and interlocking interests it may be doubted whether there is much real competition among these companies.

[FN31](#) This pattern with its effects on local regulatory efforts will be observed in our decisions. See [United Fuel Gas Co. v. Railroad Commission](#), 278 U.S. 300, 49 S.Ct. 150, 73 L.Ed. 390; [United Fuel Gas Co. v. Public Service Commission](#), 278 U.S. 322, 49 S.Ct. 157, 73 L.Ed. 402; [Dayton Power & Light v. Public Utilities Commission](#), 292 U.S. 290, 54 S.Ct. 647, 78 L.Ed. 1267; [Columbus Gas & Fuel Co. v. Public Utilities Commission](#), 292 U.S. 398, 54 S.Ct. 763, 78 L.Ed. 1327, 91 A.L.R. 1403, and the present case.

The Natural Gas Act declared the natural gas business to be 'affected with a public interest,' and its regulation 'necessary in the public interest.' [FN32](#) Originally, and at the time this proceeding was commenced and tried, it also declared 'the intention of Congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest.' [FN33](#) While this was later dropped, there is nothing to indicate that it was not and is not still an accurate statement of purpose of the Act. Extension or improvement of facilities may be ordered when 'necessary or desirable in the public interest,' abandonment of facilities may be ordered when the supply is 'depleted to the extent that the continuance of service is unwarranted, or that the present or future public convenience or necessity *639 permit' abandonment and certain extensions can only be made on finding of 'the present or future public convenience and necessity.' [FN34](#) The Commission is required to take account of the ultimate use of the gas. Thus it is given power to suspend new schedules as to rates, charges, and classification of services except where the schedules are for the sale of gas 'for resale for industrial use only,' [FN35](#) which gives the companies greater freedom to increase rates on industrial gas than on domestic gas. More particularly, the Act expressly forbids any undue preference or advantage to any person or 'any unreasonable difference in rates * * * either as between localities or as between classes of service.' [FN36](#) And the power of the Commission expressly includes that to determine the 'just and reasonable rate,

charge, classification, rule, regulation, practice, or contract to be thereafter observed and in force.' [FN37](#)

[FN32](#) [15 U.S.C. s 717\(a\)](#), [15 U.S.C.A. s 717\(a\)](#).
(Italics supplied throughout this paragraph.)

[FN33](#) s 7(c), 52 Stat. 825, [15 U.S.C.A. s 717f\(c\)](#).

[FN34](#) [15 U.S.C. s 717f](#), [15 U.S.C.A. s 717f](#).

[FN35](#) Id., [s 717c\(e\)](#).

[FN36](#) Id., [s 717c\(b\)](#).

[FN37](#) Id., [s 717d\(a\)](#).

In view of the Court's opinion that the Commission in administering the Act may ignore discrimination, it is interesting that in reporting this Bill both the Senate and the House Committees on Interstate Commerce pointed out that in 1934, on a nationwide average the price of natural gas per m.c.f. was 74.6 cents for domestic use, 49.6 cents for commercial use, and 16.9 for industrial use. [FN38](#) I am not ready to think that supporters of a bill called attention to the striking fact that householders were being charged five times as much for their gas as industrial users only as a situation which the Bill would do nothing to remedy. On the other hand the Act gave to the Commission what the Court aptly describes as 'broad powers of regulation.'

[FN38](#) Sen. Rep. No. 1162, 75th Cong., 1st Sess. 2.

*640 III.

This proceeding was initiated by the Cities of Cleveland and Akron. They alleged that the price charged by Hope for natural gas 'for resale to domestic, commercial and small industrial consumers in Cleveland and elsewhere is excessive, unjust, unreasonable, greatly in excess of the price charged by Hope to nonaffiliated companies at wholesale for resale to domestic, commercial and small industrial consumers, and greatly in excess of the price charged by Hope to East Ohio for resale to certain favored industrial consumers in Ohio, and therefore is further unduly discriminatory between consumers and between classes of service' (italics supplied). The company answered admitting differences in prices to affiliated and nonaffiliated companies and justifying them by differences in conditions of delivery.**306 As to the allegation that the contract price is 'greatly in excess of the price charged by Hope to East Ohio for resale to

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certain favored industrial consumers in Ohio,' Hope did not deny a price differential, but alleged that industrial gas was not sold to 'favored consumers' but was sold under contract and schedules filed with and approved by the Public Utilities Commission of Ohio, and that certain conditions of delivery made it not 'unduly discriminatory.'

The record shows that in 1940 Hope delivered for industrial consumption 36,523,792 m.c.f. and for domestic and commercial consumption, 50,343,652 m.c.f. I find no separate figure for domestic consumption. It served 43,767 domestic consumers directly, 511,521 through the East Ohio Gas Company, and 154,043 through the Peoples Natural Gas Company, both affiliates owned by the same parent. Its special contracts for industrial consumption, so far as appear, are confined to about a dozen big industries.

***641** Hope is responsible for discrimination as exists in favor of these few industrial consumers. It controls both the resale price and use of industrial gas by virtue of the very interstate sales contracts over which the Commission is exercising its jurisdiction.

Hope's contract with East Ohio Company is an example. Hope agrees to deliver, and the Ohio Company to take, '(a) all natural gas requisite for the supply of the domestic consumers of the Ohio Company; (b) such amounts of natural gas as may be requisite to fulfill contracts made with the consent and approval of the Hope Company by the Ohio Company, or companies which it supplies with natural gas, for the sale of gas upon special terms and conditions for manufacturing purposes.' The Ohio company is required to read domestic customers' meters once a month and meters of industrial customers daily and to furnish all meter readings to Hope. The Hope Company is to have access to meters of all consumers and to all of the Ohio Company's accounts. The domestic consumers of the Ohio Company are to be fully supplied in preference to consumers purchasing for manufacturing purposes and 'Hope Company can be required to supply gas to be used for manufacturing purposes only where the same is sold under special contracts which have first been submitted to and approved in writing by the Hope Company and which expressly provide that natural gas will be supplied thereunder only in so far as the same is not necessary to meet the requirements of domestic consumers supplied through pipe lines of the Ohio Company.' This basic contract was supplemented from time to time, chiefly as to price. The last amendment was in a letter from Hope to East Ohio in 1937. It contained a special discount on industrial gas and a schedule of special industrial contracts, Hope reserving the right to make eliminations therefrom and agreeing that others might be added from time to ***642** time with its approval

in writing. It said, 'It is believed that the price concessions contained in this letter, while not based on our costs, are under certain conditions, to our mutual advantage in maintaining and building up the volumes of gas sold by us (*italics supplied*).' [FN39](#)

[FN39](#) The list of East Ohio Gas Company's special industrial contracts thus expressly under Hope's control and their demands are as follows:

****307** The Commission took no note of the charges of discrimination and made no disposition of the issue tendered on this point. It ordered a flat reduction in the price per m.c.f. of all gas delivered by Hope in interstate commerce. It made no limitation, condition, or provision as to what classes of consumers should get the benefit of the reduction. While the cities have accepted and are defending the reduction, it is my view that the discrimination of which they have complained is perpetuated and increased by the order of the Commission and that it violates the Act in so doing.

The Commission's opinion aptly characterizes its entire objective by saying that 'bona fide investment figures now become all-important in the regulation of rates.' It should be noted that the all-importance of this theory is not the result of any instruction from Congress. When the Bill to regulate gas was first before Congress it contained ***643** the following: 'In determining just and reasonable rates the Commission shall fix such rate as will allow a fair return upon the actual legitimate prudent cost of the property used and useful for the service in question.' H.R. 5423, 74th Cong., 1st Sess. Title III, s 312(c). Congress rejected this language. See H.R. 5423, s 213 (211(c)), and H.R. Rep. No. 1318, 74th Cong., 1st Sess. 30.

The Commission contends nevertheless that the 'all important' formula for finding a rate base is that of prudent investment. But it excluded from the investment base an amount actually and admittedly invested of some \$17,000,000. It did so because it says that the Company recouped these expenditures from customers before the days of regulation from earnings above a fair return. But it would not apply all of such 'excess earnings' to reduce the rate base as one of the Commissioners suggested. The reason for applying excess earnings to reduce the investment base roughly from \$69,000,000 to \$52,000,000 but refusing to apply them to reduce it from that to some \$18,000,000 is not found in a difference in the character of the earnings or in their reinvestment. The reason assigned is a difference in bookkeeping treatment many years before the Company was subject to regulation. The \$17,000,000, reinvested chiefly in well

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drilling, was treated on the books as expense. (The Commission now requires that drilling costs be carried to capital account.) The allowed rate base thus actually was determined by the Company's bookkeeping, not its investment. This attributes a significance to formal classification in account keeping that seems inconsistent with rational rate regulation. ^{FN40} Of *644 course, the **308 Commission would not and should not allow a rate base to be inflated by bookkeeping which had improperly capitalized expenses. I have doubts about resting public regulation upon any rule that is to be used or not depending on which side it favors.

^{FN40} To make a fetish of mere accounting is to shield from examination the deeper causes, forces, movements, and conditions which should govern rates. Even as a recording of current transactions, bookkeeping is hardly an exact science. As a representation of the condition and trend of a business, it uses symbols of certainty to express values that actually are in constant flux. It may be said that in commercial or investment banking or any business extending credit success depends on knowing what not to believe in accounting. Few concerns go into bankruptcy or reorganization whose books do not show them solvent and often even profitable. If one cannot rely on accountancy accurately to disclose past or current conditions of a business, the fallacy of using it as a sole guide to future price policy ought to be apparent. However, our quest for certitude is so ardent that we pay an irrational reverence to a technique which uses symbols of certainty, even though experience again and again warns us that they are delusive. Few writers have ventured to challenge this American idolatry, but see Hamilton, Cost as a standard for Price, 4 Law and Contemporary Problems 321, 323-25. He observes that 'As the apostle would put it, accountancy is all things to all men. * * * Its purpose determines the character of a system of accounts.' He analyzes the hypothetical character of accounting and says 'It was no eternal mold for pecuniary verities handed down from on high. It was-like logic or algebra, or the device of analogy in the law-an ingenious contrivance of the human mind to serve a limited and practical purpose.' 'Accountancy is far from being a pecuniary expression of all that is industrial reality. It is an instrument, highly selective in its application, in the service of the institution of money making.' As to capital account he observes 'In an enterprise in lusty competition with others of its

kind, survival is the thing and the system of accounts has its focus in solvency. * * * Accordingly depreciation, obsolescence, and other factors which carry no immediate threat are matters of lesser concern and the capital account is likely to be regarded as a secondary phenomenon. * * * But in an enterprise, such as a public utility, where continued survival seems assured, solvency is likely to be taken for granted. * * * A persistent and ingenious attention is likely to be directed not so much to securing the upkeep of the physical property as to making it certain that capitalization fails in not one whit to give full recognition to every item that should go into the account.'

*645 The Company on the other hand, has not put its gas fields into its calculations on the present-value basis, although that, it contends, is the only lawful rule for finding a rate base. To do so would result in a rate higher than it has charged or proposes as a matter of good business to charge.

The case before us demonstrates the lack of rational relationship between conventional rate-base formulas and natural gas production and the extremities to which regulating bodies are brought by the effort to rationalize them. The Commission and the Company each stands on a different theory, and neither ventures to carry its theory to logical conclusion as applied to gas fields.

IV.

This order is under judicial review not because we interpose constitutional theories between a State and the business it seeks to regulate, but because Congress put upon the federal courts a duty toward administration of a new federal regulatory Act. If we are to hold that a given rate is reasonable just because the Commission has said it was reasonable, review becomes a costly, time-consuming pageant of no practical value to anyone. If on the other hand we are to bring judgment of our own to the task, we should for the guidance of the regulators and the regulated reveal something of the philosophy, be it legal or economic or social, which guides us. We need not be slaves to a formula but unless we can point out a rational way of reaching our conclusions they can only be accepted as resting on intuition or predilection. I must admit that I possess no instinct jby which to know the 'reasonable' from the 'unreasonable' in prices and must seek some conscious design for decision.

The Court sustains this order as reasonable, but what makes it so or what could possibly make it otherwise,

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*646 I cannot learn. It holds that: 'it is the result reached not the method employed which is controlling'; 'the fact that the method employed to reach that result may contain infirmities is not then important' and it is not 'important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at.' The Court does lean somewhat on considerations of capitalization and dividend history and requirements for dividends on outstanding stock. But I can give no real weight to that for it is generally and I think deservedly in discredit as any guide in rate cases.

[FN41](#)

[FN41](#) See 2 Bonbright, Valuation of Property (1937) 1112.

Our books already contain so much talk of methods of rationalizing rates that we must appear ambiguous if we announce results without our working methods. We are confronted with regulation of a unique type of enterprise which I think requires considered rejection of much conventional utility doctrine and adoption of concepts of 'just and reasonable' rates and practices and of the 'public interest' that will take account of the peculiarities of the business.

The Court rejects the suggestions of this opinion. It says that the Committees in reporting the bill which became the Act said it provided 'for regulation along recognized and more or less standardized lines' and that there was 'nothing novel in its provisions.' So saying it sustains a rate calculated on a novel variation of a rate base theory which itself had at the time of enactment of the legislation been recognized only in dissenting opinions. Our difference seems to be between unconscious innovation, [FN42](#) and the purposeful **309 and deliberate innovation I *647 would make to meet the necessities of regulating the industry before us.

[FN42](#) Bonbright says, '* * * the vice of traditional law lies, not in its adoption of excessively rigid concepts of value and rules of valuation, but rather in its tendency to permit shifts in meaning that are inept, or else that are ill-defined because the judges that make them will not openly admit that they are doing so.' Id., 1170.

Hope's business has two components of quite divergent character. One, while not a conventional common-carrier undertaking, is essentially a transportation enterprise consisting of conveying gas from where it is produced to point of delivery to the buyer. This is a relatively routine

operation not differing substantially from many other utility operations. The service is produced by an investment in compression and transmission facilities. Its risks are those of investing in a tested means of conveying a discovered supply of gas to a known market. A rate base calculated on the prudent investment formula would seem a reasonably satisfactory measure for fixing a return from that branch of the business whose service is roughly proportionate to the capital invested. But it has other consequences which must not be overlooked. It gives marketability and hence 'value' to gas owned by the company and gives the pipeline company a large power over the marketability and hence 'value' of the production of others.

The other part of the business-to reduce to possession an adequate supply of natural gas-is of opposite character, being more erratic and irregular and unpredictable in relation to investment than any phase of any other utility business. A thousand feet of gas captured and severed from real estate for delivery to consumers is recognized under our law as property of much the same nature as a ton of coal, a barrel of oil, or a yard of sand. The value to be allowed for it is the real battleground between the investor and consumer. It is from this part of the business that the chief difference between the parties as to a proper rate base arises.

It is necessary to a 'reasonable' price for gas that it be anchored to a rate base of any kind? Why did courts in the first place begin valuing 'rate bases' in order to 'value' something else? The method came into vogue *648 in fixing rates for transportation service which the public obtained from common carriers. The public received none of the carriers' physical property but did make some use of it. The carriage was often a monopoly so there were no open market criteria as to reasonableness. The 'value' or 'cost' of what was put to use in the service by the carrier was not a remote or irrelevant consideration in making such rates. Moreover the difficulty of appraising an intangible service was thought to be simplified if it could be related to physical property which was visible and measurable and the items of which might have market value. The court hoped to reason from the known to the unknown. But gas fields turn this method topsy turvy. Gas itself is tangible, possessible, and does have a market and a price in the field. The value of the rate base is more elusive than that of gas. It consists of intangibles-leaseholds and freeholds-operated and unoperated-of little use in themselves except as rights to reach and capture gas. Their value lies almost wholly in predictions of discovery, and of price of gas when captured, and bears little relation to cost of tools and supplies and labor to develop it. Gas is what Hope sells and it can be directly priced more reasonably and easily and accurately than the

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components of a rate base can be valued. Hence the reason for resort to a roundabout way of rate base price fixing does not exist in the case of gas in the field.

But if found, and by whatever method found, a rate base is little help in determining reasonableness of the price of gas. Appraisal of present value of these intangible rights to pursue fugitive gas depends on the value assigned to the gas when captured. The 'present fair value' rate base, generally in ill repute, [FN43](#) is not even ****310** urged by the gas company for valuing its fields.

[FN43](#) 'The attempt to regulate rates by reference to a periodic or occasional reappraisal of the properties has now been tested long enough to confirm the worst fears of its critics. Unless its place is taken by some more promising scheme of rate control, the days of private ownership under government regulation may be numbered.' 2 Bonbright, Valuation of Property (1937) 1190.

***649** The prudent investment theory has relative merits in fixing rates for a utility which creates its service merely by its investment. The amount and quality of service rendered by the usual utility will, at least roughly, be measured by the amount of capital it puts into the enterprise. But it has no rational application where there is no such relationship between investment and capacity to serve. There is no such relationship between investment and amount of gas produced. Let us assume that Doe and Roe each produces in West Virginia for delivery to Cleveland the same quantity of natural gas per day. Doe, however, through luck or foresight or whatever it takes, gets his gas from investing \$50,000 in leases and drilling. Roe drilled poorer territory, got smaller wells, and has invested \$250,000. Does anybody imagine that Roe can get or ought to get for his gas five times as much as Doe because he has spent five times as much? The service one renders to society in the gas business is measured by what he gets out of the ground, not by what he puts into it, and there is little more relation between the investment and the results than in a game of poker.

Two-thirds of the gas Hope handles it buys from about 340 independent producers. It is obvious that the principle of rate-making applied to Hope's own gas cannot be applied, and has not been applied, to the bulk of the gas Hope delivers. It is not probable that the investment of any two of these producers will bear the same ratio to their investments. The gas, however, all goes to the same use, has the same utilization value and the same ultimate price.

To regulate such an enterprise by indiscriminately

transplanting any body of rate doctrine conceived and ***650** adapted to the ordinary utility business can serve the 'public interest' as the Natural Gas Act requires, if at all, only by accident. Mr. Justice Brandeis, the pioneer juristic advocate of the prudent investment theory for man-made utilities, never, so far as I am able to discover, proposed its application to a natural gas case. On the other hand, dissenting in Commonwealth of Pennsylvania v. West Virginia, he reviewed the problems of gas supply and said, 'In no other field of public service regulation is the controlling body confronted with factors so baffling as in the natural gas industry, and in none is continuous supervision and control required in so high a degree.' [262 U.S. 553, 621, 43 S.Ct. 658, 674, 67 L.Ed. 1117, 32 A.L.R. 300](#). If natural gas rates are intelligently to be regulated we must fit our legal principles to the economy of the industry and not try to fit the industry to our books.

As our decisions stand the Commission was justified in believing that it was required to proceed by the rate base method even as to gas in the field. For this reason the Court may not merely wash its hands of the method and rationale of rate making. The fact is that this Court, with no discussion of its fitness, simply transferred the rate base method to the natural gas industry. It happened in [Newark Natural Gas & Fuel Co. v. City of Newark, Ohio, 1917, 242 U.S. 405, 37 S.Ct. 156, 157, 61 L.Ed. 393, Ann.Cas.1917B, 1025](#), in which the company wanted 25 cents per m.c.f., and under the Fourteenth Amendment challenged the reduction to 18 cents by ordinance. This Court sustained the reduction because the court below 'gave careful consideration to the questions of the value of the property * * * at the time of the inquiry,' and whether the rate 'would be sufficient to provide a fair return on the value of the property.' The Court said this method was 'based upon principles thoroughly established by repeated decisions of this court,' citing many cases, not one of which involved natural gas or a comparable wasting natural resource. Then came issues as to state power to ***651** regulate as affected by the commerce clause. [Public Utilities Commission v. Landon, 1919, 249 U.S. 236, 39 S.Ct. 268, 63 L.Ed. 577; Pennsylvania Gas Co. v. Public Service Commission, 1920, 252 U.S. 23, 40 S.Ct. 279, 64 L.Ed. 434](#). These questions settled, the Court again was called upon in natural gas cases to consider state rate-making claimed to be invalid under the Fourteenth Amendment. [United Fuel Gas Co. v. Railroad Commission of Kentucky, 1929, 278 U.S. 300, 49 S.Ct. 150, 73 L.Ed. 390; United Fuel Gas Company v. Public Service Commission of West Virginia, 1929, 278 U.S. 322, 49 S.Ct. 157, 73 L.Ed. 402](#). Then, as now, the differences were 'due ****311** chiefly to the difference in value ascribed by each to the gas rights and leaseholds.' [278 U.S. 300, 311, 49 S.Ct. 150, 153, 73 L.Ed. 390](#). No one seems to have questioned that the rate

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base method must be pursued and the controversy was at what rate base must be used. Later the 'value' of gas in the field was questioned in determining the amount a regulated company should be allowed to pay an affiliate therefor-a state determination also reviewed under the Fourteenth Amendment. Dayton Power & Light Co. v. Public Utilities Commission of Ohio, 1934, 292 U.S. 290, 54 S.Ct. 647, 78 L.Ed. 1267; Columbus Gas & Fuel Co. v. Public Utilities Commission of Ohio, 1934, 292 U.S. 398, 54 S.Ct. 763, 78 L.Ed. 1327, 91 A.L.R. 1403. In both cases, one of which sustained, and one of which struck down a fixed rate the Court assumed the rate base method, as the legal way of testing reasonableness of natural gas prices fixed by public authority, without examining its real relevancy to the inquiry.

Under the weight of such precedents we cannot expect the Commission to initiate economically intelligent methods of fixing gas prices. But the Court now faces a new plan of federal regulation based on the power to fix the price at which gas shall be allowed to move in interstate commerce. I should now consider whether these rules devised under the Fourteenth Amendment are the exclusive tests of a just and reasonable rate under the federal statute, inviting reargument directed to that point *652 if necessary. As I see it now I would be prepared to hold that these rules do not apply to a natural gas case arising under the Natural Gas Act.

Such a holding would leave the Commission to fix the price of gas in the field as one would fix maximum prices of oil or milk or coal, or any other commodity. Such a price is not calculated to produce a fair return on the synthetic value of a rate base of any individual producer, and would not undertake to assure a fair return to any producer. The emphasis would shift from the producer to the product, which would be regulated with an eye to average or typical producing conditions in the field.

Such a price fixing process on economic lines would offer little temptation to the judiciary to become back seat drivers of the price fixing machine. The unfortunate effect of judicial intervention in this field is to divert the attention of those engaged in the process from what is economically wise to what is legally permissible. It is probable that price reductions would reach economically unwise and self-defeating limits before they would reach constitutional ones. Any constitutional problems growing out of price fixing are quite different than those that have heretofore been considered to inhere in rate making. A producer would have difficulty showing the invalidity of such a fixed price so long as he voluntarily continued to sell his product in interstate commerce. Should he withdraw and other authority be invoked to compel him to part with his property, a different problem would be

presented.

Allowance in a rate to compensate for gas removed from gas lands, whether fixed as of point of production or as of point of delivery, probably best can be measured by a functional test applied to the whole industry. For good or ill we depend upon private enterprise to exploit these natural resources for public consumption. The function which an allowance for gas in the field should perform *653 for society in such circumstances is to be enough and no more than enough to induce private enterprise completely and efficiently to utilize gas resources, to acquire for public service any available gas or gas rights and to deliver gas at a rate and for uses which will be in the future as well as in the present public interest.

The Court fears that 'if we are now to tell the Commission to fix the rates so as to discourage particular uses, we would indeed be injecting into a rate case a 'novel' doctrine * * *.' With due deference I suggest that there is nothing novel in the idea that any change in price of a service or commodity reacts to encourage or discourage its use. The question is not whether such consequences will or will not follow; the question is whether effects must be suffered blindly or may be intelligently selected, whether price control shall have targets at which it deliberately aims or shall be handled like a gun in the hands of one who does not know it is loaded.

We should recognize 'price' for what it is-a tool, a means, an expedient. In public**312 hands it has much the same economic effects as in private hands. Hope knew that a concession in industrial price would tend to build up its volume of sales. It used price as an expedient to that end. The Commission makes another cut in that same price but the Court thinks we should ignore the effect that it will have on exhaustion of supply. The fact is that in natural gas regulation price must be used to reconcile the private property right society has permitted to vest in an important natural resource with the claims of society upon it-price must draw a balance between wealth and welfare.

To carry this into techniques of inquiry is the task of the Commissioner rather than of the judge, and it certainly is no task to be solved by mere bookkeeping but requires the best economic talent available. There would doubtless be inquiry into the price gas is bringing in the *654 field, how far that price is established by arms' length bargaining and how far it may be influenced by agreements in restraint of trade or monopolistic influences. What must Hope really pay to get and to replace gas it delivers under this order? If it should get more or less than that for its own, how much and why? How far are such prices influenced by pipe line access to

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markets and if the consumers pay returns on the pipe lines how far should the increment they cause go to gas producers? East Ohio is itself a producer in Ohio. ^{FN44} What do Ohio authorities require Ohio consumers to pay for gas in the field? Perhaps these are reasons why the Federal Government should put West Virginia gas at lower or at higher rates. If so what are they? Should East Ohio be required to exploit its half million acres of unoperated reserve in Ohio before West Virginia resources shall be supplied on a devalued basis of which that State complains and for which she threatens measures of self keep? What is gas worth in terms of other fuels it displaces?

^{FN44} East Ohio itself owns natural gas rights in 550,600 acres, 518,526 of which are reserved and 32,074 operated, by 375 wells. Moody's Manual of Public Utilities (1943) 5.

A price cannot be fixed without considering its effect on the production of gas. Is it an incentive to continue to exploit vast unoperated reserves? Is it conducive to deep drilling tests the result of which we may know only after trial? Will it induce bringing gas from afar to supplement or even to substitute for Appalachian gas? ^{FN45} Can it be had from distant fields as cheap or cheaper? If so, that competitive potentiality is certainly a relevant consideration. Wise regulation must also consider, as a private buyer would, what alternatives the producer has *655 if the price is not acceptable. Hope has intrastate business and domestic and industrial customers. What can it do by way of diverting its supply to intrastate sales? What can it do by way of disposing of its operated or reserve acreage to industrial concerns or other buyers? What can West Virginia do by way of conservation laws, severance or other taxation, if the regulated rate offends? It must be borne in mind that while West Virginia was prohibited from giving her own inhabitants a priority that discriminated against interstate commerce, we have never yet held that a good faith conservation act, applicable to her own, as well as to others, is not valid. In considering alternatives, it must be noted that federal regulation is very incomplete, expressly excluding regulation of 'production or gathering of natural gas,' and that the only present way to get the gas seems to be to call it forth by price inducements. It is plain that there is a downward economic limit on a safe and wise price.

^{FN45} Hope has asked a certificate of convenience and necessity to lay 1140 miles of 22-inch pipeline from Hugoton gas fields in southwest Kansas to West Virginia to carry 285 million cu. ft. of natural gas per day. The cost

was estimated at \$51,000,000. Moody's Manual of Public Utilities (1943) 1760.

But there is nothing in the law which compels a commission to fix a price at that 'value' which a company might give to its product by taking advantage of scarcity, or monopoly of supply. The very purpose of fixing maximum prices is to take away from the seller his opportunity to get all that otherwise the market would award him for his goods. This is a constitutional use of the power to fix maximum prices, ****313**Block v. Hirsh, 256 U.S. 135, 41 S.Ct. 458, 65 L.Ed. 865, 16 A.L.R. 165; Marcus Brown Holding Co. v. Feldman, 256 U.S. 170, 41 S.Ct. 465, 65 L.Ed. 877; International Harvester Co. v. Kentucky, 234 U.S. 216, 34 S.Ct. 853, 58 L.Ed. 1284; Highland v. Russell Car & Snow Plow Co., 279 U.S. 253, 49 S.Ct. 314, 73 L.Ed. 688, just as the fixing of minimum prices of goods in interstate commerce is constitutional although it takes away from the buyer the advantage in bargaining which market conditions would give him. United States v. Darby, 312 U.S. 100, 657, 61 S.Ct. 451, 85 L.Ed. 609, 132 A.L.R. 1430; Mulford v. Smith, 307 U.S. 38, 59 S.Ct. 648, 83 L.Ed. 1092; United States v. Rock Royal Co-operative, Inc., 307 U.S. 533, 59 S.Ct. 993, 83 L.Ed. 1446; Sunshine Anthracite Coal Co. v. Adkins, 310 U.S. 381, 60 S.Ct. 907, 84 L.Ed. 1263. The Commission has power to fix *656 a price that will be both maximum and minimum and it has the incidental right, and I think the duty, to choose the economic consequences it will promote or retard in production and also more importantly in consumption, to which I now turn.

If we assume that the reduction in company revenues is warranted we then come to the question of translating the allowed return into rates for consumers or classes of consumers. Here the Commission fixed a single rate for all gas delivered irrespective of its use despite the fact that Hope has established what amounts to two rates-a high one for domestic use and a lower one for industrial contracts. ^{FN46} The Commission can fix two prices for interstate gas as readily as one-a price for resale to domestic users and another for resale to industrial users. This is the pattern Hope itself has established in the very contracts over which the Commission is expressly given jurisdiction. Certainly the Act is broad enough to permit two prices to be fixed instead of one, if the concept of the 'public interest' is not unduly narrowed.

^{FN46} I find little information as to the rates for industries in the record and none at all in such usual sources as Moody's Manual.

The Commission's concept of the public interest in natural

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gas cases which is carried today into the Court's opinion was first announced in the opinion of the minority in the Pipeline case. It enumerated only two 'phases of the public interest: (1) the investor interest; (2) the consumer interest,' which it emphasized to the exclusion of all others. [315 U.S. 575, 606, 62 S.Ct. 736, 753, 86 L.Ed. 1037](#). This will do well enough in dealing with railroads or utilities supplying manufactured gas, electric, power, a communications service or transportation, where utilization of facilities does not impair their future usefulness. Limitation of supply, however, brings into a natural gas case another phase of the public interest that to my mind overrides both the owner *657 and the consumer of that interest. Both producers and industrial consumers have served their immediate private interests at the expense of the long-range public interest. The public interest, of course, requires stopping unjust enrichment of the owner. But it also requires stopping unjust impoverishment of future generations. The public interest in the use by Hope's half million domestic consumers is quite a different one from the public interest in use by a baker's dozen of industries.

Prudent price fixing it seems to me must at the very threshold determine whether any part of an allowed return shall be permitted to be realized from sales of gas for resale for industrial use. Such use does tend to level out daily and seasonal peaks of domestic demand and to some extent permits a lower charge for domestic service. But is that a wise way of making gas cheaper when, in comparison with any substitute, gas is already a cheap fuel? The interstate sales contracts provide that at times when demand is so great that there is not enough gas to go around domestic users shall first be served. Should the operation of this preference await the day of actual shortage? Since the propriety of a preference seems conceded, should it not operate to prevent the coming of a shortage as well as to mitigate its effects? Should industrial use jeopardize tomorrow's service to householders any more than today's? If, however, it is decided to cheapen domestic use by resort to industrial sales, should they be limited to the few uses **314 for which gas has special values or extend also to those who use it only because it is cheaper than competitive fuels? [FN47](#) And how much cheaper should industrial*658 gas sell than domestic gas, and how much advantage should it have over competitive fuels? If industrial gas is to contribute at all to lowering domestic rates, should it not be made to contribute the very maximum of which it is capable, that is, should not its price be the highest at which the desired volume of sales can be realized?

[FN47](#) The Federal Power Commission has touched upon the problem of conservation in

connection with an application for a certificate permitting construction of a 1500-mile pipeline from southern Texas to New York City and says: 'The Natural Gas Act as presently drafted does not enable the Commission to treat fully the serious implications of such a problem. The question should be raised as to whether the proposed use of natural gas would not result in displacing a less valuable fuel and create hardships in the industry already supplying the market, while at the same time rapidly depleting the country's natural-gas reserves. Although, for a period of perhaps 20 years, the natural gas could be so priced as to appear to offer an apparent saving in fuel costs, this would mean simply that social costs which must eventually be paid had been ignored.

'Careful study of the entire problem may lead to the conclusion that use of natural gas should be restricted by functions rather than by areas. Thus, it is especially adapted to space and water heating in urban homes and other buildings and to the various industrial heat processes which require concentration of heat, flexibility of control, and uniformity of results. Industrial uses to which it appears particularly adapted include the treating and annealing of metals, the operation of kilns in the ceramic, cement, and lime industries, the manufacture of glass in its various forms, and use as a raw material in the chemical industry. General use of natural gas under boilers for the production of steam is, however, under most circumstances of very questionable social economy.' Twentieth Annual Report of the Federal Power Commission (1940) 79.

If I were to answer I should say that the household rate should be the lowest that can be fixed under commercial conditions that will conserve the supply for that use. The lowest probable rate for that purpose is not likely to speed exhaustion much, for it still will be high enough to induce economy, and use for that purpose has more nearly reached the saturation point. On the other hand the demand for industrial gas at present rates already appears to be increasing. To lower further the industrial rate is merely further to subsidize industrial consumption and speed depletion. The impact of the flat reduction *659 of rates ordered here admittedly will be to increase the industrial advantages of gas over competing fuels and to increase its use. I think this is not, and there is no finding by the Commission that it is, in the public interest.

There is no justification in this record for the present discrimination against domestic users of gas in favor of industrial users. It is one of the evils against which the Natural Gas Act was aimed by Congress and one of the evils complained of here by Cleveland and Akron. If

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Hope's revenues should be cut by some \$3,600,000 the whole reduction is owing to domestic users. If it be considered wise to raise part of Hope's revenues by industrial purpose sales, the utmost possible revenue should be raised from the least consumption of gas. If competitive relationships to other fuels will permit, the industrial price should be substantially advanced, not for the benefit of the Company, but the increased revenues from the advance should be applied to reduce domestic rates. For in my opinion the 'public interest' requires that the great volume of gas now being put to uneconomic industrial use should either be saved for its more important future domestic use or the present domestic user should have the full benefit of its exchange value in reducing his present rates.

Of course the Commission's power directly to regulate does not extend to the fixing of rates at which the local company shall sell to consumers. Nor is such power required to accomplish the purpose. As already pointed out, the very contract the Commission is altering classifies the gas according to the purposes for which it is to be resold and provides differentials between the two classifications. It would only be necessary for the Commission to order ****315** that all gas supplied under paragraph (a) of Hope's contract with the East Ohio Company shall be ***660** at a stated price fixed to give to domestic service the entire reduction herein and any further reductions that may prove possible by increasing industrial rates. It might further provide that gas delivered under paragraph (b) of the contract for industrial purposes to those industrial customers Hope has approved in writing shall be at such other figure as might be found consistent with the public interest as herein defined. It is too late in the day to contend that the authority of a regulatory commission does not extend to a consideration of public interests which it may not directly regulate and a conditioning of its orders for their protection. [Interstate Commerce Commission v. Railway Labor Executives Ass'n, 315 U.S. 373, 62 S.Ct. 717, 86 L.Ed. 904; United States v. Lowden, 308 U.S. 225, 60 S.Ct. 248, 84 L.Ed. 208.](#)

Whether the Commission will assert its apparently broad statutory authorization over prices and discriminations is, of course, its own affair, not ours. It is entitled to its own notion of the 'public interest' and its judgment of policy must prevail. However, where there is ground for thinking that views of this Court may have constrained the Commission to accept the rate-base method of decision and a particular single formula as 'all important' for a rate base, it is appropriate to make clear the reasons why I, at least, would not be so understood. The Commission is free to face up realistically to the nature and peculiarity of the resources in its control, to foster

their duration in fixing price, and to consider future interests in addition to those of investors and present consumers. If we return this case it may accept or decline the proffered freedom. This problem presents the Commission an unprecedented opportunity if it will boldly make sound economic considerations, instead of legal and accounting theories, the foundation of federal policy. I would return the case to the Commission and thereby be clearly quit of what now may appear to be some responsibility for perpetrating a shortsighted pattern of natural gas regulation.

U.S. 1944.

Federal Power Commission v. Hope Natural Gas Co.

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Supreme Court of the United States
BLUEFIELD WATERWORKS & IMPROVEMENT
CO.
v.
PUBLIC SERVICE COMMISSION OF WEST
VIRGINIA et al.
No. 256.

Argued January 22, 1923.
Decided June 11, 1923.

In Error to the Supreme Court of Appeals of West
Virginia.

Proceedings by the Bluefield Waterworks &
Improvement Company against the Public Service
Commission of the State of West Virginia and others
to suspend and set aside an order of the Commission
fixing rates. From a judgment of the Supreme Court
of West Virginia, dismissing the petition, and
denying the relief (89 W. Va. 736, 110 S. E. 205), the
Waterworks Company bring error. Reversed.

West Headnotes

Constitutional Law 92 🔑298(1.5)

92 Constitutional Law

92XII Due Process of Law

92k298 Regulation of Charges and Prices

92k298(1.5) k. Public Utilities in
General. Most Cited Cases

Rates which are not sufficient to yield a reasonable
return on the value of the property used in public
service at the time it is being so used to render the
service are unjust, unreasonable, and confiscatory,
and their enforcement deprives the public utility
company of its property, in violation of the
Fourteenth Amendment of the Constitution.

Constitutional Law 92 🔑298(3)

92 Constitutional Law

92XII Due Process of Law

92k298 Regulation of Charges and Prices

92k298(3) k. Water and Irrigation
Companies. Most Cited Cases

Under the due process clause of the Fourteenth
Amendment of the Constitution, U.S.C.A., a

waterworks company is entitled to the independent
judgment of the court as to both law and facts, where
the question is whether the rates fixed by a public
service commission are confiscatory.

Waters and Water Courses 405 🔑203(10)

405 Waters and Water Courses

405IX Public Water Supply

405IX(A) Domestic and Municipal
Purposes

405k203 Water Rents and Other
Charges

405k203(10) k. Reasonableness
of Charges. Most Cited Cases

It was error for a state public service commission, in
arriving at the value of the property used in public
service, for the purpose of fixing the rates, to fail to
give proper weight to the greatly increased cost of
construction since the war.

Waters and Water Courses 405 🔑203(10)

405 Waters and Water Courses

405IX Public Water Supply

405IX(A) Domestic and Municipal
Purposes

405k203 Water Rents and Other
Charges

405k203(10) k. Reasonableness
of Charges. Most Cited Cases

A public utility is entitled to such rates as will permit
it to earn a return on the value of the property which
it employs for the convenience of the public equal to
that generally being made at the same time and in the
same general part of the country on investments in
other business undertakings which are attended by
corresponding risks and uncertainties, but it has no
constitutional right to such profits as are realized or
anticipated in highly profitable enterprises or
speculative ventures.

Waters and Water Courses 405 🔑203(10)

405 Waters and Water Courses

405IX Public Water Supply

405IX(A) Domestic and Municipal
Purposes

405k203 Water Rents and Other
Charges

405k203(10) k. Reasonableness

(Cite as: **P.U.R. 1923D 11, 43 S.Ct. 675**)

of Charges. [Most Cited Cases](#)

Since the investors take into account the result of past operations as well as present rates in determining whether they will invest, a waterworks company which had been earning a low rate of returns through a long period up to the time of the inquiry is entitled to return of more than 6 per cent. on the value of its property used in the public service, in order to justly compensate it for the use of its property.

Federal Courts 504.1

[170B](#) Federal Courts

[170BVII](#) Supreme Court

[170BVII\(E\)](#) Review of Decisions of State Courts

[170Bk504](#) Nature of Decisions or Questions Involved

[170Bk504.1](#) k. In General. [Most Cited Cases](#)

(Formerly 106k394(6))

A proceeding in a state court attacking an order of a public service commission fixing rates, on the ground that the rates were confiscatory and the order void under the federal Constitution, is one where there is drawn in question the validity of authority exercised under the state, on the ground of repugnancy to the federal Constitution, and therefore is reviewable by writ of error.

****675 *680** Messrs. Alfred G. Fox and Jos. M. Sanders, both of Bluefield, W. Va., for plaintiff in error.

Mr. Russell S. Ritz, of Bluefield, W. Va., for defendants in error.

***683** Mr. Justice BUTLER delivered the opinion of the Court.

Plaintiff in error is a corporation furnishing water to the city of Bluefield, W. Va., ****676** and its inhabitants. September 27, 1920, the Public Service Commission of the state, being authorized by statute to fix just and reasonable rates, made its order prescribing rates. In accordance with the laws of the state (section 16, c. 15-O, Code of West Virginia [sec. 651]), the company instituted proceedings in the Supreme Court of Appeals to suspend and set aside the order. The petition alleges that the order is repugnant to the Fourteenth Amendment, and deprives the company of its property without just

compensation and without due process of law, and denies it equal protection of the laws. A final judgment was entered, denying the company relief and dismissing its petition. The case is here on writ of error.

[\[1\]](#) 1. The city moves to dismiss the writ of error for the reason, as it asserts, that there was not drawn in question the validity of a statute or an authority exercised under the state, on the ground of repugnancy to the federal Constitution.

The validity of the order prescribing the rates was directly challenged on constitutional grounds, and it was held valid by the highest court of the state. The prescribing of rates is a legislative act. The commission is an instrumentality of the state, exercising delegated powers. Its order is of the same force as would be a like enactment by the Legislature. If, as alleged, the prescribed rates are confiscatory, the order is void. Plaintiff in error is entitled to bring the case here on writ of error and to have that question decided by this court. The motion to dismiss will be denied. See [*684Oklahoma Natural Gas Co. v. Russell, 261 U. S. 290, 43 Sup. Ct. 353, 67 L. Ed. 659](#), decided March 5, 1923, and cases cited; also [Ohio Valley Co. v. Ben Avon Borough, 253 U. S. 287, 40 Sup. Ct. 527, 64 L. Ed. 908](#).

2. The commission fixed \$460,000 as the amount on which the company is entitled to a return. It found that under existing rates, assuming some increase of business, gross earnings for 1921 would be \$80,000 and operating expenses \$53,000 leaving \$27,000, the equivalent of 5.87 per cent., or 3.87 per cent. after deducting 2 per cent. allowed for depreciation. It held existing rates insufficient to the extent of 10,000. Its order allowed the company to add 16 per cent. to all bills, excepting those for public and private fire protection. The total of the bills so to be increased amounted to \$64,000; that is, 80 per cent. of the revenue was authorized to be increased 16 per cent., equal to an increase of 12.8 per cent. on the total, amounting to \$10,240.

As to value: The company claims that the value of the property is greatly in excess of \$460,000. Reference to the evidence is necessary. There was submitted to the commission evidence of value which it summarized substantially as follows:

a.

Estimate by company's engineer

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

	on. basis of reproduction new, less. depreciation, at prewar prices.	\$ 624,548 00
b.	Estimate by company's engineer on. basis of reproduction new, less. depreciation, at 1920 prices.	1,194,663 00
c.	Testimony of company's engineer. fixing present fair value for rate. making purposes.	900,000 00
d.	Estimate by commissioner's engineer on. basis of reproduction new, less. depreciation at 1915 prices, plus. additions since December 31, 1915, at. actual cost, excluding Bluefield. Valley waterworks, water rights,. and going value.	397,964 38
e.	Report of commission's statistician. showing investment cost less. depreciation.	365,445 13
f.	Commission's valuation, as fixed in. case No. 368 (\$360,000), plus gross. additions to capital since made. (\$92,520.53).	452,520 53

***685** It was shown that the prices prevailing in 1920 were nearly double those in 1915 and pre-war time. The company did not claim value as high as its estimate of cost of construction in 1920. Its valuation engineer testified that in his opinion the value of the property was \$900,000-a figure between the cost of construction in 1920, less depreciation, and the cost of construction in 1915 and before the war, less depreciation.

The commission's application of the evidence may be stated briefly as follows:

As to 'a,' supra: The commission deducted \$204,000 from the estimate (details printed in the margin), [FN1](#) leaving approximately \$421,000, which it contrasted with the estimate of its own engineer, \$397,964.38 (see 'd,' supra). It found that there should be included \$25,000 for the Bluefield Valley waterworks plant in Virginia, 10 per cent. for going value, and \$10,000 for working capital. If these be added to \$421,000, there results \$500,600. This may be compared with the commission's final figure, \$460,000.

[FN1](#)

Difference in depreciation allowed.	\$ 49,000
Preliminary organization and development. cost.	14,500
Bluefield Valley waterworks plant.	25,000
Water rights.	50,000
Excess overhead costs.	39,000
Paving over mains.	28,500
	\$204,000

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

***686** As to 'b' and 'c,' supra: These were given no weight by the commission in arriving at its final figure, \$460,000. It said:

'Applicant's plant was originally constructed more than twenty years ago, and has been added to from time to time as the progress and development of the community required. For this reason, it would be unfair to its consumers to use as a basis for present fair value the abnormal prices prevailing during the recent war period; but, when, as in this case, a part of the plant has been constructed or added to during that period, in fairness to the applicant, consideration must be given to the cost of such expenditures made to meet the demands of the public.'

****677** As to 'd,' supra: The commission, taking \$400,000 (round figures), added \$25,000 for Bluefield Valley waterworks plant in Virginia, 10 per cent. for going value, and \$10,000 for working capital, making \$477,500. This may be compared with its final figure, \$460,000.

As to 'e,' supra: The commission, on the report of its statistician, found gross investment to be \$500,402.53. Its engineer, applying the straight line method, found 19 per cent. depreciation. It applied 81 per cent. to gross investment and added 10 per cent. for going value and \$10,000 for working capital, producing \$455,500. [FN2](#) This may be compared with its final figure, \$460,000.

[FN2](#) As to 'e': \$365,445.13 represents investment cost less depreciation. The gross investment was found to be \$500,402.53, indicating a deduction on account of depreciation of \$134,957.40, about 27 per cent., as against 19 per cent. found by the commission's engineer.

As to 'f,' supra: It is necessary briefly to explain how this figure, \$452,520.53, was arrived at. Case No. 368 was a proceeding initiated by the application of the company for higher rates, April 24, 1915. The commission made a valuation as of January 1, 1915. There were presented two estimates of reproduction cost less depreciation, one by a valuation engineer engaged by the company, ***687** and the other by a valuation engineer engaged by the city, both 'using the same method.' An inventory made by the company's engineer was accepted as correct by the city and by the commission. The method 'was that generally employed by courts and commissions in arriving at the value of public utility properties under this method.' and in both estimates 'five year average unit prices' were applied. The estimate of the company's engineer was \$540,000 and of the city's engineer, \$392,000. The principal differences as given by the commission are shown in the margin. [FN3](#) The commission disregarded both estimates and arrived at \$360,000. It held that the best basis of valuation was the net investment, i. e., the total cost of the property less depreciation. It said:

[FN3](#)

		Company Engineer.	City Engineer.
1.	Preliminary costs.	\$14,455	\$1,000
2.	Water rights.	50,000	Nothing
3.	Cutting pavements over. mains.	27,744	233
4.	Pipe lines from gravity. springs.	22,072	15,442
5.	Laying cast iron street. mains.	19,252	15,212
6.	Reproducing Ada springs.	18,558	13,027
7.	Superintendence and. engineering.	20,515	13,621
8.	General contingent cost.	16,415	5,448
		\$189,011	\$63,983

since its organization, of \$407,882, and that there has been charged off for depreciation from year to year the total sum of \$83,445, leaving a net investment of

'The books of the company show a total gross investment,

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

\$324,427. * * * From an examination of the books * * * it appears that the records of the company have been remarkably well kept and preserved. It therefore seems that, when a plant is developed under these conditions, the net investment, which, of course, means the total gross investment less depreciation, is the very best basis of valuation for rate making purposes and that the other methods above referred to should *688 be used only when it is impossible to arrive at the true investment. Therefore, after making due allowance for capital necessary for the conduct of the business and considering the plant as a going concern, it is the opinion of the commission that the fair value for the purpose of determining reasonable and just rates in this case of the property of the applicant company, used by it in the public service of supplying water to the city of Bluefield and its citizens, is the sum of \$360,000, which sum is hereby fixed and determined by the commission to be the fair present value for the said purpose of determining the reasonable and just rates in this case.'

In its report in No. 368, the commission did not indicate the amounts respectively allowed for going value or working capital. If 10 per cent. be added for the former, and \$10,000 for the latter (as fixed by the commission in the present case), there is produced \$366,870, to be compared with \$360,000, found by the commission in its valuation as of January 1, 1915. To this it added \$92,520.53, expended since, producing \$452,520.53. This may be compared with its final figure, \$460,000.

The state Supreme Court of Appeals holds that the valuing of the property of a public utility corporation and prescribing rates are purely legislative acts, not subject to judicial review, except in so far as may be necessary to determine whether such rates are void on constitutional or other grounds, and that findings of fact by the commission based on evidence to support them will not be reviewed by the court. City of Bluefield v. Waterworks, 81 W. Va. 201, 204, 94 S. E. 121; Coal & Coke Co. v. Public Service Commission, 84 W. Va. 662, 678, 100 S. E. 557, 7 A. L. R. 108; Charleston v. Public Service Commission, 86 W. Va. 536, 103 S. E. 673.

In this case (89 W. Va. 736, 738, 110 S. E. 205, 206) it said:

'From the written opinion of the commission we find that it ascertained the value of the petitioner's property for rate making [then quoting the commission] 'after *689 maturely and carefully considering the various methods presented for the ascertainment of fair value and giving such weight as seems proper to every element involved and all the facts and circumstances disclosed by the record.'

[2] [3] The record clearly shows that the commission, in arriving at its final figure, did not accord proper, if any, weight to the greatly enhanced costs of construction in 1920 over those prevailing about 1915 and before the war, as established by uncontradicted *678 evidence; and the company's detailed estimated cost of reproduction new, less depreciation, at 1920 prices, appears to have been wholly disregarded. This was erroneous. Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri, 262 U. S. 276, 43 Sup. Ct. 544, 67 L. Ed. 981, decided May 21, 1923. Plaintiff in error is entitled under the due process clause of the Fourteenth Amendment to the independent judgment of the court as to both law and facts. Ohio Valley Co. v. Ben Avon Borough, 253 U. S. 287, 289, 40 Sup. Ct. 527, 64 L. Ed. 908, and cases cited.

We quote further from the court's opinion (89 W. Va. 739, 740, 110 S. E. 206):

'In our opinion the commission was justified by the law and by the facts in finding as a basis for rate making the sum of \$460,000.00. * * * In our case of Coal & Coke Ry. Co. v. Conley, 67 W. Va. 129, it is said: 'It seems to be generally held that, in the absence of peculiar and extraordinary conditions, such as a more costly plant than the public service of the community requires, or the erection of a plant at an actual, though extravagant, cost, or the purchase of one at an exorbitant or inflated price, the actual amount of money invested is to be taken as the basis, and upon this a return must be allowed equivalent to that which is ordinarily received in the locality in which the business is done, upon capital invested in similar enterprises. In addition to this, consideration must be given to the nature of the investment, a higher rate *690 being regarded as justified by the risk incident to a hazardous investment.'

'That the original cost considered in connection with the history and growth of the utility and the value of the services rendered constitute the principal elements to be considered in connection with rate making, seems to be supported by nearly all the authorities.'

[4] The question in the case is whether the rates prescribed in the commission's order are confiscatory and therefore beyond legislative power. Rates which are not sufficient to yield a reasonable return on the value of the property used at the time it is being used to render the service are unjust, unreasonable and confiscatory, and their enforcement deprives the public utility company of its property in violation of the Fourteenth Amendment. This is so well settled by numerous decisions of this court that citation of the cases is scarcely necessary:

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

'What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience.' [Smyth v. Ames \(1898\) 169 U. S. 467, 547, 18 Sup. Ct. 418, 434 \(42 L. Ed. 819\).](#)

'There must be a fair return upon the reasonable value of the property at the time it is being used for the public. * * * And we concur with the court below in holding that the value of the property is to be determined as of the time when the inquiry is made regarding the rates. If the property, which legally enters into the consideration of the question of rates, has increased in value since it was acquired, the company is entitled to the benefit of such increase.' [Willcox v. Consolidated Gas Co. \(1909\) 212 U. S. 19, 41, 52, 29 Sup. Ct. 192, 200 \(53 L. Ed. 382, 15 Ann. Cas. 1034, 48 L. R. A. \[N. S.\] 1134\).](#)

'The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment having its basis in a proper consideration of all relevant facts.' [Minnesota Rate Cases \(1913\) 230 U. S. 352, 434, 33 Sup. Ct. 729, 754 \(57 L. Ed. 1511, 48 L. R. A. \[N. S.\] 1151, Ann. Cas. 1916A, 18\).](#) *691 'And in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property.' [Smyth v. Ames, 169 U. S., 546, 547, 18 Sup. Ct. 434, 42 L. Ed. 819.](#)

* * * The making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law.'

[Minnesota Rate Cases, 230 U. S. 454, 33 Sup. Ct. 762, 57 L. Ed. 1511, 48 L. R. A. \(N. S.\) 1151, Ann. Cas. 1916A, 18.](#)

In *Missouri ex rel. Southwestern Bell Telephone Co., v. Public Service Commission of Missouri*, supra, applying the principles of the cases above cited and others, this court said:

'Obviously, the commission undertook to value the property without according any weight to the greatly enhanced costs of material, labor, supplies, etc., over those prevailing in 1913, 1914, and 1916. As matter of common knowledge, these increases were large. Competent witnesses estimated them as 45 to 50 per

centum. * * * It is impossible to ascertain what will amount to a fair return upon properties devoted to public service, without giving consideration to the cost of labor, supplies, etc., at the time the investigation is made. An honest and intelligent forecast of probable future values, made upon a view of all the relevant circumstances, is essential. If the highly important element of present costs is wholly disregarded, such a forecast becomes impossible. Estimates for to-morrow cannot ignore prices of to-day.'

[5] *692 It is clear that the court also failed to give proper consideration to the higher cost of construction in 1920 over that in 1915 and before the war, and failed to give weight to cost of reproduction less depreciation on the basis of 1920 prices, or to the testimony of the company's valuation engineer, based on present and past costs of construction, that the property in his opinion, was worth \$900,000. The final figure, \$460,000, was arrived **679 at substantially on the basis of actual cost, less depreciation, plus 10 per cent. for going value and \$10,000 for working capital. This resulted in a valuation considerably and materially less than would have been reached by a fair and just consideration of all the facts. The valuation cannot be sustained. Other objections to the valuation need not be considered.

3. Rate of return: The state commission found that the company's net annual income should be approximately \$37,000, in order to enable it to earn 8 per cent. for return and depreciation upon the value of its property as fixed by it. Deducting 2 per cent. for depreciation, there remains 6 per cent. on \$460,000, amounting to \$27,600 for return. This was approved by the state court.

[6] The company contends that the rate of return is too low and confiscatory. What annual rate will constitute just compensation depends upon many circumstances, and must be determined by the exercise of a fair and enlightened judgment, having regard to all relevant facts. A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding, risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in *693 highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. A

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions generally.

In 1909, this court, in Willcox v. Consolidated Gas Co., 212 U. S. 19, 48-50, 29 Sup. Ct. 192, 53 L. Ed. 382, 15 Ann. Cas. 1034, 48 L. R. A. (N. S.) 1134, held that the question whether a rate yields such a return as not to be confiscatory depends upon circumstances, locality and risk, and that no proper rate can be established for all cases; and that, under the circumstances of that case, 6 per cent. was a fair return on the value of the property employed in supplying gas to the city of New York, and that a rate yielding that return was not confiscatory. In that case the investment was held to be safe, returns certain and risk reduced almost to a minimum-as nearly a safe and secure investment as could be imagined in regard to any private manufacturing enterprise.

In 1912, in Cedar Rapids Gas Co. v. Cedar Rapids, 223 U. S. 655, 670, 32 Sup. Ct. 389, 56 L. Ed. 594, this court declined to reverse the state court where the value of the plant considerably exceeded its cost, and the estimated return was over 6 per cent.

In 1915, in Des Moines Gas Co. v. Des Moines, 238 U. S. 153, 172, 35 Sup. Ct. 811, 59 L. Ed. 1244, this court declined to reverse the United States District Court in refusing an injunction upon the conclusion reached that a return of 6 per cent. per annum upon the value would not be confiscatory.

In 1919, this court in Lincoln Gas Co. v. Lincoln, 250 U. S. 256, 268, 39 Sup. Ct. 454, 458 (63 L. Ed. 968), declined on the facts of that case to approve a finding that no rate yielding as much as 6 per cent. *694 on the invested capital could be regarded as confiscatory. Speaking for the court, Mr. Justice Pitney said:

'It is a matter of common knowledge that, owing principally to the World War, the costs of labor and supplies of every kind have greatly advanced since the ordinance was adopted, and largely since this cause was last heard in the court below. And it is equally well known that annual returns upon capital and enterprise the world over have materially increased, so that what would have been a proper rate of return for capital invested in gas plants and similar public utilities a few years ago furnishes no safe criterion for the present or for the future.'

In 1921, in Brush Electric Co. v. Galveston, the United States District Court held 8 per cent. a fair rate of return. ^{FN4}

^{FN4} This case was affirmed by this court June 4, 1923, 262 U. S. 443, 43 Sup. Ct. 606, 67 L. Ed. 1076.

In January, 1923, in City of Minneapolis v. Rand, the Circuit Court of Appeals of the Eighth Circuit (285 Fed. 818, 830) sustained, as against the attack of the city on the ground that it was excessive, 7 1/2 per cent., found by a special master and approved by the District Court as a fair and reasonable return on the capital investment-the value of the property.

[7] Investors take into account the result of past operations, especially in recent years, when determining the terms upon which they will invest in such an undertaking. Low, uncertain, or irregular income makes for low prices for the securities of the utility and higher rates of interest to be demanded by investors. The fact that the company may not insist as a matter of constitutional right that past losses be made up by rates to be applied in the present and future tends to weaken credit, and the fact that the utility is protected against being compelled to serve for confiscatory rates tends to support it. In *695 this case the record shows that the rate of return has been low through a long period up to the time of the inquiry by the commission here involved. For example, the average rate of return on the total cost of the property from 1895 to 1915, inclusive, was less than 5 per cent.; from 1911 to 1915, inclusive, about 4.4 per cent., without allowance for depreciation. In 1919 the net operating income was approximately \$24,700, leaving \$15,500, approximately, or 3.4 per cent. on \$460,000 fixed by the commission, after deducting 2 per cent. for depreciation. In 1920, the net operating income was approximately \$25,465, leaving \$16,265 for return, after allowing for depreciation. Under the facts and circumstances indicated by the record, we think that a rate of return of 6 per cent. upon the value of the property is substantially too low to constitute just compensation for the use of the property employed to render the service.

The judgment of the Supreme Court of Appeals of West Virginia is reversed.

Mr. Justice BRANDEIS concurs in the judgment of reversal, for the reasons stated by him in Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri, supra.

U.S. 1923

Bluefield Waterworks & Imp. Co. v. Public Service Commission of W. Va.

P.U.R. 1923D 11, 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176

43 S.Ct. 675

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P.U.R. 1923D 11, 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176
(Cite as: **P.U.R. 1923D 11, 43 S.Ct. 675**)

END OF DOCUMENT

AQUARION WATER COMPANY OF NEW HAMPSHIRE

DW 20-184

Aquarion Water Company's Responses to DOE Data Requests—Set 5

Data Request Received: October 7, 2021
Request No.: DOE 5-17

Date of Response: October 21, 2021
Witness: Dylan D'Ascendis

REQUEST: Reference the Predictive Risk Premium Model (PRPM)

- a. Do any other rate of return experts, beyond Mr. D'Ascendis's Scott Madden colleagues, use the PRPM methodology to estimate the cost of equity? If so, please provide a table of examples containing the following fields:
 - i. State
 - ii. Utility
 - iii. Docket number
 - iv. Rate of return expert name
- b. Is the PRPM used to estimate the cost of equity or expected equity returns in any context other than utility regulatory proceedings? If so, please provide evidence of such use, e.g., articles, academic papers, analyst reports, textbooks, etc.
- c. Please provide historical spot variance and GARCH coefficient data like that provided in DOE 4-2 Attachment 1, updated through 2020M09, for each member of the Utility Peer Group.
- d. The PRPM-based risk premium is estimated differently in different parts of the analysis:
 - Utility Proxy Group (DWD-4, p. 2): average of long-term and spot, using each company's stock returns and the long-term risk-free rate
 - Total market approach (DWD-4, p. 2): long-term only, using each company's stock returns and the long-term risk-free rate
 - Utility Proxy Group (DWD-4, p. 2): long-term only, using large company stock returns and A3/A2-rated bonds
 - Utility Proxy Group (DWD-4, p. 2): long-term only, using utility index returns and A2-rated public utility bonds
 - CAPM/ECAPM market risk premium: long-term only, using large company stock returns and the long-term risk-free rate
 - i. Please confirm that different estimation methods are used as described above.
 - ii. Please explain why different methods are used in each of these analyses.
- e. The Michelfelder and Ahern papers (OCA 1-12, Attachments 1 and 2) each describe their risk premium estimation methodologies as follows:

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- Ahern (p. 273):

To test the stability of the predicted risk premia over time, the predicted risk premia were calculated using either the predicted variance over each entire time period or the last monthly (spot) predicted variance. Table 3 presents the mean predicted risk premia, the range of predicted premia and the standard deviations for each time period. It is clear from the results that the risk premia are more stable over the rolling 24 month period when calculated using the average predicted variance compared with using the spot variance. Secondly, the 20 and 79 year means are substantially more stable and reasonable in magnitude than the 5 year means.

Next, given the lessons from the analyses above, we apply the model to mechanically estimate the cost of common equity for 8 utility companies using the model ... **[Using spot or long-term variance?]**

- Michelfelder (p. 86):

First, predicted volatility, i.e., risk, is derived based upon previous volatility plus previous prediction error, because volatility is highly predictable and correlated over time. Second, the predicted volatility **[Spot or long-term? Volatility (standard deviation) or variance?]** can then be used to generate the predicted equity risk premium (ERP) by multiplying it by the GARCH coefficient, i.e., the slope of the predicted volatility.

- i. Do the authors use long-term only, spot only, the average, or some other weighting?
- ii. How do Mr. D'Ascendis's methods (long-term only, average of long-term and spot) compare to those used in the Michelfelder and Ahern papers?
- iii. Please explain any differences between the methods used in the papers and those in Mr. D'Ascendis's analyses.

RESPONSE:

- a. **While Mr. D'Ascendis has not conducted comprehensive research, please see a partial list of non-ScottMadden employees that have used the PRPM in rate cases:**

AQUARION WATER COMPANY OF NEW HAMPSHIRE

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State	Utility	Docket No.	Name
Maine	Emera Maine	2017-00198	John E. Perkins
Maryland	Washington Gas	9322	Frank J. Hanley
Washington DC	Washington Gas	1093	Frank J. Hanley

- b. In “Treasury Bond risk and return, the implications for the hedging of consumption and lessons for asset pricing”, published in the Journal of Economics and Business, (attached as DOE 5-17 Attachment 1) Michelfelder and Pilotte state:

The beauty of the general consumption-based model is that it provides a simple and straightforward test of the hedging effectiveness of any asset that requires only modeling the first two moments of the asset’s return. The test does not require consumption data, nor does it require that the researcher choose a specific model of investor preferences. The model’s predictions regarding the first two moments of returns hold for any asset, for any two periods of a multi-period model, and require no assumptions regarding complete markets, return distributions, time- or state-separable utility, or the existence of labor income or human capital.¹

The PRPM has been published six times in peer-reviewed academic journals:

1. Pilotte, Eugene, A and Michelfelder, Richard A., *Treasury Bond Risk and Return, the Implications for the Hedging of Consumption and Lessons for Asset Pricing*, Journal of Economics and Business, June 2011, 582-604
2. Michelfelder, Richard A., *Empirical Analysis of the Generalized Consumption Asset Pricing Model: Estimating the Cost of Capital*, Journal

¹ R.A. Michelfelder, E.A Pilotte, “Treasury Bond risk and return, the implications for the hedging of consumption and lessons for asset pricing”, Journal of Economics and Business, 63 (2011), 582-604

AQUARION WATER COMPANY OF NEW HAMPSHIRE

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of Economics and Business, April 2015, 37-50 (attached as DOE 5-17 Attachment 2)

3. Pauline M. Ahern, Frank J. Hanley, and Richard A. Michelfelder, *New Approach to Estimating the Equity Risk Premium for Public Utilities*, The Journal of Regulatory Economics, December 2011, at 40:261-278 (attached as DOE 5-17 Attachment 3)

4. Richard A. Michelfelder, Pauline M. Ahern, Dylan W. D'Ascendis, and Frank J. Hanley, *Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity*, The Electricity Journal, April 2013, at 84-89 (attached as DOE 5-17 Attachment 4)

5. Richard A. Michelfelder, Pauline M. Ahern, and Dylan W. D'Ascendis, *Decoupling, Risk Impacts and the Cost of Capital*, The Electricity Journal, January 2020 (attached as DOE 5-17 Attachment 5)

6. Richard A. Michelfelder, Pauline M. Ahern, and Dylan W. D'Ascendis, *Decoupling Impact and Public Utility Conservation Investment*, Energy Policy, April 2019, 311-319 (attached as DOE 5-17 Attachment 6)

Notably, none of these articles have been refuted or rebutted in the academic literature.

Additionally, the PRPM has been included in the following textbooks:

1. *Cost of Capital: Applications and Examples*, (5th Ed.), 2015, Wiley & Sons, Shannon Pratt and Roger Grabowski (editors).

2. *The Lawyer's Guide to Cost of Capital: Understanding Risk and Return for Valuing Businesses and Other Investments*, ABA Publishing, Shannon Pratt and Roger Grabowski (editors), 2015.

AQUARION WATER COMPANY OF NEW HAMPSHIRE

DW 20-184

Aquarion Water Company's Responses to DOE Data Requests—Set 5

Data Request Received: October 7, 2021
Request No.: DOE 5-17

Date of Response: October 21, 2021
Witness: Dylan D'Ascendis

The PRPM is also expected to be included in Dr. Morin's next edition of New Regulatory Finance, forthcoming 2021.

- c. Mr. D'Ascendis objects to this request as he does not currently possess the data and the analysis would be unduly burdensome to produce.**
- d. Mr. D'Ascendis estimated the following risk premiums using the PRPM in his direct analysis. While the request only references page 2, the analysis appears on the following cited pages.**
 - i.**
 - 1. On Attachment DWD-4, page 2, Mr. D'Ascendis derived the GARCH coefficient, spot and long-term average variances using the historical individual returns of the Utility Proxy Group less the long-term risk-free rate. In this instance, he averaged the spot and long-term predicted variances to calculate individual equity risk premiums for his Utility Proxy Group companies;**
 - 2. On Attachment DWD-4, page 8, Mr. D'Ascendis derived the GARCH coefficient, spot and long-term average variances using the historical returns of the S&P 500 less the average yield on Aaa and Aa corporate bonds. In this instance, he used the long-term average variance to calculate the equity risk premium for the market less Aaa and Aa corporate bonds;**
 - 3. On Attachment DWD-4, page 12, Mr. D'Ascendis derived the GARCH coefficient, spot and long-term variances using the historical returns on the S&P Utility Index less the yield on A-rated public utility bonds to calculate the equity risk premium for the S&P Utilities Index less A-rated public utility bonds;**

AQUARION WATER COMPANY OF NEW HAMPSHIRE

DW 20-184

Aquarion Water Company's Responses to DOE Data Requests—Set 5

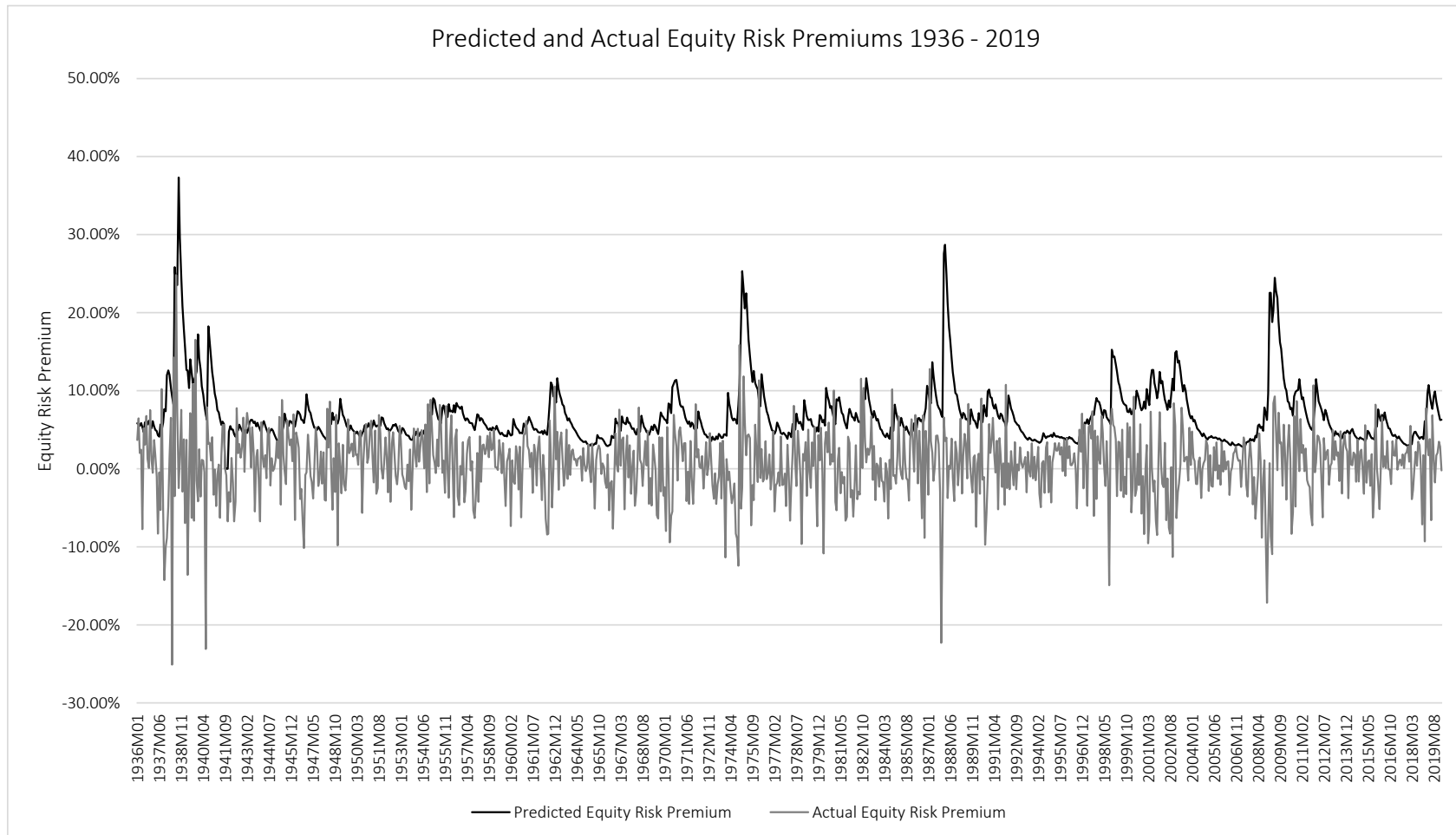
Data Request Received: October 7, 2021
Request No.: DOE 5-17

Date of Response: October 21, 2021
Witness: Dylan D'Ascendis

4. On Attachment DWD-5, page 2, Mr. D'Ascendis derived the GARCH coefficient, spot and long-term average variances using the historical return on the S&P 500 less the risk-free rate. In this instance, he used the long-term average variance to calculate the equity risk premium for the market less the risk-free rate for use in the CAPM;
 5. The equity risk premium shown on Attachment DWD-7, page 5 is derived in the same manner as instance 2, above; and
 6. The PRPM component of the average market risk premium shown on Attachment DWD-7, page 6 is calculated in the same manner as instance 4, above.
- ii. Mr. D'Ascendis uses his professional judgment in determining whether to use the long-term average, the spot, or the average of the long-term and spot variance in determining the equity risk premium.
- e.
- i. As stated in the Ahern excerpt above, the authors consider both the spot and long-term variance:

It is clear from the results that the risk premia are more stable over the rolling 24 month period when calculated using the average predicted variance compared with using the spot variance.
 - ii. Like the authors, Mr. D'Ascendis considers both the spot and average predicted variance when using the PRPM.
 - iii. Please see response to part ii, above.

PRPM Clustering 1936 - 2019



1933M05

[illegible]

1937M04

[illegible]

1941M03

[illegible]

1941M04
1941M05
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1941M08
1941M09
1941M10
1941M11
1941M12
1942M01
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1944M12
1945M01
1945M02

[illegible]

1949M01

[illegible]

1952M12

[illegible]

1956M11

[illegible]

1960M10

[illegible]

1960M11
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[illegible]

1968M08

[illegible]

1968M09			
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1971M07			
1971M08			0.25%
1971M09			0.24%
1971M10			0.24%
1971M11			0.23%
1971M12			0.23%
1972M01			0.22%
1972M02			0.50%
1972M03			0.47%
1972M04			0.43%
1972M05			0.41%
1972M06			0.38%
1972M07			0.38%

1972M08			0.36%
1972M09			0.35%
1972M10			0.41%
1972M11			0.38%
1972M12			0.36%
1973M01	0.14%	0.09%	0.35%
1973M02	0.17%	0.11%	0.39%
1973M03	0.18%	0.12%	0.37%
1973M04	0.20%	0.14%	0.38%
1973M05	0.21%	0.14%	0.36%
1973M06	0.22%	0.17%	0.34%
1973M07	0.23%	0.17%	0.32%
1973M08	0.24%	0.21%	0.32%
1973M09	0.26%	0.22%	0.30%
1973M10	0.28%	0.22%	0.29%
1973M11	0.28%	0.22%	0.29%
1973M12	0.39%	0.24%	0.29%
1974M01	0.41%	0.30%	0.29%
1974M02	0.42%	0.45%	0.28%
1974M03	0.40%	0.41%	0.27%
1974M04	0.40%	0.36%	0.27%
1974M05	0.42%	0.32%	0.27%
1974M06	0.43%	0.38%	0.27%
1974M07	0.41%	0.34%	0.26%
1974M08	0.41%	0.33%	0.31%
1974M09	0.39%	0.32%	0.38%
1974M10	0.39%	0.30%	0.38%
1974M11	0.38%	0.27%	0.37%
1974M12	0.41%	0.28%	0.35%
1975M01	0.42%	0.26%	0.33%
1975M02	0.46%	0.37%	0.53%
1975M03	0.44%	0.35%	0.54%
1975M04	0.42%	0.31%	0.52%
1975M05	0.42%	0.28%	0.53%
1975M06	0.40%	0.27%	0.51%
1975M07	0.46%	0.26%	0.51%
1975M08	0.44%	0.24%	0.49%
1975M09	0.44%	0.24%	0.55%
1975M10	0.42%	0.23%	0.59%
1975M11	0.40%	0.22%	0.56%
1975M12	0.40%	0.21%	0.63%
1976M01	0.39%	0.21%	0.60%
1976M02	0.44%	0.26%	0.57%
1976M03	0.43%	0.32%	0.54%
1976M04	0.43%	0.30%	0.52%
1976M05	0.43%	0.27%	0.48%
1976M06	0.43%	0.26%	0.45%

1976M07	0.41%		0.24%	0.43%
1976M08	0.40%		0.24%	0.40%
1976M09	0.38%		0.23%	0.41%
1976M10	0.38%		0.22%	0.39%
1976M11	0.37%		0.21%	0.37%
1976M12	0.36%		0.21%	0.39%
1977M01	0.39%		0.20%	0.40%
1977M02	0.38%		0.20%	0.38%
1977M03	0.38%		0.22%	0.37%
1977M04	0.37%		0.22%	0.34%
1977M05	0.36%		0.21%	0.32%
1977M06	0.36%		0.21%	0.32%
1977M07	0.35%		0.22%	0.30%
1977M08	0.34%		0.24%	0.29%
1977M09	0.34%		0.22%	0.30%
1977M10	0.34%		0.21%	0.30%
1977M11	0.33%		0.20%	0.29%
1977M12	0.33%		0.19%	0.42%
1978M01	0.32%		0.19%	0.39%
1978M02	0.32%		0.19%	0.46%
1978M03	0.31%		0.22%	0.44%
1978M04	0.32%		0.21%	0.41%
1978M05	0.31%		0.20%	0.45%
1978M06	0.32%		0.21%	0.45%
1978M07	0.35%		0.21%	0.45%
1978M08	0.34%		0.22%	0.43%
1978M09	0.35%		0.21%	0.40%
1978M10	0.35%		0.20%	0.41%
1978M11	0.38%		0.20%	0.59%
1978M12	0.37%		0.21%	0.54%
1979M01	0.36%		0.20%	0.51%
1979M02	0.35%		0.21%	0.47%
1979M03	0.34%		0.21%	0.45%
1979M04	0.34%		0.20%	0.44%
1979M05	0.33%		0.20%	0.42%
1979M06	0.34%		0.19%	0.53%
1979M07	0.33%		0.19%	0.58%
1979M08	0.33%		0.20%	0.54%
1979M09	0.33%		0.19%	0.51%
1979M10	0.33%		0.22%	0.49%
1979M11	0.35%		0.23%	0.56%
1979M12	0.34%		0.22%	0.72%
1980M01	0.33%		0.21%	0.73%
1980M02	0.33%		0.24%	0.68%
1980M03	0.35%		0.39%	0.64%
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1980M05	0.34%		0.47%	1.10%

1980M06	0.42%		0.47%	1.09%
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1980M08	0.40%		0.39%	1.07%
1980M09	0.41%		0.34%	0.96%
1980M10	0.40%		0.43%	0.94%
1980M11	0.41%		0.38%	0.85%
1980M12	0.40%		0.35%	1.04%
1981M01	0.38%		0.31%	0.99%
1981M02	0.37%		0.34%	0.98%
1981M03	0.35%		0.36%	0.90%
1981M04	0.37%		0.41%	0.81%
1981M05	0.36%		0.37%	0.97%
1981M06	0.36%		0.35%	0.87%
1981M07	0.35%		0.31%	0.79%
1981M08	0.34%		0.31%	0.93%
1981M09	0.34%		0.29%	0.87%
1981M10	0.34%		0.40%	0.78%
1981M11	0.34%		0.35%	0.71%
1981M12	0.41%		0.46%	0.67%
1982M01	0.40%		0.40%	0.63%
1982M02	0.38%		0.37%	0.57%
1982M03	0.38%		0.33%	0.54%
1982M04	0.38%		0.31%	0.50%
1982M05	0.37%		0.28%	0.47%
1982M06	0.36%		0.26%	0.46%
1982M07	0.35%		0.25%	0.43%
1982M08	0.34%		0.24%	0.40%
1982M09	0.35%		0.23%	0.38%
1982M10	0.34%		0.23%	0.46%
1982M11	0.34%		0.22%	0.48%
1982M12	0.33%		0.22%	0.46%
1983M01	0.33%		0.21%	0.43%
1983M02	0.33%		0.21%	0.41%
1983M03	0.33%		0.22%	0.40%
1983M04	0.33%		0.21%	0.39%
1983M05	0.35%		0.23%	0.37%
1983M06	0.34%		0.21%	0.35%
1983M07	0.33%		0.21%	0.35%
1983M08	0.33%		0.20%	0.34%
1983M09	0.32%		0.21%	0.35%
1983M10	0.32%		0.21%	0.57%
1983M11	0.31%		0.21%	0.62%
1983M12	0.31%		0.20%	0.56%
1984M01	0.30%		0.22%	0.52%
1984M02	0.30%		0.31%	0.52%
1984M03	0.30%		0.32%	0.51%
1984M04	0.30%		0.29%	0.51%

1984M05	0.34%		0.27%	0.57%
1984M06	0.34%		0.33%	0.57%
1984M07	0.33%		0.32%	0.53%
1984M08	0.33%		0.32%	0.50%
1984M09	0.33%		0.29%	0.49%
1984M10	0.32%		0.33%	0.47%
1984M11	0.32%		0.31%	0.46%
1984M12	0.35%		0.29%	0.42%
1985M01	0.34%		0.38%	0.42%
1985M02	0.34%		0.43%	0.39%
1985M03	0.33%		0.39%	0.37%
1985M04	0.50%		0.34%	0.45%
1985M05	0.47%		0.42%	0.41%
1985M06	0.45%		0.46%	0.40%
1985M07	0.43%		0.40%	0.38%
1985M08	0.45%		0.35%	0.48%
1985M09	0.46%		0.31%	0.49%
1985M10	0.44%		0.30%	0.45%
1985M11	0.42%		0.28%	0.42%
1985M12	0.40%		0.26%	0.40%
1986M01	0.39%		0.28%	0.37%
1986M02	0.38%		0.27%	0.35%
1986M03	0.37%		0.26%	0.34%
1986M04	0.36%		0.25%	0.34%
1986M05	0.35%		0.25%	0.34%
1986M06	0.36%		0.23%	0.32%
1986M07	0.54%		0.29%	0.30%
1986M08	0.51%		0.30%	0.30%
1986M09	0.48%		0.28%	0.67%
1986M10	0.49%		0.28%	0.75%
1986M11	0.46%		0.26%	0.81%
1986M12	0.44%		0.24%	0.73%
1987M01	0.47%		0.25%	0.71%
1987M02	0.45%		0.26%	0.65%
1987M03	0.42%		0.24%	0.60%
1987M04	0.41%		0.22%	0.56%
1987M05	0.41%		0.22%	0.56%
1987M06	0.40%		0.27%	0.53%
1987M07	0.38%		0.26%	0.48%
1987M08	0.37%		0.36%	0.47%
1987M09	0.36%		0.32%	0.44%
1987M10	0.36%		0.29%	0.42%
1987M11	0.39%		0.42%	0.49%
1987M12	0.39%		0.70%	0.49%
1988M01	0.40%		0.60%	0.46%
1988M02	0.47%		0.51%	0.42%
1988M03	0.46%		0.48%	0.52%

1988M04	0.43%		0.42%	0.49%
1988M05	0.42%		0.38%	0.48%
1988M06	0.41%		0.48%	0.47%
1988M07	0.39%		0.51%	0.45%
1988M08	0.39%		0.47%	0.44%
1988M09	0.37%		0.43%	0.45%
1988M10	0.37%		0.37%	0.42%
1988M11	0.36%		0.36%	0.39%
1988M12	0.35%		0.35%	0.40%
1989M01	0.34%		0.31%	0.38%
1989M02	0.33%		0.28%	0.35%
1989M03	0.33%		0.29%	0.34%
1989M04	0.33%		0.27%	0.33%
1989M05	0.33%		0.26%	0.31%
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1989M08	0.32%		0.31%	0.27%
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1989M12	0.32%		0.24%	0.30%
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1990M03	0.32%		0.22%	0.27%
1990M04	0.32%		0.28%	0.26%
1990M05	0.34%		0.26%	0.30%
1990M06	0.34%		0.24%	0.32%
1990M07	0.35%		0.24%	0.32%
1990M08	0.35%		0.22%	0.33%
1990M09	0.34%		0.21%	0.37%
1990M10	0.36%		0.23%	0.41%
1990M11	0.35%		0.24%	0.47%
1990M12	0.34%		0.23%	0.44%
1991M01	0.33%		0.22%	0.41%
1991M02	0.32%		0.26%	0.39%
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1991M06	0.32%		0.32%	0.35%
1991M07	0.33%		0.41%	0.33%
1991M08	0.35%		0.38%	0.31%
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1991M12	0.33%		0.34%	0.32%
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1992M03	0.33%		0.32%	0.29%
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1993M02	0.31%		0.29%	0.28%
1993M03	0.31%		0.27%	0.30%
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1993M08	0.33%		0.24%	0.27%
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1993M11	0.34%		0.31%	0.26%
1993M12	0.33%		0.30%	0.30%
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1994M03	0.41%		0.36%	0.27%
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1994M05	0.40%		0.29%	0.28%
1994M06	0.40%		0.26%	0.27%
1994M07	0.38%		0.24%	0.26%
1994M08	0.38%		0.23%	0.25%
1994M09	0.36%		0.22%	0.25%
1994M10	0.37%		0.25%	0.25%
1994M11	0.38%		0.25%	0.27%
1994M12	0.37%		0.24%	0.26%
1995M01	0.39%		0.23%	0.25%
1995M02	0.37%		0.23%	0.24%
1995M03	0.36%		0.22%	0.24%
1995M04	0.38%		0.27%	0.24%
1995M05	0.37%		0.30%	0.23%
1995M06	0.39%		0.27%	0.22%
1995M07	0.38%		0.26%	0.22%
1995M08	0.38%		0.25%	0.23%
1995M09	0.37%		0.23%	0.23%
1995M10	0.36%		0.25%	0.22%
1995M11	0.35%		0.23%	0.24%
1995M12	0.34%		0.22%	0.23%
1996M01	0.34%		0.21%	0.26%

1996M02	0.34%		0.29%	0.25%
1996M03	0.36%		0.27%	0.26%
1996M04	0.37%		0.25%	0.26%
1996M05	0.36%		0.23%	0.25%
1996M06	0.35%		0.22%	0.26%
1996M07	0.34%		0.21%	0.25%
1996M08	0.40%		0.24%	0.25%
1996M09	0.45%		0.29%	0.25%
1996M10	0.43%		0.29%	0.24%
1996M11	0.43%		0.27%	0.24%
1996M12	0.43%		0.26%	0.30%
1997M01	0.44%		0.28%	0.31%
1997M02	0.42%		0.26%	0.30%
1997M03	0.40%		0.24%	0.28%
1997M04	0.39%		0.29%	0.68%
1997M05	0.38%		0.39%	1.12%
1997M06	0.38%		0.36%	1.05%
1997M07	0.38%		0.34%	0.94%
1997M08	0.39%		0.31%	0.85%
1997M09	0.38%		0.33%	1.05%
1997M10	0.37%		0.32%	1.01%
1997M11	0.36%		0.29%	0.91%
1997M12	0.35%		0.31%	0.87%
1998M01	0.38%		0.37%	0.97%
1998M02	0.37%		0.33%	0.88%
1998M03	0.35%		0.30%	0.82%
1998M04	0.34%		0.40%	0.75%
1998M05	0.39%		0.35%	0.70%
1998M06	0.39%		0.66%	0.68%
1998M07	0.57%		0.69%	0.68%
1998M08	0.57%		0.64%	0.63%
1998M09	0.54%		0.61%	0.81%
1998M10	0.55%		0.52%	0.74%
1998M11	0.52%		0.72%	0.75%
1998M12	0.51%		0.61%	0.68%
1999M01	0.48%		0.87%	0.78%
1999M02	0.46%		1.05%	0.90%
1999M03	0.44%		0.94%	1.02%
1999M04	0.50%		0.78%	0.92%
1999M05	0.48%		0.70%	0.84%
1999M06	0.46%		0.73%	0.77%
1999M07	0.44%		0.61%	0.70%
1999M08	0.43%		0.55%	0.64%
1999M09	0.52%		0.51%	0.58%
1999M10	0.50%		0.53%	0.53%
1999M11	0.47%		0.49%	0.50%
1999M12	0.49%		0.48%	0.46%

2000M01	0.47%		0.44%	0.53%
2000M02	0.48%		0.55%	0.51%
2000M03	0.59%		0.47%	0.52%
2000M04	0.58%		0.68%	0.49%
2000M05	0.54%		0.58%	1.15%
2000M06	0.50%		0.49%	1.03%
2000M07	0.47%		0.43%	1.22%
2000M08	0.45%		0.38%	1.11%
2000M09	0.49%		0.41%	1.00%
2000M10	0.55%		0.36%	0.91%
2000M11	0.51%		0.32%	0.82%
2000M12	0.50%		0.29%	0.74%
2001M01	0.49%		0.26%	1.28%
2001M02	0.56%		0.39%	1.35%
2001M03	0.53%		0.35%	1.23%
2001M04	0.51%		0.60%	1.10%
2001M05	0.48%		0.62%	0.99%
2001M06	0.48%		0.56%	0.91%
2001M07	0.49%		0.48%	0.88%
2001M08	0.46%		0.46%	0.80%
2001M09	0.47%		0.45%	0.75%
2001M10	0.45%		0.40%	0.71%
2001M11	0.47%		0.40%	0.68%
2001M12	0.46%		0.36%	0.63%
2002M01	0.44%		0.34%	0.62%
2002M02	0.42%		0.35%	0.56%
2002M03	0.41%		0.31%	0.52%
2002M04	0.39%		0.29%	0.48%
2002M05	0.40%		0.28%	0.44%
2002M06	0.39%		0.27%	0.58%
2002M07	0.38%		0.27%	0.54%
2002M08	0.49%		0.27%	0.50%
2002M09	0.49%		0.27%	0.49%
2002M10	0.48%		0.25%	0.48%
2002M11	0.46%		0.23%	0.45%
2002M12	0.48%		0.22%	0.46%
2003M01	0.46%		0.29%	0.43%
2003M02	0.44%		0.26%	0.41%
2003M03	0.42%		0.27%	0.39%
2003M04	0.40%		0.24%	0.37%
2003M05	0.40%		0.27%	0.35%
2003M06	0.38%		0.25%	0.34%
2003M07	0.38%		0.24%	0.32%
2003M08	0.37%		0.22%	0.31%
2003M09	0.38%		0.33%	0.30%
2003M10	0.38%		0.29%	0.28%
2003M11	0.37%		0.30%	0.28%

2003M12	0.36%		0.30%	0.42%
2004M01	0.35%		0.29%	0.39%
2004M02	0.34%		0.27%	0.37%
2004M03	0.34%		0.26%	0.35%
2004M04	0.33%		0.27%	0.33%
2004M05	0.34%		0.24%	0.34%
2004M06	0.33%		0.23%	0.33%
2004M07	0.32%		0.23%	0.31%
2004M08	0.32%		0.22%	0.31%
2004M09	0.34%		0.23%	0.34%
2004M10	0.33%		0.22%	0.33%
2004M11	0.32%		0.21%	0.32%
2004M12	0.33%		0.56%	0.35%
2005M01	0.32%		0.52%	0.33%
2005M02	0.32%		0.68%	0.32%
2005M03	0.32%		0.59%	0.31%
2005M04	0.34%		0.52%	0.29%
2005M05	0.33%		0.45%	0.33%
2005M06	0.36%		0.46%	0.32%
2005M07	0.36%		0.40%	0.35%
2005M08	0.35%		0.44%	0.36%
2005M09	0.35%		0.41%	0.37%
2005M10	0.34%		0.36%	0.41%
2005M11	0.35%		0.53%	0.49%
2005M12	0.35%		0.46%	0.50%
2006M01	0.34%		0.44%	0.47%
2006M02	0.33%		0.48%	0.44%
2006M03	0.35%		0.42%	0.41%
2006M04	0.36%		0.37%	0.39%
2006M05	0.36%		0.37%	0.54%
2006M06	0.38%		0.48%	0.50%
2006M07	0.37%		0.45%	0.48%
2006M08	0.37%		0.39%	0.47%
2006M09	0.36%		0.36%	0.47%
2006M10	0.35%		0.33%	0.49%
2006M11	0.37%		0.32%	0.52%
2006M12	0.40%		0.30%	0.48%
2007M01	0.39%		0.27%	0.47%
2007M02	0.37%		0.26%	0.44%
2007M03	0.37%		0.25%	0.41%
2007M04	0.36%		0.23%	0.39%
2007M05	0.36%		0.22%	0.37%
2007M06	0.34%		0.23%	0.35%
2007M07	0.34%		0.21%	0.34%
2007M08	0.33%		0.21%	0.33%
2007M09	0.34%		0.22%	0.37%
2007M10	0.33%		0.21%	0.38%

2007M11	0.41%		0.42%	0.35%
2007M12	0.42%		0.52%	0.35%
2008M01	0.45%		0.49%	0.35%
2008M02	0.46%		0.47%	0.37%
2008M03	0.45%		0.46%	0.37%
2008M04	0.46%		0.39%	0.35%
2008M05	0.44%	0.72%	0.35%	0.33%
2008M06	0.42%	0.69%	0.35%	0.36%
2008M07	0.41%	0.66%	0.43%	0.38%
2008M08	0.39%	0.56%	0.52%	0.36%
2008M09	0.41%	0.47%	0.48%	0.50%
2008M10	0.39%	0.43%	0.42%	0.48%
2008M11	0.43%	0.40%	0.38%	0.44%
2008M12	0.41%	0.39%	0.48%	0.70%
2009M01	0.41%	0.38%	0.48%	0.67%
2009M02	0.40%	0.38%	0.47%	0.61%
2009M03	0.39%	0.32%	0.51%	0.67%
2009M04	0.39%	0.32%	0.47%	0.64%
2009M05	0.39%	0.29%	0.47%	0.66%
2009M06	0.41%	0.29%	0.53%	0.69%
2009M07	0.42%	0.27%	0.48%	0.66%
2009M08	0.41%	0.27%	0.41%	0.60%
2009M09	0.43%	0.27%	0.37%	0.59%
2009M10	0.43%	0.26%	0.34%	0.55%
2009M11	0.44%	0.25%	0.35%	0.65%
2009M12	0.42%	0.19%	0.31%	0.60%
2010M01	0.42%	0.19%	0.28%	0.57%
2010M02	0.42%	0.19%	0.26%	0.56%
2010M03	0.40%	0.20%	0.24%	0.52%
2010M04	0.40%	0.20%	0.24%	0.48%
2010M05	0.40%	0.20%	0.23%	0.45%
2010M06	0.41%	0.19%	0.27%	0.43%
2010M07	0.40%	0.20%	0.25%	0.40%
2010M08	0.39%	0.20%	0.24%	0.43%
2010M09	0.39%	0.20%	0.22%	0.40%
2010M10	0.39%	0.20%	0.24%	0.38%
2010M11	0.38%	0.21%	0.23%	0.37%
2010M12	0.37%	0.21%	0.21%	0.34%
2011M01	0.37%	0.21%	0.20%	0.33%
2011M02	0.36%	0.22%	0.20%	0.32%
2011M03	0.35%	0.20%	2.06E-03	0.31%
2011M04	0.36%	0.21%	2.19E-03	0.29%
2011M05	0.35%	0.21%	2.08E-03	0.28%
2011M06	0.34%	0.21%	1.99E-03	0.27%
2011M07	0.33%	0.21%	1.95E-03	0.27%
2011M08	0.33%	0.21%	1.96E-03	0.28%
2011M09	0.33%	0.20%	2.01E-03	0.28%

2011M10	0.33%	0.21%	2.40E-03	0.27%
2011M11	0.32%	0.21%	2.42E-03	0.26%
2011M12	0.32%	0.21%	2.26E-03	0.26%
2012M01	0.31%	0.22%	2.16E-03	0.25%
2012M02	0.31%	0.22%	2.05E-03	0.24%
2012M03	0.31%	0.22%	2.16E-03	0.23%
2012M04	0.31%	0.22%	2.40E-03	0.23%
2012M05	0.30%	0.22%	2.26E-03	0.22%
2012M06	0.30%	0.23%	2.26E-03	0.22%
2012M07	0.32%	0.23%	0.24%	0.25%
2012M08	0.34%	0.22%	0.23%	0.25%
2012M09	0.33%	0.23%	2.15E-03	0.24%
2012M10	0.47%	0.23%	2.06E-03	0.25%
2012M11	0.45%	0.23%	2.01E-03	0.25%
2012M12	0.43%	0.23%	1.97E-03	0.24%
2013M01	0.41%	0.23%	1.92E-03	0.23%
2013M02	0.40%	0.23%	2.19E-03	0.26%
2013M03	0.39%	0.23%	2.17E-03	0.28%
2013M04	0.40%	0.23%	0.21%	0.31%
2013M05	0.39%	0.23%	1.99E-03	0.29%
2013M06	0.38%	0.23%	0.19%	0.28%
2013M07	0.37%	0.23%	0.19%	0.27%
2013M08	0.49%	0.23%	0.31%	0.30%
2013M09	0.59%	0.23%	0.36%	0.37%
2013M10	0.55%	0.23%	0.32%	0.35%
2013M11	0.51%	0.23%	0.33%	0.33%
2013M12	0.48%	0.23%	0.31%	0.32%
2014M01	0.46%	0.23%	2.83E-03	0.31%
2014M02	0.44%	0.24%	2.58E-03	0.30%
2014M03	0.43%	0.23%	0.24%	0.29%
2014M04	0.42%	0.24%	0.22%	0.28%
2014M05	0.42%	0.24%	2.58E-03	0.27%
2014M06	0.40%	0.23%	0.24%	0.26%
2014M07	0.41%	0.23%	0.31%	0.25%
2014M08	0.43%	0.23%	0.33%	0.32%
2014M09	0.42%	0.23%	0.34%	0.32%
2014M10	0.41%	0.22%	0.38%	0.34%
2014M11	0.50%	0.20%	0.57%	0.40%
2014M12	0.47%	0.20%	0.50%	0.37%
2015M01	0.46%	0.21%	0.44%	0.35%
2015M02	0.44%	0.21%	0.38%	0.33%
2015M03	0.42%	0.21%	0.35%	0.31%
2015M04	0.40%	0.21%	0.33%	0.30%
2015M05	0.39%	0.21%	0.31%	0.28%
2015M06	0.38%	0.21%	0.28%	0.27%
2015M07	0.37%	0.20%	0.28%	0.31%
2015M08	0.36%	0.19%	3.00E-03	0.30%

2015M09	0.35%	0.20%	2.89E-03	0.28%
2015M10	0.37%	0.20%	0.31%	0.28%
2015M11	0.36%	0.20%	0.28%	0.31%
2015M12	0.35%	0.20%	0.25%	0.29%
2016M01	0.34%	0.21%	0.24%	0.28%
2016M02	0.35%	0.20%	0.28%	0.29%
2016M03	0.36%	0.20%	0.26%	0.28%
2016M04	0.37%	0.20%	0.29%	0.28%
2016M05	0.37%	0.20%	0.28%	0.27%
2016M06	0.37%	0.21%	0.27%	0.26%
2016M07	0.41%	0.17%	0.63%	0.32%
2016M08	0.39%	0.17%	0.55%	0.31%
2016M09	0.42%	0.15%	0.58%	0.41%
2016M10	0.40%	0.16%	0.51%	0.38%
2016M11	0.38%	0.16%	0.46%	0.36%
2016M12	0.38%	0.17%	0.52%	0.34%
2017M01	0.38%	0.17%	0.45%	0.32%
2017M02	0.38%	0.18%	0.39%	0.31%
2017M03	0.36%	0.18%	0.38%	0.30%
2017M04	0.35%	0.18%	0.35%	0.29%
2017M05	0.34%	0.19%	0.31%	0.28%
2017M06	0.34%	0.19%	0.29%	0.27%
2017M07	0.33%	0.20%	0.30%	0.26%
2017M08	0.33%	0.20%	0.29%	0.25%
2017M09	0.32%	0.20%	0.28%	0.24%
2017M10	0.32%	0.21%	0.26%	0.23%
2017M11	0.34%	0.20%	0.33%	0.25%
2017M12	0.35%	0.20%	0.36%	0.28%
2018M01	0.34%	0.20%	0.32%	0.27%
2018M02	0.34%	0.18%	0.42%	0.32%
2018M03	0.34%	0.18%	0.42%	0.32%
2018M04	0.33%	0.18%	0.37%	0.31%
2018M05	0.33%	0.19%	0.34%	0.30%
2018M06	0.32%	0.19%	0.31%	0.28%
2018M07	0.32%	0.19%	0.30%	0.27%
2018M08	0.32%	0.19%	0.29%	0.27%
2018M09	0.31%	0.20%	0.27%	0.26%
2018M10	0.31%	0.20%	0.26%	0.25%
2018M11	0.31%	0.21%	0.25%	0.36%
2018M12	0.33%	0.20%	0.30%	0.36%
2019M01	0.33%	0.19%	0.29%	0.34%
2019M02	0.32%	0.20%	0.27%	0.32%
2019M03	0.32%	0.19%	0.27%	0.31%
2019M04	0.32%	0.20%	0.26%	0.29%
2019M05	0.31%	0.20%	0.31%	0.31%
2019M06	0.31%	0.20%	0.28%	0.29%
2019M07	0.31%	0.21%	0.26%	0.29%

2019M08	0.30%	0.21%	0.27%	0.28%
2019M09	0.44%	0.19%	0.27%	0.28%
2019M10	0.42%	0.19%	0.30%	0.27%
2019M11	0.41%	0.19%	0.30%	0.26%
2019M12	0.44%	0.20%	0.34%	0.26%
2020M01	0.42%	0.20%	0.31%	0.27%
2020M02	0.40%	0.18%	0.28%	0.33%
2020M03	0.46%	0.16%	0.34%	0.54%
2020M04	0.44%	0.17%	0.32%	0.53%
2020M05	0.43%	0.17%	0.42%	0.49%
2020M06	0.41%	0.18%	0.38%	0.46%
2020M07	0.40%	0.18%	0.34%	0.44%
2020M08	0.39%	0.14%	0.31%	0.44%
2020M09	0.37%	0.15%	0.29%	0.44%

Avg Pred. Variance 0.38% 0.23% 0.32% 0.44%

Spot Variance 0.37% 0.15% 0.29% 0.44%

GARCH Coefficient	1.858272	5.95293	1.87426	2.2287
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Predicted RP Based on Avg

Predicted RP Based on Spot

Predicted RP

MSEX	SJW	YORW	MKTRP	SPRP	MKTAAAAA
Last updated: Last updated: Last updated: Last updated: 0 Last updated: Last updated: 09/ Modified: 1 11Modified: 1 11Modified: 1 11Modified: 1 113 Modified: 1 11Modified: 1 1136 ,					
			0.13%		
			0.12%		
			0.13%		
			0.17%		
			0.16%		
			0.14%		
			0.15%		
			0.16%		
			0.14%		
			0.13%		
			0.14%		
			0.14%		
			0.13%		
			0.12%		
			0.14%		
			0.13%		
			0.12%		
			0.15%		
			0.14%		
			0.17%		
			0.18%		
			0.17%		
			0.20%		
			0.23%		
			0.20%	0.27%	0.23%
			0.18%	0.25%	0.20%
			0.17%	0.23%	0.18%
			0.28%	0.25%	0.30%
			0.25%	0.31%	0.26%
			0.22%	0.28%	0.23%
			0.22%	0.27%	0.23%
			0.20%	0.24%	0.20%
			0.24%	0.26%	0.24%
			0.21%	0.23%	0.21%
			0.19%	0.21%	0.19%
			0.35%	0.66%	0.35%
			0.30%	0.58%	0.30%
			0.29%	0.66%	0.29%
			0.25%	0.60%	0.25%
			0.22%	0.53%	0.22%
			0.19%	0.47%	0.20%
			0.20%	0.43%	0.20%

			0.32%	0.85%	0.32%
			0.29%	0.80%	0.29%
			0.35%	0.78%	0.36%
			0.35%	0.69%	0.35%
			0.87%	1.70%	0.88%
			1.03%	1.81%	1.03%
			0.86%	1.59%	0.87%
			0.73%	1.41%	0.74%
			0.62%	1.28%	0.63%
			0.57%	1.16%	0.58%
			0.49%	1.02%	0.50%
			0.42%	0.91%	0.43%
			0.76%	1.27%	0.78%
			0.64%	1.11%	0.66%
			0.54%	0.97%	0.55%
			0.74%	1.03%	0.75%
			0.77%	1.02%	0.78%
			0.67%	0.98%	0.67%
			0.67%	0.89%	0.68%
			0.57%	0.79%	0.58%
			0.61%	0.90%	0.62%
			0.62%	0.80%	0.62%
			0.69%	0.87%	0.69%
			0.87%	0.92%	0.88%
			0.89%	0.96%	0.91%
			0.88%	0.91%	0.89%
			0.74%	0.80%	0.75%
			1.94%	1.89%	1.96%
			1.62%	1.70%	1.64%
			1.57%	1.57%	1.58%
			1.77%	1.64%	1.77%
			1.56%	1.46%	1.56%
			1.30%	1.30%	1.30%
			1.40%	1.33%	1.40%
			1.93%	1.51%	1.92%
			2.60%	2.36%	2.58%
			2.25%	2.07%	2.22%
			3.09%	2.75%	3.14%
			3.63%	3.78%	3.75%
			3.28%	3.37%	3.37%
			3.43%	3.22%	3.47%
			3.12%	2.89%	3.13%
			2.60%	2.54%	2.62%
			2.23%	2.27%	2.23%
			2.62%	2.59%	2.61%
			2.20%	2.51%	2.19%
			3.44%	2.72%	3.51%

			2.89%	2.54%	2.98%
			2.42%	2.32%	2.51%
			2.34%	2.30%	2.41%
			1.97%	2.03%	2.04%
			2.02%	2.26%	2.07%
			1.96%	2.10%	1.99%
			1.66%	1.87%	1.70%
			1.39%	1.64%	1.43%
			1.21%	1.65%	1.24%
			1.07%	1.48%	1.10%
			0.91%	1.30%	0.94%
			0.80%	1.18%	0.82%
			0.80%	1.14%	0.82%
			0.67%	1.00%	0.69%
			0.80%	1.23%	0.82%
			0.69%	1.07%	0.70%
			0.59%	0.94%	0.60%
			0.53%	0.90%	0.54%
			0.52%	0.79%	0.53%
			0.44%	0.78%	0.46%
			0.42%	0.70%	0.43%
			0.39%	0.79%	0.40%
			0.35%	0.78%	0.36%
			0.40%	0.80%	0.40%
			0.35%	0.80%	0.35%
			0.34%	0.78%	0.35%
			0.36%	0.74%	0.37%
			0.31%	0.67%	0.32%
			0.27%	0.59%	0.28%
			0.29%	0.65%	0.30%
			0.27%	0.57%	0.27%
			0.24%	0.52%	0.25%
			0.25%	0.56%	0.26%
			0.22%	0.52%	0.23%
			0.20%	0.46%	0.20%
			0.26%	0.49%	0.27%
			0.26%	0.48%	0.26%
			0.23%	0.43%	0.23%
			0.25%	0.47%	0.25%
			0.22%	0.42%	0.22%
			0.19%	0.38%	0.19%
			0.23%	0.36%	0.23%
			0.20%	0.32%	0.20%
			0.18%	0.29%	0.18%
			0.17%	0.26%	0.17%
			0.16%	0.25%	0.16%
			0.14%	0.27%	0.14%

			0.23%	0.31%	0.23%
			0.20%	0.32%	0.20%
			0.22%	0.31%	0.22%
			0.31%	0.55%	0.31%
			0.31%	0.60%	0.31%
			0.56%	0.71%	0.57%
			0.65%	0.67%	0.65%
			0.70%	0.59%	0.70%
			0.65%	0.64%	0.65%
			0.55%	0.59%	0.55%
			0.49%	0.52%	0.50%
			1.32%	0.94%	1.32%
			1.23%	1.03%	1.25%
			1.09%	0.90%	1.11%
			1.50%	1.02%	1.54%
			1.26%	0.89%	1.30%
			1.10%	0.83%	1.13%
			0.92%	0.73%	0.95%
			0.80%	0.94%	0.83%
			0.71%	0.89%	0.73%
			0.60%	0.79%	0.62%
			0.60%	0.69%	0.62%
			0.51%	0.65%	0.53%
			0.73%	0.82%	0.74%
			0.62%	0.72%	0.63%
			0.56%	0.66%	0.57%
			0.55%	0.61%	0.56%
			0.58%	0.67%	0.59%
			0.58%	0.65%	0.59%
			0.76%	0.58%	0.78%
			0.66%	0.51%	0.67%
			0.60%	0.46%	0.62%
			0.51%	0.41%	0.52%
			0.47%	0.36%	0.47%
			0.40%	0.32%	0.40%
			0.34%	0.28%	0.35%
			0.29%	0.26%	0.30%
			0.98%	0.68%	1.00%
			0.85%	0.80%	0.87%
			0.72%	0.70%	0.73%
			0.60%	0.62%	0.62%
			0.51%	0.56%	0.52%
			0.44%	0.49%	0.45%
			0.40%	0.62%	0.41%
			0.35%	0.55%	0.35%
			0.34%	0.48%	0.35%
			0.30%	0.44%	0.30%

			0.26%	0.40%	0.26%
			0.29%	0.45%	0.29%
			0.25%	0.42%	0.25%
			0.25%	0.37%	0.25%
			0.25%	0.35%	0.25%
			0.22%	0.32%	0.22%
			0.19%	0.30%	0.19%
			0.24%	0.35%	0.24%
			0.23%	0.37%	0.23%
			0.23%	0.39%	0.23%
			0.20%	0.35%	0.20%
			0.18%	0.33%	0.19%
			0.23%	0.43%	0.23%
			0.23%	0.41%	0.23%
			0.27%	0.44%	0.27%
			0.23%	0.39%	0.24%
			0.21%	0.34%	0.21%
			0.19%	0.30%	0.19%
			0.17%	0.29%	0.17%
			0.20%	0.44%	0.20%
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			0.22%	0.45%	0.22%
			0.23%	0.44%	0.23%
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			0.18%	0.31%	0.18%
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			0.17%	0.21%	0.17%
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			0.21%	0.24%	0.21%
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			0.18%	0.24%	0.18%
			0.17%	0.24%	0.17%
			0.15%	0.21%	0.15%
			0.19%	0.33%	0.19%
			0.23%	0.35%	0.24%
			0.22%	0.34%	0.23%
			0.21%	0.31%	0.21%
			0.19%	0.28%	0.19%
			0.19%	0.26%	0.19%
			0.18%	0.26%	0.18%
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			0.30%	0.21%	0.30%

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			0.16%	0.07%	0.16%
			0.15%	0.07%	0.15%
			0.14%	0.07%	0.13%
			0.13%	0.07%	0.13%
			0.12%	0.06%	0.12%
			0.14%	0.08%	0.14%

			0.14%	0.08%	0.14%
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			0.11%	0.07%	0.11%
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			0.15%	0.08%	0.15%
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			0.21%	0.09%	0.21%
			0.21%	0.11%	0.21%
			0.21%	0.11%	0.21%
			0.22%	0.11%	0.22%
			0.19%	0.10%	0.19%

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			0.16%	0.08%	0.16%
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			0.14%	0.10%	0.14%
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			0.20%	0.10%	0.20%
			0.20%	0.09%	0.20%
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			0.18%	0.12%	0.18%
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			0.18%	0.08%	0.18%
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			0.12%	0.12%	0.11%
			0.17%	0.13%	0.16%
			0.25%	0.22%	0.25%
			0.32%	0.24%	0.32%
			0.31%	0.25%	0.31%
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			0.32%	0.35%	0.32%
			0.34%	0.36%	0.34%
			0.34%	0.37%	0.35%
			0.34%	0.41%	0.34%
			0.31%	0.38%	0.31%
			0.27%	0.34%	0.27%
			0.24%	0.31%	0.24%
			0.23%	0.36%	0.23%
			0.23%	0.36%	0.23%
			0.21%	0.32%	0.21%
			0.19%	0.30%	0.19%
			0.17%	0.27%	0.18%
			0.17%	0.26%	0.16%
			0.18%	0.26%	0.18%
			0.16%	0.24%	0.16%
			0.17%	0.22%	0.17%
			0.17%	0.21%	0.17%
			0.15%	0.20%	0.15%
			0.17%	0.18%	0.17%
			0.15%	0.16%	0.15%
			0.21%	0.20%	0.21%
			0.19%	0.18%	0.19%
	0.10%		0.17%	0.18%	0.17%
	0.12%		0.15%	0.16%	0.15%
	0.13%		0.14%	0.16%	0.14%
	0.15%		0.13%	0.15%	0.13%
	0.15%		0.13%	0.14%	0.13%

	0.17%		0.12%	0.13%	0.12%
	0.19%		0.12%	0.15%	0.12%
	0.19%		0.11%	0.13%	0.11%
	0.20%		0.11%	0.16%	0.10%
	0.20%		0.12%	0.17%	0.12%
0.07%	0.21%		0.11%	0.16%	0.11%
0.09%	0.21%		0.11%	0.18%	0.11%
0.10%	0.21%		0.13%	0.17%	0.12%
0.11%	0.28%		0.12%	0.16%	0.12%
0.12%	0.28%		0.14%	0.15%	0.14%
0.12%	0.30%		0.13%	0.13%	0.13%
0.12%	0.30%		0.12%	0.13%	0.12%
0.13%	0.29%		0.13%	0.13%	0.12%
0.16%	0.29%		0.14%	0.13%	0.14%
0.18%	0.30%		0.14%	0.17%	0.14%
0.19%	0.30%		0.13%	0.18%	0.12%
0.21%	0.34%		0.29%	0.33%	0.29%
0.23%	0.34%		0.25%	0.30%	0.25%
0.25%	0.38%		0.23%	0.28%	0.23%
0.24%	0.40%		0.20%	0.25%	0.20%
0.23%	0.39%		0.19%	0.25%	0.19%
0.24%	0.39%		0.20%	0.44%	0.20%
0.25%	0.39%		0.20%	0.43%	0.20%
0.23%	0.41%		0.18%	0.43%	0.18%
0.26%	0.40%		0.26%	0.39%	0.26%
0.25%	0.38%		0.35%	0.45%	0.35%
0.28%	0.40%		0.53%	0.41%	0.53%
0.26%	0.43%		0.71%	0.48%	0.72%
0.24%	0.42%		0.66%	0.43%	0.67%
0.24%	0.44%		0.58%	0.38%	0.59%
0.28%	0.58%		0.62%	0.67%	0.63%
0.25%	0.56%		0.55%	0.59%	0.56%
0.23%	0.53%		0.46%	0.53%	0.47%
0.22%	0.50%		0.40%	0.48%	0.41%
0.21%	0.48%		0.36%	0.48%	0.37%
0.19%	0.46%		0.32%	0.51%	0.32%
0.18%	0.44%		0.36%	0.50%	0.37%
0.18%	0.43%		0.32%	0.45%	0.33%
0.17%	0.41%		0.31%	0.40%	0.31%
0.17%	0.40%		0.29%	0.39%	0.30%
0.17%	0.39%		0.26%	0.35%	0.26%
0.17%	0.38%		0.23%	0.31%	0.23%
0.21%	0.37%		0.35%	0.34%	0.35%
0.20%	0.39%		0.30%	0.33%	0.31%
0.21%	0.39%		0.27%	0.29%	0.27%
0.20%	0.38%		0.24%	0.26%	0.24%
0.19%	0.39%		0.21%	0.24%	0.22%

0.18%	0.38%		0.20%	0.22%	0.20%
0.18%	0.37%		0.18%	0.20%	0.18%
0.18%	0.36%		0.16%	0.19%	0.16%
0.19%	0.39%		0.15%	0.18%	0.15%
0.19%	0.38%		0.15%	0.16%	0.15%
0.44%	0.37%		0.13%	0.15%	0.13%
0.55%	0.38%		0.15%	0.17%	0.15%
0.55%	0.38%		0.18%	0.15%	0.18%
0.48%	0.40%		0.17%	0.16%	0.17%
0.41%	0.39%		0.16%	0.14%	0.16%
0.36%	0.39%		0.14%	0.13%	0.14%
0.32%	0.38%		0.14%	0.12%	0.14%
0.30%	0.37%		0.14%	0.13%	0.14%
0.30%	0.36%		0.14%	0.12%	0.14%
0.27%	0.35%		0.13%	0.13%	0.13%
0.25%	0.34%		0.12%	0.12%	0.12%
0.23%	0.34%		0.15%	0.13%	0.14%
0.23%	0.33%		0.14%	0.13%	0.14%
0.21%	0.33%		0.13%	0.12%	0.13%
0.21%	0.34%		0.18%	0.15%	0.18%
0.20%	0.36%		0.17%	0.14%	0.17%
0.21%	0.37%		0.16%	0.13%	0.15%
0.19%	0.36%		0.21%	0.12%	0.21%
0.19%	0.35%		0.19%	0.11%	0.19%
0.27%	0.34%		0.18%	0.10%	0.18%
0.28%	0.35%		0.18%	0.10%	0.18%
0.26%	0.35%		0.17%	0.09%	0.17%
0.24%	0.35%		0.15%	0.09%	0.15%
0.23%	0.34%		0.27%	0.15%	0.27%
0.30%	0.38%		0.23%	0.14%	0.23%
0.29%	0.37%		0.20%	0.13%	0.20%
0.27%	0.37%		0.19%	0.16%	0.19%
0.25%	0.36%		0.19%	0.16%	0.19%
0.23%	0.35%		0.19%	0.14%	0.19%
0.23%	0.35%		0.17%	0.14%	0.17%
0.21%	0.34%		0.17%	0.13%	0.17%
0.22%	0.34%		0.16%	0.13%	0.16%
0.21%	0.37%		0.14%	0.12%	0.14%
0.20%	0.36%		0.16%	0.11%	0.16%
0.19%	0.35%		0.15%	0.11%	0.14%
0.22%	0.41%		0.21%	0.14%	0.21%
0.24%	0.40%		0.20%	0.16%	0.20%
0.22%	0.39%		0.18%	0.14%	0.18%
0.23%	0.38%		0.19%	0.13%	0.19%
0.30%	0.38%		0.17%	0.14%	0.17%
0.46%	0.44%		0.31%	0.17%	0.32%
0.57%	0.46%		0.28%	0.27%	0.28%

0.50%	0.48%		0.26%	0.25%	0.26%
0.45%	0.46%		0.23%	0.22%	0.23%
0.39%	0.45%		0.23%	0.20%	0.24%
0.35%	0.44%		0.21%	0.19%	0.21%
0.31%	0.43%		0.18%	0.18%	0.18%
0.30%	0.41%		0.16%	0.16%	0.16%
0.31%	0.40%		0.26%	0.16%	0.26%
0.29%	0.49%		0.26%	0.15%	0.26%
0.28%	0.47%		0.27%	0.15%	0.27%
0.26%	0.45%		0.24%	0.15%	0.24%
0.24%	0.44%		0.21%	0.14%	0.21%
0.23%	0.45%		0.21%	0.13%	0.21%
0.22%	0.44%		0.18%	0.12%	0.18%
0.20%	0.43%		0.17%	0.12%	0.17%
0.19%	0.41%		0.15%	0.11%	0.16%
0.20%	0.40%		0.20%	0.10%	0.21%
0.27%	0.41%		0.24%	0.13%	0.24%
0.26%	0.39%		0.22%	0.14%	0.23%
0.35%	0.39%		0.20%	0.14%	0.21%
0.32%	0.38%		0.20%	0.15%	0.21%
0.29%	0.37%		0.19%	0.14%	0.20%
0.27%	0.38%		0.23%	0.13%	0.24%
0.27%	0.38%		0.21%	0.12%	0.21%
0.37%	0.43%		0.19%	0.13%	0.20%
0.33%	0.41%		0.19%	0.13%	0.20%
0.32%	0.40%		0.19%	0.13%	0.19%
0.31%	0.45%		0.19%	0.13%	0.19%
0.35%	0.45%		0.32%	0.24%	0.32%
0.32%	0.44%		0.28%	0.22%	0.28%
0.34%	0.43%		0.35%	0.22%	0.36%
0.39%	0.43%		0.31%	0.20%	0.31%
0.38%	0.42%		0.27%	0.18%	0.27%
0.40%	0.41%		0.24%	0.17%	0.24%
0.45%	0.57%		0.21%	0.16%	0.21%
0.43%	0.56%		0.19%	0.14%	0.19%
0.38%	0.54%		0.22%	0.15%	0.22%
0.35%	0.61%		0.20%	0.14%	0.20%
0.32%	0.59%		0.18%	0.13%	0.18%
0.37%	0.57%		0.19%	0.12%	0.19%
0.33%	0.55%		0.17%	0.11%	0.17%
0.31%	0.53%		0.15%	0.12%	0.15%
0.30%	0.50%		0.14%	0.12%	0.14%
0.28%	0.49%		0.13%	0.13%	0.13%
0.33%	0.47%		0.12%	0.13%	0.12%
0.32%	0.49%		0.12%	0.13%	0.12%
0.29%	0.48%		0.14%	0.15%	0.14%
0.26%	0.46%		0.13%	0.14%	0.12%

0.26%	0.45%		0.12%	0.13%	0.11%
0.23%	0.43%		0.16%	0.13%	0.16%
0.22%	0.42%		0.15%	0.12%	0.15%
0.21%	0.47%		0.15%	0.12%	0.14%
0.27%	0.47%		0.25%	0.14%	0.25%
0.25%	0.45%		0.22%	0.13%	0.22%
0.23%	0.54%		0.20%	0.12%	0.20%
0.24%	0.52%		0.18%	0.12%	0.18%
0.24%	0.49%		0.16%	0.11%	0.16%
0.26%	0.50%		0.20%	0.10%	0.20%
0.26%	0.49%		0.17%	0.10%	0.17%
0.24%	0.48%		0.16%	0.09%	0.16%
0.54%	0.47%		0.15%	0.09%	0.15%
0.56%	0.45%		0.16%	0.11%	0.16%
0.61%	0.44%		0.14%	0.10%	0.14%
0.56%	0.42%		0.13%	0.13%	0.13%
0.48%	0.48%		0.13%	0.12%	0.13%
0.41%	0.46%		0.14%	0.15%	0.14%
0.37%	0.48%		0.14%	0.17%	0.14%
0.32%	0.46%		0.17%	0.17%	0.17%
0.29%	0.45%		0.17%	0.19%	0.17%
0.27%	0.45%		0.15%	0.17%	0.15%
0.27%	0.43%		0.19%	0.18%	0.19%
0.24%	0.42%		0.19%	0.18%	0.19%
0.27%	0.41%		0.18%	0.18%	0.18%
0.25%	0.42%		0.18%	0.19%	0.18%
0.32%	0.41%		0.16%	0.19%	0.16%
0.30%	0.40%		0.20%	0.18%	0.20%
0.44%	0.39%		0.23%	0.22%	0.23%
0.39%	0.43%		0.32%	0.37%	0.32%
0.41%	0.41%		0.29%	0.34%	0.29%
0.36%	0.40%		0.25%	0.30%	0.26%
0.41%	0.40%		0.24%	0.29%	0.24%
0.41%	0.39%		0.40%	0.34%	0.40%
0.41%	0.39%		0.35%	0.32%	0.35%
0.38%	0.38%		0.30%	0.29%	0.30%
0.48%	0.37%		0.27%	0.29%	0.27%
0.42%	0.36%		0.23%	0.26%	0.23%
0.44%	0.36%		0.22%	0.24%	0.22%
0.38%	0.37%		0.21%	0.22%	0.21%
0.34%	0.35%		0.19%	0.21%	0.19%
0.32%	0.35%		0.18%	0.19%	0.19%
0.36%	0.44%		0.83%	0.25%	0.84%
0.32%	0.43%		0.86%	0.27%	0.87%
0.36%	0.41%		0.74%	0.24%	0.75%
0.32%	0.40%		0.63%	0.33%	0.64%
0.50%	0.40%		0.53%	0.30%	0.54%

0.43%	0.42%		0.49%	0.32%	0.50%
0.41%	0.41%		0.42%	0.28%	0.42%
0.37%	0.40%		0.36%	0.26%	0.36%
0.33%	0.38%		0.32%	0.24%	0.32%
0.29%	0.37%		0.28%	0.21%	0.28%
0.30%	0.36%		0.27%	0.20%	0.28%
0.27%	0.35%		0.25%	0.19%	0.25%
0.25%	0.34%		0.22%	0.17%	0.22%
0.23%	0.34%		0.20%	0.16%	0.20%
0.21%	0.34%		0.18%	0.14%	0.18%
0.20%	0.34%		0.20%	0.15%	0.20%
0.19%	0.33%		0.20%	0.15%	0.20%
0.19%	0.33%		0.17%	0.14%	0.18%
0.19%	0.32%		0.18%	0.16%	0.18%
0.19%	0.33%		0.17%	0.17%	0.17%
0.22%	0.33%		0.15%	0.15%	0.15%
0.21%	0.32%		0.22%	0.19%	0.22%
0.20%	0.32%		0.19%	0.17%	0.19%
0.22%	0.33%		0.17%	0.16%	0.17%
0.21%	0.32%		0.17%	0.14%	0.17%
0.21%	0.32%		0.15%	0.13%	0.15%
0.20%	0.31%		0.14%	0.17%	0.14%
0.19%	0.36%		0.21%	0.24%	0.20%
0.19%	0.35%		0.18%	0.22%	0.18%
0.18%	0.34%		0.16%	0.20%	0.16%
0.19%	0.34%		0.16%	0.20%	0.16%
0.18%	0.33%		0.24%	0.22%	0.24%
0.17%	0.33%		0.21%	0.21%	0.21%
0.17%	0.33%		0.19%	0.19%	0.19%
0.17%	0.33%		0.31%	0.26%	0.31%
0.17%	0.32%		0.32%	0.24%	0.32%
0.17%	0.31%		0.28%	0.24%	0.28%
0.17%	0.31%		0.27%	0.22%	0.27%
0.17%	0.30%		0.24%	0.19%	0.24%
0.17%	0.30%		0.22%	0.19%	0.22%
0.18%	0.33%		0.24%	0.18%	0.24%
0.18%	0.32%		0.21%	0.16%	0.21%
0.18%	0.32%		0.18%	0.15%	0.19%
0.17%	0.31%		0.18%	0.15%	0.18%
0.17%	0.33%		0.20%	0.14%	0.20%
0.17%	0.33%		0.19%	0.13%	0.19%
0.18%	0.32%		0.17%	0.12%	0.17%
0.17%	0.33%		0.16%	0.11%	0.16%
0.21%	0.34%		0.15%	0.10%	0.15%
0.19%	0.33%		0.16%	0.10%	0.17%
0.23%	0.32%		0.28%	0.14%	0.28%
0.21%	0.33%		0.26%	0.17%	0.26%

0.20%	0.32%		0.22%	0.17%	0.23%
0.19%	0.32%		0.21%	0.16%	0.21%
0.19%	0.31%		0.19%	0.17%	0.19%
0.19%	0.31%		0.17%	0.16%	0.17%
0.19%	0.32%		0.16%	0.14%	0.16%
0.19%	0.33%		0.15%	0.18%	0.15%
0.18%	0.32%		0.15%	0.17%	0.15%
0.19%	0.31%		0.14%	0.15%	0.14%
0.26%	0.33%		0.12%	0.14%	0.12%
0.24%	0.34%		0.12%	0.13%	0.12%
0.27%	0.33%		0.11%	0.13%	0.11%
0.25%	0.33%		0.10%	0.12%	0.10%
0.23%	0.38%		0.10%	0.15%	0.10%
0.22%	0.37%		0.09%	0.14%	0.09%
0.22%	0.36%		0.10%	0.13%	0.10%
0.22%	0.36%		0.10%	0.12%	0.10%
0.21%	0.35%		0.10%	0.13%	0.09%
0.20%	0.34%		0.09%	0.12%	0.09%
0.23%	0.33%		0.10%	0.13%	0.10%
0.35%	0.33%		0.10%	0.12%	0.09%
0.31%	0.32%		0.09%	0.11%	0.09%
0.31%	0.32%		0.09%	0.14%	0.09%
0.30%	0.34%		0.09%	0.13%	0.09%
0.30%	0.34%		0.09%	0.12%	0.09%
0.27%	0.33%		0.10%	0.15%	0.10%
0.28%	0.33%		0.13%	0.16%	0.13%
0.50%	0.32%		0.12%	0.14%	0.12%
0.44%	0.33%		0.11%	0.15%	0.11%
0.40%	0.32%		0.12%	0.13%	0.12%
0.37%	0.32%		0.12%	0.13%	0.11%
0.39%	0.31%		0.12%	0.12%	0.12%
0.34%	0.31%		0.13%	0.12%	0.12%
0.31%	0.31%		0.12%	0.11%	0.12%
0.28%	0.30%		0.14%	0.11%	0.13%
0.41%	0.33%		0.12%	0.10%	0.12%
0.37%	0.38%		0.12%	0.14%	0.12%
0.35%	0.39%		0.12%	0.13%	0.12%
0.33%	0.40%		0.11%	0.12%	0.11%
0.30%	0.39%		0.11%	0.12%	0.11%
0.27%	0.38%		0.11%	0.12%	0.11%
0.24%	0.37%		0.11%	0.11%	0.11%
0.23%	0.36%		0.11%	0.10%	0.11%
0.21%	0.35%		0.10%	0.10%	0.10%
0.20%	0.34%		0.11%	0.12%	0.11%
0.19%	0.34%		0.11%	0.11%	0.10%
0.22%	0.34%		0.11%	0.11%	0.11%
0.21%	0.35%		0.11%	0.14%	0.10%

0.20%	0.36%		0.11%	0.13%	0.11%
0.20%	0.38%		0.10%	0.14%	0.10%
0.23%	0.37%		0.10%	0.14%	0.09%
0.25%	0.37%		0.09%	0.13%	0.09%
0.23%	0.36%		0.09%	0.12%	0.09%
0.21%	0.40%		0.09%	0.12%	0.08%
0.20%	0.43%		0.12%	0.16%	0.12%
0.19%	0.41%		0.11%	0.15%	0.11%
0.19%	0.40%		0.13%	0.14%	0.13%
0.19%	0.39%		0.12%	0.14%	0.12%
0.20%	0.41%		0.17%	0.13%	0.17%
0.19%	0.40%		0.16%	0.12%	0.16%
0.19%	0.39%		0.18%	0.11%	0.18%
0.19%	0.40%		0.16%	0.11%	0.16%
0.19%	0.39%		0.18%	0.11%	0.18%
0.21%	0.38%		0.19%	0.11%	0.19%
0.21%	0.39%		0.20%	0.11%	0.20%
0.21%	0.38%		0.19%	0.11%	0.19%
0.21%	0.37%		0.23%	0.10%	0.23%
0.26%	0.36%		0.26%	0.10%	0.26%
0.24%	0.35%		0.24%	0.11%	0.25%
0.22%	0.35%		0.24%	0.10%	0.24%
0.23%	0.34%		0.23%	0.14%	0.23%
0.60%	0.35%		0.20%	0.17%	0.20%
0.61%	0.35%		0.17%	0.18%	0.18%
0.52%	0.36%		0.21%	0.17%	0.21%
0.47%	0.41%		0.20%	0.19%	0.20%
0.41%	0.48%		0.18%	0.18%	0.18%
0.35%	0.47%		0.17%	0.16%	0.17%
0.31%	0.49%		0.16%	0.15%	0.16%
0.31%	0.48%		0.15%	0.18%	0.15%
0.29%	0.48%		0.44%	0.16%	0.44%
0.27%	0.49%		0.40%	0.21%	0.40%
0.25%	0.48%		0.39%	0.19%	0.40%
0.40%	0.48%		0.36%	0.17%	0.37%
0.37%	0.47%		0.33%	0.16%	0.34%
0.33%	0.45%		0.30%	0.18%	0.30%
0.39%	0.44%		0.28%	0.18%	0.28%
0.46%	0.46%		0.25%	0.17%	0.26%
0.52%	0.45%		0.23%	0.22%	0.23%
0.50%	0.44%		0.22%	0.23%	0.22%
0.45%	0.58%		0.21%	0.22%	0.22%
0.39%	0.55%		0.21%	0.20%	0.21%
0.61%	0.53%		0.19%	0.18%	0.19%
0.52%	0.51%		0.19%	0.20%	0.19%
0.45%	0.79%		0.20%	0.18%	0.20%
0.52%	0.74%		0.18%	0.24%	0.18%

0.54%	0.70%		0.19%	0.22%	0.19%
0.50%	0.67%		0.21%	0.30%	0.22%
0.65%	0.64%		0.20%	0.32%	0.20%
0.62%	0.61%		0.27%	0.29%	0.27%
0.53%	0.58%		0.26%	0.31%	0.26%
0.46%	0.55%		0.24%	0.29%	0.24%
0.40%	0.53%		0.21%	0.31%	0.21%
0.36%	0.51%		0.20%	0.31%	0.20%
0.34%	0.48%		0.21%	0.44%	0.21%
0.30%	0.46%		0.23%	0.46%	0.24%
0.34%	0.45%		0.21%	0.43%	0.21%
0.35%	0.44%		0.29%	0.39%	0.29%
0.53%	0.46%		0.25%	0.42%	0.25%
0.47%	0.46%	2.69%	0.22%	0.50%	0.23%
0.49%	0.65%	2.38%	0.33%	0.45%	0.34%
0.42%	0.62%	2.44%	0.36%	0.40%	0.37%
0.37%	0.59%	2.13%	0.36%	0.38%	0.36%
0.55%	0.56%	1.85%	0.31%	0.36%	0.31%
0.51%	0.54%	1.61%	0.28%	0.41%	0.29%
0.45%	0.52%	1.41%	0.25%	0.39%	0.26%
0.39%	0.49%	1.25%	0.29%	0.37%	0.30%
0.35%	0.48%	1.10%	0.36%	0.50%	0.37%
0.31%	0.46%	0.99%	0.31%	0.44%	0.32%
0.27%	0.46%	0.88%	0.32%	0.44%	0.33%
0.25%	0.45%	0.88%	0.28%	0.39%	0.28%
0.23%	0.45%	0.81%	0.25%	0.40%	0.25%
0.23%	0.43%	0.74%	0.23%	0.36%	0.23%
0.21%	0.42%	0.67%	0.21%	0.46%	0.21%
0.23%	0.41%	0.69%	0.25%	0.41%	0.25%
0.22%	0.40%	0.63%	0.22%	0.48%	0.23%
0.29%	0.39%	0.62%	0.28%	0.50%	0.29%
0.33%	0.38%	0.59%	0.35%	0.69%	0.35%
0.32%	0.38%	0.58%	0.30%	0.61%	0.31%
0.31%	0.37%	0.53%	0.45%	0.76%	0.46%
0.28%	0.36%	0.49%	0.45%	0.68%	0.45%
0.26%	0.35%	0.46%	0.40%	0.60%	0.41%
0.29%	0.35%	0.55%	0.41%	0.53%	0.42%
0.27%	0.34%	0.54%	0.38%	0.49%	0.38%
0.25%	0.33%	0.50%	0.33%	0.47%	0.34%
0.23%	0.33%	0.47%	0.29%	0.43%	0.29%
0.21%	0.35%	0.49%	0.31%	0.44%	0.31%
0.23%	0.35%	0.52%	0.29%	0.48%	0.29%
0.23%	0.34%	0.49%	0.25%	0.42%	0.25%
0.28%	0.33%	0.48%	0.22%	0.44%	0.22%
0.25%	0.32%	0.45%	0.19%	0.39%	0.19%
0.31%	0.32%	0.43%	0.18%	0.35%	0.18%
0.30%	0.32%	0.42%	0.18%	0.31%	0.19%

0.27%	0.31%	0.40%	0.16%	0.28%	0.16%
0.25%	0.30%	0.38%	0.17%	0.28%	0.17%
0.23%	0.30%	0.37%	0.15%	0.25%	0.15%
0.22%	0.43%	0.35%	0.14%	0.23%	0.14%
0.21%	0.42%	0.34%	0.13%	0.20%	0.13%
0.19%	0.41%	0.34%	0.13%	0.20%	0.13%
0.23%	0.41%	0.33%	0.12%	0.18%	0.12%
0.22%	0.40%	0.34%	0.11%	0.16%	0.11%
0.34%	0.40%	0.34%	0.12%	0.15%	0.12%
0.33%	0.40%	0.34%	0.11%	0.15%	0.11%
0.31%	0.40%	0.33%	0.11%	0.13%	0.10%
0.28%	0.38%	0.33%	0.10%	0.14%	0.10%
0.39%	0.44%	0.40%	0.11%	0.14%	0.11%
0.38%	0.44%	0.38%	0.11%	0.13%	0.11%
0.36%	0.44%	0.37%	0.12%	0.12%	0.11%
0.32%	0.43%	0.36%	0.11%	0.11%	0.11%
0.28%	0.42%	0.34%	0.11%	0.10%	0.11%
0.29%	0.42%	0.34%	0.11%	0.10%	0.11%
0.40%	0.45%	0.34%	0.11%	0.10%	0.11%
0.35%	0.47%	0.33%	0.10%	0.12%	0.10%
0.53%	0.55%	0.41%	0.11%	0.11%	0.11%
0.48%	0.57%	0.40%	0.11%	0.10%	0.10%
0.43%	0.54%	0.42%	0.10%	0.11%	0.10%
0.42%	0.52%	0.46%	0.10%	0.15%	0.10%
0.49%	0.50%	0.50%	0.11%	0.14%	0.10%
0.54%	0.53%	0.47%	0.10%	0.12%	0.10%
0.53%	0.55%	0.45%	0.10%	0.12%	0.10%
0.45%	0.52%	0.43%	0.09%	0.11%	0.09%
0.40%	0.50%	0.41%	0.09%	0.13%	0.09%
0.36%	0.49%	0.39%	0.09%	0.12%	0.08%
0.33%	0.52%	0.38%	0.10%	0.11%	0.10%
0.30%	0.55%	0.45%	0.09%	0.10%	0.09%
0.30%	0.52%	0.47%	0.09%	0.12%	0.09%
0.44%	0.58%	0.45%	0.09%	0.11%	0.09%
0.43%	0.55%	0.42%	0.09%	0.11%	0.09%
0.38%	0.57%	0.40%	0.09%	0.13%	0.09%
0.34%	0.55%	0.42%	0.09%	0.12%	0.09%
0.30%	0.55%	0.39%	0.09%	0.11%	0.08%
0.28%	0.53%	0.38%	0.09%	0.10%	0.08%
0.25%	0.58%	0.36%	0.09%	0.11%	0.09%
0.23%	0.65%	0.36%	0.09%	0.12%	0.08%
0.21%	0.70%	0.35%	0.10%	0.12%	0.10%
0.20%	0.69%	0.34%	0.10%	0.11%	0.10%
0.19%	0.65%	0.33%	0.11%	0.14%	0.10%
0.18%	0.70%	0.33%	0.12%	0.15%	0.11%
0.20%	0.78%	0.32%	0.11%	0.13%	0.11%
0.19%	0.73%	0.32%	0.11%	0.13%	0.11%

0.18%	0.69%	0.31%	0.11%	0.16%	0.10%
0.17%	0.66%	0.33%	0.13%	0.15%	0.13%
0.17%	0.63%	0.32%	0.12%	0.13%	0.12%
0.17%	0.67%	0.31%	0.17%	0.18%	0.17%
0.17%	0.63%	0.31%	0.18%	0.20%	0.18%
0.19%	0.61%	0.31%	0.16%	0.18%	0.16%
0.18%	0.59%	0.31%	0.16%	0.19%	0.16%
0.17%	0.56%	0.33%	0.15%	0.17%	0.15%
0.29%	0.63%	0.32%	0.24%	0.16%	0.24%
0.27%	0.60%	0.32%	0.22%	0.20%	0.22%
0.25%	0.58%	0.32%	0.19%	0.18%	0.19%
0.24%	0.57%	0.38%	0.29%	0.33%	0.29%
0.22%	0.56%	0.37%	0.67%	0.47%	0.68%
0.21%	0.53%	0.38%	0.68%	0.42%	0.69%
0.19%	0.52%	0.38%	0.57%	0.38%	0.58%
0.20%	0.54%	0.37%	0.62%	0.33%	0.63%
0.44%	0.60%	0.36%	0.73%	0.50%	0.75%
0.38%	0.60%	0.38%	0.66%	0.44%	0.68%
0.35%	0.57%	0.37%	0.63%	0.39%	0.64%
0.31%	0.69%	0.37%	0.54%	0.35%	0.56%
0.29%	0.69%	0.39%	0.46%	0.33%	0.48%
0.29%	0.66%	0.42%	0.44%	0.30%	0.45%
0.26%	0.62%	0.43%	0.38%	0.27%	0.39%
0.24%	0.59%	0.48%	0.33%	0.24%	0.34%
0.22%	0.57%	0.45%	0.30%	0.23%	0.30%
0.24%	0.55%	0.43%	0.28%	0.22%	0.29%
0.29%	0.53%	0.40%	0.25%	0.22%	0.25%
0.27%	0.51%	0.42%	0.24%	0.23%	0.25%
0.26%	0.49%	0.40%	0.22%	0.21%	0.22%
0.24%	0.52%	0.38%	0.22%	0.19%	0.23%
0.25%	0.51%	0.36%	0.20%	0.18%	0.20%
0.28%	0.55%	0.36%	0.27%	0.21%	0.28%
0.30%	0.53%	0.38%	0.29%	0.19%	0.29%
0.28%	0.51%	0.37%	0.30%	0.22%	0.30%
0.25%	0.51%	0.36%	0.30%	0.20%	0.30%
0.24%	0.50%	0.35%	0.33%	0.18%	0.34%
0.25%	0.48%	0.34%	0.29%	0.17%	0.30%
0.23%	0.46%	0.33%	0.26%	0.17%	0.26%
0.23%	0.45%	0.35%	0.26%	0.16%	0.26%
0.23%	0.46%	0.35%	0.23%	0.14%	0.23%
0.25%	0.44%	0.34%	0.21%	0.13%	0.21%
0.24%	0.45%	0.33%	0.19%	0.12%	0.19%
0.23%	0.43%	0.32%	0.17%	0.12%	0.17%
0.21%	0.41%	0.31%	0.16%	0.11%	0.16%
0.20%	0.40%	0.32%	0.15%	0.10%	0.15%
0.20%	0.39%	0.32%	0.14%	0.10%	0.14%
0.18%	0.38%	0.31%	0.18%	0.09%	0.18%

0.22%	0.39%	0.34%	0.24%	0.09%	0.24%
0.32%	0.39%	0.34%	0.33%	0.09%	0.34%
0.29%	0.39%	0.34%	0.29%	0.09%	0.29%
0.26%	0.39%	0.33%	0.25%	0.09%	0.25%
0.24%	0.38%	0.32%	0.23%	0.10%	0.24%
0.22%	0.36%	0.32%	0.22%	0.09%	0.22%
0.21%	0.35%	0.31%	0.20%	0.09%	0.20%
0.20%	0.34%	0.30%	0.18%	0.08%	0.18%
0.19%	0.34%	0.30%	0.22%	0.08%	0.22%
0.20%	0.34%	0.31%	0.21%	0.09%	0.21%
0.19%	0.33%	0.30%	0.18%	0.09%	0.18%
0.18%	0.33%	0.30%	0.16%	0.11%	0.16%
0.17%	0.34%	0.30%	0.15%	0.10%	0.15%
0.17%	0.34%	0.31%	0.15%	0.09%	0.14%
0.17%	0.33%	0.31%	0.13%	0.12%	0.13%
0.18%	0.35%	0.30%	0.12%	0.11%	0.12%
0.18%	0.34%	0.32%	0.14%	0.11%	0.14%
0.17%	0.34%	0.31%	0.13%	0.11%	0.12%
0.16%	0.33%	0.31%	0.13%	0.13%	0.13%
0.16%	0.33%	0.30%	0.12%	0.15%	0.12%
0.16%	0.34%	0.30%	0.11%	0.23%	0.11%
0.16%	0.34%	0.29%	0.11%	0.21%	0.11%
0.19%	0.34%	0.33%	0.13%	0.20%	0.13%
0.21%	0.35%	0.35%	0.13%	0.21%	0.13%
0.23%	0.35%	0.34%	0.13%	0.19%	0.13%
0.23%	0.34%	0.33%	0.14%	0.18%	0.14%
0.25%	0.34%	0.33%	0.13%	0.17%	0.13%
0.27%	0.35%	0.33%	0.13%	0.15%	0.12%
0.28%	0.35%	0.33%	0.14%	0.14%	0.13%
0.25%	0.35%	0.32%	0.14%	0.14%	0.14%
0.29%	0.34%	0.31%	0.13%	0.13%	0.13%
0.32%	0.36%	0.31%	0.12%	0.14%	0.12%
0.29%	0.35%	0.30%	0.11%	0.13%	0.11%
0.26%	0.34%	0.30%	0.11%	0.13%	0.11%
0.27%	0.33%	0.33%	0.11%	0.18%	0.10%
0.24%	0.33%	0.33%	0.11%	0.18%	0.11%
0.25%	0.32%	0.32%	0.11%	0.17%	0.11%
0.45%	0.44%	0.35%	0.11%	0.21%	0.10%
0.40%	0.44%	0.37%	0.11%	0.19%	0.10%
0.36%	0.43%	0.44%	0.10%	0.18%	0.10%
0.36%	0.42%	0.41%	0.11%	0.17%	0.11%
0.36%	0.41%	0.39%	0.14%	0.20%	0.13%
0.32%	0.42%	0.37%	0.13%	0.18%	0.13%
0.29%	0.42%	0.36%	0.12%	0.17%	0.12%
0.28%	0.41%	0.40%	0.11%	0.15%	0.11%
0.26%	0.39%	0.40%	0.11%	0.18%	0.11%
0.23%	0.38%	0.38%	0.11%	0.18%	0.10%

0.21%	0.38%	0.37%	0.15%	0.19%	0.15%
0.22%	0.38%	0.35%	0.15%	0.18%	0.15%
0.26%	0.37%	0.38%	0.21%	0.16%	0.21%
0.24%	0.37%	0.36%	0.19%	0.15%	0.19%
0.23%	0.36%	0.36%	0.17%	0.14%	0.17%
0.29%	0.38%	0.36%	0.20%	0.15%	0.20%
0.27%	0.41%	0.35%	0.18%	0.14%	0.18%
0.34%	0.40%	0.37%	0.20%	0.19%	0.20%
0.64%	0.40%	0.36%	0.18%	0.18%	0.18%
0.54%	0.39%	0.38%	0.16%	0.16%	0.16%
0.74%	0.44%	0.50%	0.14%	0.20%	0.14%
0.67%	0.44%	0.47%	0.14%	0.18%	0.14%
1.01%	0.42%	0.48%	0.13%	0.21%	0.13%
0.85%	0.41%	0.46%	0.12%	0.18%	0.12%
0.71%	0.48%	0.44%	0.12%	0.17%	0.12%
0.75%	0.47%	0.49%	0.12%	0.19%	0.12%
0.64%	0.46%	0.47%	0.11%	0.19%	0.11%
0.74%	0.49%	0.46%	0.11%	0.17%	0.11%
0.63%	0.47%	0.43%	0.12%	0.18%	0.11%
0.55%	0.45%	0.41%	0.11%	0.17%	0.10%
0.47%	0.43%	0.40%	0.10%	0.15%	0.10%
0.47%	0.42%	0.45%	0.10%	0.15%	0.09%
0.54%	0.40%	0.43%	0.09%	0.15%	0.09%
0.46%	0.41%	0.41%	0.09%	0.14%	0.09%
0.42%	0.40%	0.40%	0.09%	0.13%	0.08%
0.37%	0.39%	0.38%	0.09%	0.13%	0.08%
0.43%	0.38%	0.37%	0.09%	0.13%	0.08%
0.40%	0.44%	0.36%	0.09%	0.13%	0.09%
0.58%	0.44%	0.38%	0.09%	0.16%	0.08%
0.55%	0.45%	0.39%	0.12%	0.16%	0.12%
0.51%	0.48%	0.43%	0.13%	0.17%	0.13%
0.45%	0.46%	0.43%	0.13%	0.16%	0.13%
0.55%	0.51%	0.41%	0.12%	0.15%	0.12%
0.51%	0.49%	0.39%	0.12%	0.14%	0.11%
0.48%	0.48%	0.38%	0.11%	0.13%	0.11%
0.43%	0.46%	0.37%	0.11%	0.12%	0.11%
0.38%	0.49%	0.36%	0.11%	0.11%	0.11%
0.36%	0.47%	0.35%	0.11%	0.10%	0.10%
0.38%	0.45%	0.34%	0.17%	0.10%	0.16%
0.57%	0.46%	0.34%	0.15%	0.10%	0.15%
0.49%	0.44%	0.33%	0.26%	0.11%	0.26%
0.44%	0.44%	0.32%	0.29%	0.13%	0.29%
0.39%	0.43%	0.36%	0.25%	0.13%	0.25%
0.38%	0.41%	0.36%	0.22%	0.12%	0.22%
0.34%	0.40%	0.35%	0.21%	0.11%	0.21%
0.30%	0.38%	0.34%	0.25%	0.11%	0.25%
0.27%	0.37%	0.33%	0.26%	0.11%	0.26%

0.27%	0.38%	0.32%	0.23%	0.10%	0.23%
0.26%	0.37%	0.32%	0.21%	0.11%	0.21%
0.27%	0.36%	0.42%	0.19%	0.12%	0.19%
0.25%	0.36%	0.40%	0.17%	0.11%	0.17%
0.28%	0.35%	0.38%	0.16%	0.11%	0.16%
0.25%	0.34%	0.37%	0.15%	0.11%	0.15%
0.23%	0.34%	0.35%	0.14%	0.14%	0.14%
0.31%	0.43%	0.39%	0.22%	0.25%	0.22%
0.27%	0.43%	0.37%	0.42%	0.34%	0.42%
0.25%	0.42%	0.38%	0.52%	0.31%	0.53%
0.39%	0.41%	0.40%	0.45%	0.29%	0.46%
0.34%	0.40%	0.40%	0.38%	0.29%	0.39%
0.34%	0.39%	0.39%	0.33%	0.31%	0.33%
0.30%	0.37%	0.37%	0.33%	0.29%	0.34%

0.30% 0.42% 0.45% 0.28% 0.30% 0.28%

0.30% 0.37% 0.37% 0.33% 0.29% 0.34%

2.131443	1.519753	2.114701	3.029283	1.51554	2.676725
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10.66% 5.53% 9.54%

12.67% 5.38% 11.31%

11.66% 5.46% 10.43%

// Conditional Variance

Input Date: (ROE model)
User: (CPU title)

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jan-26	0.0000%		0.3100%												
Feb-26	-3.8500%		0.2800%					-4.1300%							
Mar-26	-5.7500%		0.3200%					-6.0700%							
Apr-26	2.5300%		0.3000%					2.2300%							
May-26	1.7900%		0.2800%					1.5100%							
Jun-26	4.5700%		0.3300%					4.2400%							
Jul-26	4.7900%		0.3100%					4.4800%							
Aug-26	2.4800%		0.3100%					2.1700%							
Sep-26	2.5200%		0.3000%					2.2200%							
Oct-26	-2.8400%		0.3000%					-3.1400%							
Nov-26	3.4700%		0.3100%					3.1600%							
Dec-26	1.9600%		0.3000%					1.6600%			11.61%	3.60%			8.01%
Jan-27	-1.9300%		0.3000%					-2.2300%			9.45%	3.60%			5.85%
Feb-27	5.3700%		0.2700%					5.1000%			19.95%	3.24%			16.71%
Mar-27	0.8700%		0.2900%					0.5800%			28.37%	3.48%			24.89%
Apr-27	2.0100%		0.2700%					1.7400%			27.72%	3.24%			24.48%
May-27	6.0700%		0.2800%					5.7900%			33.09%	3.36%			29.73%
Jun-27	-0.6700%		0.2700%					-0.9400%			26.42%	3.24%			23.18%
Jul-27	6.7000%		0.2700%					6.4300%			28.73%	3.24%			25.49%
Aug-27	5.1500%		0.2900%					4.8600%			32.08%	3.48%			28.60%
Sep-27	4.5000%		0.2700%					4.2300%			34.63%	3.24%			31.39%
Oct-27	-5.0200%		0.2800%					-5.3000%			31.61%	3.36%			28.25%
Nov-27	7.2100%		0.2700%					6.9400%			36.37%	3.24%			33.13%
Dec-27	2.7900%		0.2700%					2.5200%			37.48%	3.24%			34.24%
Jan-28	-0.4000%	3.7500%	0.2700%	0.3717%	0.3842%	0.3779%	0.4042%	-0.6700%	-0.7779%	3.3458%	39.62%				36.38%
Feb-28	-1.2500%	-0.8000%	0.2500%	0.3717%	0.3842%	0.3779%	0.4042%	-1.5000%	-1.6279%	-1.2042%	30.85%				3.00%
Mar-28	11.0100%	7.2300%	0.2700%	0.3717%	0.3825%	0.3771%	0.4017%	10.7400%	10.6329%	6.8283%	44.01%				40.77%
Apr-28	3.4500%	9.8600%	0.2600%	0.3717%	0.3833%	0.3775%	0.4017%	3.1900%	3.0725%	9.4583%	46.04%				42.92%
May-28	1.9700%	2.0800%	0.2700%	0.3742%	0.3867%	0.3804%	0.4058%	1.7000%	1.5896%	1.6742%	40.39%				37.15%
Jun-28	-3.8500%	-4.0100%	0.2700%	0.3808%	0.3958%	0.3883%	0.4158%	-4.1200%	-4.2383%	-4.4258%	35.90%				32.66%
Jul-28	1.4100%	-0.7600%	0.2700%	0.3842%	0.3992%	0.3917%	0.4200%	1.1400%	1.0183%	-1.1800%	29.16%				25.92%
Aug-28	8.0300%	6.8200%	0.2900%	0.3867%	0.4017%	0.3942%	0.4233%	7.7400%	7.6358%	6.3967%	32.70%				29.22%
Sep-28	2.5900%	2.8700%	0.2700%	0.3842%	0.3992%	0.3917%	0.4208%	2.3200%	2.1983%	2.4492%	30.27%				27.03%
Oct-28	1.6800%	-0.9200%	0.3000%	0.3842%	0.3983%	0.3913%	0.4158%	1.3800%	1.2888%	-1.3358%	39.46%				35.86%
Nov-28	12.9200%	21.4700%	0.2700%	0.3817%	0.3933%	0.3875%	0.4150%	12.6500%	12.5325%	21.0550%	46.89%				43.65%
Dec-28	0.4900%	1.0000%	0.2900%	0.3842%	0.3975%	0.3908%	0.4208%	0.2000%	0.0992%	0.5792%	43.61%	4.69%			40.13%
Jan-29	5.8300%	13.2500%	0.2900%	0.3850%	0.3992%	0.3921%	0.4208%	5.5400%	5.4379%	12.8292%	52.59%	4.71%			49.11%
Feb-29	-0.1900%	-2.3200%	0.2700%	0.3883%	0.4050%	0.3967%	0.4250%	-0.4600%	-0.5867%	-2.7450%	54.23%	4.76%			50.99%
Mar-29	-0.1200%	-1.1000%	0.2800%	0.3917%	0.4100%	0.4008%	0.4283%	-0.4000%	-0.5208%	-1.5283%	38.76%	4.81%			35.40%
Apr-29	1.7600%	3.4700%	0.3400%	0.3908%	0.4092%	0.4000%	0.4283%	1.4200%	1.3600%	3.0417%	40.89%	4.80%			32.42%
May-29	-3.6200%	4.7000%	0.3000%	0.3917%	0.4092%	0.4004%	0.4283%	-3.9200%	-4.0204%	4.2717%	29.01%	4.81%			25.41%
Jun-29	11.4000%	21.7800%	0.2900%	0.3975%	0.4150%	0.4063%	0.4358%	11.1100%	10.9938%	21.3442%	49.48%	4.88%			44.60%
Jul-29	4.7100%	9.0500%	0.3200%	0.3975%	0.4142%	0.4058%	0.4367%	4.3900%	4.3042%	8.6133%	54.34%	4.87%			49.47%
Aug-29	10.2800%	10.3300%	0.3000%	0.4158%	0.4075%	0.4075%	0.4417%	9.9800%	9.8725%	9.8883%	57.55%	4.89%			52.66%
Sep-29	-4.7600%	0.0400%	0.3200%	0.4000%	0.4175%	0.4088%	0.4483%	-5.0800%	-5.1688%	-0.4083%	46.27%	4.84%			41.36%
Oct-29	-19.7300%	-30.2200%	0.3100%	0.3975%	0.4175%	0.4075%	0.4450%	-20.0400%	-20.1375%	-30.6650%	15.47%	4.89%			10.58%
Nov-29	-12.4600%	-14.2400%	0.2600%	0.3967%	0.4117%	0.4042%	0.4408%	-12.7200%	-12.8642%	-14.6808%	-10.48%	4.85%			-15.33%
Dec-29	2.8200%	6.8000%	0.3100%	0.3892%	0.4033%	0.3963%	0.4358%	2.5100%	2.4238%	6.3642%	-8.41%	4.76%			-13.16%
Jan-30	6.3900%	7.4000%	0.2900%	0.3883%	0.4050%	0.3967%	0.4383%	6.1000%	5.9933%	6.9617%	-7.92%	4.76%			-12.68%
Feb-30	2.5900%	8.8500%	0.2600%	0.3908%	0.4075%	0.3992%	0.4408%	2.3300%	2.1908%	8.4092%	-5.36%	4.79%			-10.15%
Mar-30	8.1200%	8.9100%	0.2900%	0.3850%	0.4000%	0.3925%	0.4317%	7.8300%	7.7275%	8.4783%	2.45%	4.71%			-2.26%
Apr-30	-0.8000%	3.4100%	0.2700%	0.3833%	0.3983%	0.3908%	0.4292%	-1.0700%	-1.1908%	2.9808%	-0.13%	4.69%			-4.82%
May-30	-0.9600%	-2.3600%	0.2700%	0.3833%	0.3975%	0.3904%	0.4200%	-1.2300%	-1.3504%	-2.7800%	2.63%	4.69%			-2.06%
Jun-30	-16.2500%	-19.0300%	0.2900%	0.3808%	0.3967%	0.3888%	0.4175%	-16.5400%	-16.6388%	-19.4475%	-22.85%	4.67%			-27.51%
Jul-30	3.8600%	1.7600%	0.2800%	0.3767%	0.3950%	0.3858%	0.4158%	3.5800%	3.4742%	1.3442%	-23.47%	4.63%			-28.10%
Aug-30	1.4100%	0.7600%	0.2600%	0.3725%	0.3900%	0.3813%	0.4125%	1.1500%	1.0288%	0.3475%	-29.63%	4.58%			-32.75%
Sep-30	-12.8200%	-11.0800%	0.2900%	0.3683%	0.3875%	0.3779%	0.4050%	-13.1100%	-13.1979%	-11.4850%	-35.58%	4.54%			-40.12%
Oct-30	-8.5500%	-8.1800%	0.2700%	0.3683%	0.3892%	0.3788%	0.4067%	-8.8200%	-8.9288%	-8.5867%	-26.61%	4.55%			-31.16%
Nov-30	-0.8900%	-7.3000%	0.2600%	0.3725%	0.3958%	0.3842%	0.4133%	-1.1500%	-1.2742%	-7.7133%	-16.91%	4.61%			-21.52%
Dec-30	-7.0600%	-3.3900%	0.2800%	0.3767%	0.4042%	0.3904%	0.4258%	-7.3400%	-7.4504%	-3.8158%	-24.90%	4.69%			-29.58%
Jan-31	5.0200%	5.4000%	0.2800%	0.3683%	0.3917%	0.3800%	0.4175%	4.7400%	4.6400%	4.9825%	-25.86%	4.56%			-30.42%
Feb-31	11.9300%	15.2400%	0.2600%	0.3692%	0.3917%	0.3804%	0.4175%	11.6700%	11.5496%	14.8225%	-19.11%	4.57%			-23.68%
Mar-31	-6.7500%	-2.3900%	0.2900%	0.3658%	0.3892%	0.3775%	0.4150%	-7.0400%	-7.1275%	-2.8050%	-30.24%	4.48%			-34.77%
Apr-31	-9.3500%	-10.5400%	0.2700%	0.3667%	0.3967%	0.3817%	0.4050%	-9.6200%	-9.7317%	-10.9450%	-36.25%	4.58%			-40.83%
May-31	-12.7900%	-10.2900%	0.2600%	0.3642%	0.3967%	0.3804%	0.4033%	-13.0500%	-13.1704%	-10.6933%	-43.86%	4.57%			-48.43%
Jun-31	14.2100%	13.7300%	0.2800%	0.3633%	0.4008%	0.3821%	0.4058%	13.9300%	13.8279%	13.3242%	-23.45%	4.59%			-26.81%
Jul-31	-7.2200%	-6.2200%	0.2700%	0.3633%	0.4008%	0.3821%	0.4025%	-7.4900%	-7.6021%	-6.6225%	-31.61%	4.59%			-34.85%
Aug-31	1.8200%	2.5600%	0.2700%	0.3667%	0.4042%	0.3854%	0.4008%	1.5500%	1.4346%	2.1592%	-31.34%	4.63%			-35.96%
Sep-31	-29.7300%	-31.4900%	0.2700%	0.3792%	0.4233%	0.4013%	0.4208%	-30.0000%	-30.1313%	-31.9108%	-44.66%	4.82%			-49.47%
Oct-31	8.9600%	9.9000%	0.2900%	0.4158%	0.4642%	0.4400%	0.4617%	8.6700%	8.5200%	9.4383%	-34.06%	5.28%			-39.34%
Nov-31	-7.9800%	-6.1400%	0.3100%	0.4117%	0.4675%	0.4396%	0.4592%	-8.2900%	-8.4196%	-6.5992%	-38.78%	5.28%			-42.50%
Dec-31	-14.0000%	-12.8300%	0.3200%	0.4433%	0.5217%	0.4825%	0.5200%	-14.3200%	-14.4825%	-13.3500%	-43.35%	5.79%			-49.14%
Jan-32	-2.7100%	-2.0000%	0.3200%	0.4333%	0.5067%	0.4700%	0.5142%	-3.0300%	-3.1800%	-2.5142%	-47.52%	5.64%			-53.16%
Feb-32	5.7000%	7.9900%	0.3200%	0.4358%	0.5108%	0.4733%	0.5342%	5.3800%	5.2267%	7.4558%	-50.44%	5.68%			-56.12%
Mar-32	-11.5800%	-10.5800%	0.3100%	0.4150%	0.4875%	0.4513%	0.5050%	-11.8900%	-12.0313%	-11.0850%	-53.01%	5.42%			-58.42%
Apr-32	-19.9700%	-15.3500%	0.3000%	0.4308%	0.5092%	0.4700%	0.5692%	-20.2700%	-20.4400%	-15.9192%	-62.11%	5.64%			-64.15%
May-32	-21.9600%	-28.0600%	0.2800%	0.4467%	0.5317%	0.4892%	0.6133%	-22.2400%	-22.4492%	-28.6733%	-62.87%	5.87%			-68.74%
Jun-32	-0.2200%	0.9000%	0.2800%	0.4508%	0.5500%	0.5004%	0.6308%	-0.5000%	-0.7204%	0.2692%	-67.57%	3.36%	6.01%		-73.57%

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jul-32	38.1500%	33.1800%	0.2800%	0.4383%	0.5425%	0.4904%	0.6067%	37.8700%	37.6596%	32.5733%	-51.70%	3.36%	5.89%	-55.06%	-57.59%
Aug-32	38.6900%	40.3000%	0.2800%	0.4092%	0.4858%	0.4475%	0.5292%	38.4100%	38.2425%	39.7708%	-34.22%	3.36%	5.37%	-37.58%	-39.59%
Sep-32	-3.4600%	-2.7000%	0.2600%	0.3917%	0.4617%	0.4267%	0.4925%	-3.7200%	-3.8867%	-3.1925%	-9.62%	3.12%	5.12%	-12.74%	-14.74%
Oct-32	-13.4900%	-10.4700%	0.2700%	0.3867%	0.4592%	0.4229%	0.4842%	-13.7600%	-13.9129%	-10.9542%	-28.24%	3.24%	5.08%	-31.48%	-33.32%
Nov-32	-4.1700%	-3.5400%	0.2600%	0.3858%	0.4642%	0.4250%	0.4900%	-4.4300%	-4.5950%	-4.0300%	-25.27%	3.12%	5.10%	-28.39%	-30.37%
Dec-32	5.6500%	8.9300%	0.2700%	0.3825%	0.4667%	0.4246%	0.4875%	5.3800%	5.2254%	8.4425%	-8.20%	3.24%	5.10%	-11.44%	-13.29%
Jan-33	0.8700%	-3.1100%	0.2700%	0.3700%	0.4417%	0.4058%	0.4492%	0.6000%	0.4642%	-3.5592%	-4.82%	3.24%	4.87%	-8.06%	-9.69%
Feb-33	-17.7200%	-19.8400%	0.2300%	0.3733%	0.4458%	0.4096%	0.4808%	-17.9500%	-18.1296%	-20.3208%	-25.91%	2.76%	4.92%	-28.67%	-30.82%
Mar-33	3.5300%	-10.8000%	0.2700%	0.3900%	0.4675%	0.4288%	0.5363%	3.2600%	3.1013%	-11.3283%	-13.25%	3.24%	5.15%	-16.49%	-18.39%
Apr-33	42.5600%	26.3500%	0.2500%	0.3983%	0.4842%	0.4413%	0.5742%	42.3100%	42.1188%	25.7758%	54.53%	3.00%	5.30%	51.53%	49.24%
May-33	16.8300%	17.3200%	0.2800%	0.3858%	0.4500%	0.4179%	0.5417%	16.5500%	16.4121%	16.7783%	131.34%	3.36%	5.02%	127.98%	126.33%
Jun-33	13.3800%	14.2600%	0.2500%	0.3717%	0.4242%	0.3979%	0.5092%	13.1300%	12.9821%	13.7508%	162.88%	3.00%	4.78%	159.88%	158.10%
Jul-33	-8.6200%	-12.0400%	0.2600%	0.3633%	0.4025%	0.3829%	0.4925%	-8.8800%	-9.0029%	-12.5325%	73.88%	3.12%	4.60%	70.76%	69.29%
Aug-33	12.0600%	-0.5600%	0.2600%	0.3583%	0.3975%	0.3779%	0.4983%	11.8000%	11.6821%	-1.0583%	40.49%	3.12%	4.54%	37.37%	35.96%
Sep-33	-11.1800%	-17.5900%	0.2500%	0.3633%	0.4133%	0.3883%	0.5300%	-11.4300%	-11.5683%	-18.1200%	29.26%	3.00%	4.66%	26.26%	24.60%
Oct-33	-8.5500%	-7.1200%	0.2600%	0.3617%	0.4142%	0.3879%	0.5300%	-8.8100%	-8.9379%	-7.6500%	36.64%	3.12%	4.66%	33.52%	31.99%
Nov-33	11.2700%	-1.8000%	0.2500%	0.3783%	0.4458%	0.4121%	0.5883%	11.0200%	10.8579%	-2.3883%	55.66%	3.00%	4.95%	55.66%	53.71%
Dec-33	2.5300%	1.2600%	0.2800%	0.3750%	0.4392%	0.4071%	0.6017%	2.2500%	2.1229%	0.6583%	53.97%	3.36%	4.89%	50.61%	49.09%
Jan-34	10.6900%	17.4600%	0.2900%	0.3625%	0.4167%	0.3896%	0.5467%	10.4000%	10.3004%	16.9133%	68.96%	3.48%	4.68%	65.48%	64.28%
Feb-34	-3.2200%	-2.4200%	0.2400%	0.3500%	0.3917%	0.3708%	0.4817%	-3.4600%	-3.5908%	-2.9017%	98.73%	2.88%	4.45%	95.85%	94.28%
Mar-34	0.0000%	-1.1100%	0.2700%	0.3442%	0.3792%	0.3617%	0.4717%	-0.2700%	-0.3617%	-1.5817%	91.96%	3.24%	4.34%	88.72%	87.62%
Apr-34	-2.5100%	-3.5100%	0.2500%	0.3392%	0.3692%	0.3542%	0.4533%	-2.7600%	-2.8642%	-3.9633%	31.27%	3.00%	4.25%	28.27%	27.02%
May-34	-7.3600%	-7.6500%	0.2500%	0.3342%	0.3642%	0.3492%	0.4492%	-7.6100%	-7.7092%	-8.0992%	4.09%	3.00%	4.19%	1.09%	-0.10%
Jun-34	2.9900%	4.7800%	0.2400%	0.3275%	0.3583%	0.3429%	0.4500%	2.0500%	1.9471%	4.3300%	-6.09%	2.88%	4.12%	-8.97%	-10.21%
Jul-34	-11.3200%	-16.0300%	0.2400%	0.3242%	0.3567%	0.3404%	0.4408%	-11.5600%	-11.6604%	-16.4708%	-8.86%	2.88%	4.09%	-11.74%	-12.95%
Aug-34	6.1100%	2.6900%	0.2400%	0.3275%	0.3617%	0.3446%	0.4525%	5.8700%	5.7654%	2.2375%	-13.70%	2.88%	4.14%	-16.58%	-17.84%
Sep-34	-0.3300%	0.9500%	0.2300%	0.3300%	0.3683%	0.3492%	0.4633%	-0.5600%	-0.6792%	0.4867%	-3.16%	2.76%	4.19%	-5.92%	-7.35%
Oct-34	-2.8600%	-6.6600%	0.2700%	0.3250%	0.3633%	0.3442%	0.4500%	-3.1300%	-3.2042%	-7.1100%	2.86%	3.24%	4.13%	-0.38%	-1.27%
Nov-34	9.4200%	-0.4800%	0.2500%	0.3217%	0.3567%	0.3392%	0.4483%	9.1700%	9.0808%	-0.9283%	1.15%	3.00%	4.07%	-1.85%	-2.92%
Dec-34	-0.1000%	-7.0100%	0.2500%	0.3175%	0.3558%	0.3367%	0.4467%	-0.3500%	-0.4367%	-7.4567%	-1.44%	3.00%	4.04%	-4.44%	-5.48%
Jan-35	-4.1100%	-2.3100%	0.2500%	0.3142%	0.3508%	0.3325%	0.4317%	-4.3600%	-4.4425%	-2.7417%	-14.62%	3.00%	3.99%	-17.62%	-18.61%
Feb-35	-3.4100%	-11.3600%	0.2100%	0.3075%	0.3442%	0.3258%	0.4133%	-3.6200%	-3.7358%	-11.7733%	-14.79%	2.52%	3.91%	-17.31%	-18.70%
Mar-35	-2.8600%	10.4300%	0.2200%	0.3058%	0.3425%	0.3242%	0.4067%	-3.0800%	-3.1842%	10.0233%	-17.22%	2.64%	3.89%	-19.86%	-21.11%
Apr-35	9.8000%	11.7800%	0.2300%	0.3050%	0.3400%	0.3225%	0.3992%	9.5700%	9.4775%	11.3808%	-6.77%	2.76%	3.87%	-9.53%	-10.64%
May-35	4.0900%	11.0600%	0.2300%	0.3042%	0.3358%	0.3200%	0.3842%	3.8600%	3.7700%	10.6758%	4.75%	2.76%	3.84%	1.99%	0.91%
Jun-35	6.9900%	10.3600%	0.2200%	0.3008%	0.3325%	0.3167%	0.3775%	6.7700%	6.6733%	9.9825%	9.56%	2.64%	3.80%	6.92%	5.76%
Jul-35	8.5000%	8.7000%	0.2400%	0.2967%	0.3242%	0.3104%	0.3683%	8.2600%	8.1896%	8.3317%	34.05%	2.88%	3.73%	31.17%	30.33%
Aug-35	2.8000%	5.6300%	0.2300%	0.3000%	0.3225%	0.3113%	0.3700%	2.5700%	2.4888%	5.2600%	29.87%	2.76%	3.74%	27.11%	26.13%
Sep-35	2.5600%	-1.2200%	0.2300%	0.2992%	0.3208%	0.3100%	0.3692%	2.3300%	2.2500%	-1.5892%	33.63%	2.76%	3.72%	30.87%	29.91%
Oct-35	7.7700%	12.2400%	0.2300%	0.2933%	0.3183%	0.3058%	0.3667%	7.5400%	7.4642%	11.8733%	48.26%	2.76%	3.67%	45.50%	44.59%
Nov-35	4.7400%	1.0800%	0.2400%	0.2892%	0.3108%	0.3000%	0.3625%	4.5000%	4.4400%	0.7175%	41.92%	2.88%	3.60%	39.04%	38.32%
Dec-35	3.9400%	4.7900%	0.2400%	0.2867%	0.3042%	0.2954%	0.3575%	3.7000%	3.6446%	4.4325%	47.66%	2.88%	3.55%	44.78%	44.11%
Jan-36	6.7000%	11.0300%	0.2400%	0.2808%	0.2975%	0.2892%	0.3508%	6.4600%	6.4108%	10.6792%	64.30%	2.88%	3.47%	61.42%	60.83%
Feb-36	2.4400%	-3.4200%	0.2300%	0.2767%	0.2958%	0.2863%	0.3475%	2.0100%	1.9538%	-3.7675%	73.91%	2.76%	3.44%	71.15%	70.48%
Mar-36	2.6800%	0.3300%	0.2400%	0.2742%	0.2958%	0.2850%	0.3475%	2.4400%	2.3950%	-0.0175%	83.83%	2.88%	3.42%	80.95%	80.41%
Apr-36	-7.5100%	-8.1400%	0.2200%	0.2742%	0.2975%	0.2858%	0.3475%	-7.7300%	-7.7958%	-8.4875%	54.85%	2.64%	3.43%	52.21%	51.42%
May-36	5.4500%	7.6100%	0.2200%	0.2725%	0.2942%	0.2833%	0.3450%	5.2300%	5.1667%	7.2650%	56.87%	2.64%	3.40%	54.23%	53.47%
Jun-36	3.3300%	3.5000%	0.2400%	0.2700%	0.2925%	0.2813%	0.3433%	3.0900%	3.0488%	3.1567%	51.51%	2.88%	3.38%	48.63%	48.13%
Jul-36	7.0100%	10.0900%	0.2300%	0.2692%	0.2900%	0.2796%	0.3392%	6.7800%	6.7304%	9.7508%	49.43%	2.76%	3.36%	46.67%	46.07%
Aug-36	1.5100%	-0.1800%	0.2300%	0.2675%	0.2867%	0.2771%	0.3383%	1.2800%	1.2329%	-0.5183%	47.55%	2.76%	3.33%	44.79%	44.23%
Sep-36	0.3100%	-2.2500%	0.2100%	0.2650%	0.2842%	0.2746%	0.3375%	0.1000%	0.0354%	-2.5875%	44.31%	2.52%	3.30%	41.79%	41.02%
Oct-36	7.5000%	5.6600%	0.2300%	0.2650%	0.2808%	0.2729%	0.3367%	7.5200%	7.4771%	5.3233%	44.29%	2.76%	3.28%	41.53%	41.01%
Nov-36	1.3400%	-1.6900%	0.2200%	0.2625%	0.2758%	0.2692%	0.3292%	1.1200%	1.0708%	-2.0192%	39.60%	2.64%	3.23%	36.96%	36.37%
Dec-36	-0.2900%	-1.7400%	0.2200%	0.2583%	0.2733%	0.2658%	0.3192%	-0.5100%	-0.5558%	-2.0592%	33.92%	2.64%	3.19%	31.28%	30.73%
Jan-37	3.9000%	1.9500%	0.2100%	0.2583%	0.2750%	0.2667%	0.3183%	3.6900%	3.6333%	1.6317%	30.41%	2.52%	3.20%	27.89%	27.21%
Feb-37	1.9100%	-3.5300%	0.2000%	0.2683%	0.2833%	0.2758%	0.3242%	1.7100%	1.6342%	-3.8542%	29.99%	2.40%	3.31%	27.59%	26.68%
Mar-37	-0.7700%	-5.7300%	0.2200%	0.2767%	0.2917%	0.2842%	0.3333%	-0.9900%	-1.0542%	-6.0633%	25.62%	2.64%	3.41%	22.98%	22.21%
Apr-37	-8.0900%	-7.3600%	0.2300%	0.2850%	0.2975%	0.2913%	0.3392%	-8.3200%	-8.3813%	-7.6992%	24.83%	2.76%	3.50%	22.07%	21.34%
May-37	-0.2400%	-5.1600%	0.2200%	0.2775%	0.2900%	0.2838%	0.3333%	-0.4600%	-0.5238%	-5.4933%	18.10%	2.64%	3.41%	15.46%	14.69%
Jun-37	-5.0400%	-4.6700%	0.2500%	0.2733%	0.2858%	0.2796%	0.3325%	-5.2900%	-5.3196%	-5.0025%	8.53%	3.00%	3.36%	5.53%	5.17%
Jul-37	10.4500%	16.7100%	0.2400%	0.2708%	0.2842%	0.2775%	0.3283%	10.2100%	10.1725%	16.3817%	12.02%	2.88%	3.33%	9.14%	8.69%
Aug-37	-4.8300%	-9.0300%	0.2300%	0.2700%	0.2842%	0.2771%	0.3242%	-5.0600%	-5.1071%	-9.3542%	5.02%	2.76%	3.33%	2.26%	1.70%
Sep-37	-14.0300%	-11.7400%	0.2300%	0.2733%	0.2883%	0.2808%	0.3300%	-14.2600%	-14.3108%	-12.0700%	-9.99%	2.76%	3.37%	-12.75%	-13.36%
Oct-37	-9.8100%	-5.1600%	0.2300%	0.2725%	0.2942%	0.2833%	0.3408%	-10.0400%	-10.0933%	-5.5008%	-24.66%	2.76%	3.40%	-27.42%	-28.06%
Nov-37	-8.6600%	0.8000%	0.2400%	0.2700%	0.2950%	0.2825%	0.3400%	-8.9000%	-8.9425%	0.4600%	-32.09%	2.88%	3.39%	-34.97%	-35.48%
Dec-37	-4.5900%	-9.5100%	0.2300%	0.2675%	0.2917%	0.2796%	0.3358%	-4.8200%	-4.8696%	-9.8458%	-35.02%	2.76%	3.36%	-37.78%	-38.38%
Jan-38	1.5200%	-3.6800%	0.2300%	0.2642%	0.2917%	0.2779%	0.3342%	1.2900%	1.2421%	-4.0142%	-36.51%	2.76%	3.34%	-39.27%	-39.85%
Feb-38	6.7400%	3.4100%	0.2100%	0.2667%	0.2925%	0.2796%	0.3358%	6.5300%	6.4604%	3.0742%	-33.50%	2.52%	3.36%	-36.02%	-36.86%
Mar-38	-24.8700%	-19.8400%	0.2300%	0.2683%	0.2967%	0.2825%	0.3325%	-25.1000%	-25.1525%	-20.1725%	-49.65%	2.76%	3.39%	-52.41%	-53.04%
Apr-38	14.7700%	15.3800%	0.2200%	0.2750%	0.3108%	0.2929%	0.3400%	14.2500%	14.1771%	15.0400%	-37.29%	2.64%	3.52%	-39.93%	-40.81%
May-38	-3.3000%	1.8100%	0.2200%	0.2683%	0.2967%	0.2825%	0.3292%	-3.5200%	-3.5825%	1.4808%	-39.22%	2.64%</			

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Apr-39	-0.2700%	2.8500%	0.1900%	0.2517%	0.2683%	0.2600%	0.2958%	-0.4600%	-0.5300%	2.5542%	17.77%	2.28%	3.12%	15.49%	14.65%
May-39	7.3300%	6.6500%	0.2000%	0.2475%	0.2633%	0.2554%	0.2917%	7.1300%	7.0746%	6.3583%	30.72%	2.40%	3.07%	28.32%	27.65%
Jun-39	-6.1200%	-4.2300%	0.1800%	0.2433%	0.2608%	0.2521%	0.2892%	-6.3000%	-6.3721%	-4.5192%	-1.85%	2.16%	3.03%	-4.01%	-4.87%
Jul-39	11.0500%	12.0800%	0.1900%	0.2408%	0.2567%	0.2488%	0.2858%	10.8600%	10.8013%	11.7942%	1.45%	2.28%	2.99%	-0.83%	-1.54%
Aug-39	-6.4800%	-6.4700%	0.1800%	0.2442%	0.2592%	0.2517%	0.2842%	-6.6600%	-6.7317%	-6.7542%	-2.93%	2.16%	3.02%	-5.09%	-5.95%
Sep-39	16.7300%	4.2100%	0.1900%	0.2708%	0.2908%	0.2808%	0.3092%	16.5400%	16.4492%	3.9008%	11.46%	2.28%	3.37%	9.18%	8.09%
Oct-39	-1.2300%	1.3000%	0.2300%	0.2625%	0.2792%	0.2708%	0.2983%	-1.4600%	-1.5008%	1.0017%	2.16%	2.76%	3.25%	-0.60%	-1.09%
Nov-39	-3.9800%	-1.5700%	0.2000%	0.2500%	0.2633%	0.2567%	0.2842%	-4.1800%	-4.2367%	-1.8542%	0.85%	2.40%	3.08%	-1.55%	-2.23%
Dec-39	2.7000%	2.7200%	0.1900%	0.2450%	0.2617%	0.2533%	0.2817%	2.5100%	2.4467%	2.4383%	-0.42%	2.28%	3.04%	-2.70%	-3.46%
Jan-40	-3.3600%	0.6900%	0.2000%	0.2400%	0.2567%	0.2483%	0.2783%	-3.5600%	-3.6083%	0.4117%	3.19%	2.40%	2.98%	0.79%	0.21%
Feb-40	1.3300%	-1.0200%	0.1800%	0.2383%	0.2542%	0.2463%	0.2792%	1.1500%	1.0838%	-1.2992%	0.63%	2.16%	2.96%	-1.53%	-2.32%
Mar-40	1.2400%	0.9400%	0.1900%	0.2367%	0.2533%	0.2450%	0.2783%	1.0500%	0.9950%	0.6617%	17.63%	2.28%	2.94%	15.35%	14.69%
Apr-40	-0.2400%	-0.9200%	0.1800%	0.2350%	0.2492%	0.2421%	0.2708%	-0.4200%	-0.4821%	-1.1908%	17.67%	2.16%	2.91%	15.51%	14.76%
May-40	-22.8900%	-19.6400%	0.1900%	0.2442%	0.2567%	0.2504%	0.2750%	-23.0800%	-23.1404%	-19.9150%	-15.46%	2.28%	3.01%	-17.74%	-18.47%
Jun-40	8.0900%	15.0600%	0.1900%	0.2467%	0.2583%	0.2525%	0.2783%	7.9000%	7.8375%	14.7817%	-2.67%	2.28%	3.03%	-4.95%	-5.70%
Jul-40	3.4100%	0.6500%	0.2000%	0.2400%	0.2508%	0.2454%	0.2692%	3.2100%	3.1646%	3.0808%	-9.36%	2.40%	2.95%	-11.76%	-12.31%
Aug-40	3.5000%	-0.9400%	0.1900%	0.2375%	0.2525%	0.2450%	0.2675%	3.3100%	3.2550%	-1.2075%	0.31%	2.28%	2.94%	-1.97%	-2.63%
Sep-40	1.2300%	-2.1100%	0.1800%	0.2350%	0.2508%	0.2429%	0.2650%	1.0500%	0.9871%	-2.3750%	-13.01%	2.16%	2.92%	-15.17%	-15.93%
Oct-40	4.2200%	3.1700%	0.1800%	0.2325%	0.2508%	0.2417%	0.2625%	4.0400%	3.9783%	2.9075%	-8.21%	2.16%	2.90%	-10.37%	-11.11%
Nov-40	-3.1600%	-12.0700%	0.1800%	0.2292%	0.2467%	0.2379%	0.2592%	-3.3400%	-3.3979%	-12.3292%	-7.43%	2.16%	2.86%	-9.59%	-10.28%
Dec-40	0.0900%	1.5400%	0.1700%	0.2258%	0.2433%	0.2346%	0.2583%	-0.0800%	-0.1446%	1.2817%	-9.78%	2.04%	2.82%	-11.82%	-12.59%
Jan-41	-4.6300%	-0.8400%	0.1600%	0.2292%	0.2458%	0.2375%	0.2625%	-4.7900%	-4.8675%	-1.1025%	-10.96%	1.92%	2.85%	-12.88%	-13.81%
Feb-41	-0.6000%	-2.3300%	0.1600%	0.2317%	0.2500%	0.2408%	0.2667%	-0.7600%	-0.8408%	-2.5967%	-12.66%	1.92%	2.89%	-14.58%	-15.55%
Mar-41	0.7100%	-2.8000%	0.1800%	0.2333%	0.2508%	0.2421%	0.2633%	0.5300%	0.4679%	-3.0633%	-13.12%	2.16%	2.91%	-15.28%	-16.02%
Apr-41	-6.1200%	-8.4400%	0.1700%	0.2350%	0.2533%	0.2442%	0.2617%	-6.2900%	-6.3642%	-8.7017%	-18.24%	2.04%	2.93%	-20.28%	-21.17%
May-41	1.8300%	-3.3700%	0.1700%	0.2342%	0.2492%	0.2417%	0.2567%	1.6600%	1.5883%	-3.6267%	7.97%	2.04%	2.90%	5.93%	5.07%
Jun-41	5.7800%	2.5700%	0.1600%	0.2308%	0.2458%	0.2383%	0.2525%	5.6200%	5.5417%	2.3175%	5.67%	1.92%	2.86%	3.75%	2.81%
Jul-41	5.7900%	5.3800%	0.1600%	0.2283%	0.2417%	0.2350%	0.2500%	5.6300%	5.5550%	5.1300%	8.10%	1.92%	2.82%	6.18%	5.28%
Aug-41	0.1000%	-1.9200%	0.1600%	0.2283%	0.2417%	0.2350%	0.2483%	-0.0600%	-0.1350%	-2.1683%	4.55%	1.92%	2.82%	2.63%	1.73%
Sep-41	-0.6800%	-2.8200%	0.1600%	0.2292%	0.2425%	0.2358%	0.2500%	-0.8400%	-0.9158%	-3.0700%	2.57%	1.92%	2.83%	0.65%	-0.26%
Oct-41	-6.5700%	-8.4800%	0.1600%	0.2275%	0.2392%	0.2333%	0.2500%	-6.7300%	-6.8033%	-8.7300%	-8.05%	1.92%	2.80%	-9.97%	-10.85%
Nov-41	-2.8400%	-6.5200%	0.1400%	0.2267%	0.2383%	0.2325%	0.2483%	-2.9800%	-3.0725%	-6.6833%	-7.74%	1.68%	2.79%	-9.42%	-10.53%
Dec-41	-4.0700%	-6.7800%	0.1600%	0.2333%	0.2458%	0.2396%	0.2500%	-4.2300%	-4.3096%	-7.0350%	-11.58%	1.92%	2.88%	-13.50%	-14.45%
Jan-42	1.6100%	2.5200%	0.2100%	0.2358%	0.2467%	0.2413%	0.2575%	1.4000%	1.3688%	2.2625%	-5.79%	2.52%	2.90%	-8.31%	-8.69%
Feb-42	-1.5900%	-3.3900%	0.1900%	0.2375%	0.2483%	0.2429%	0.2575%	-1.7800%	-1.8329%	-3.6475%	-6.73%	2.28%	2.92%	-9.01%	-9.64%
Mar-42	-6.5200%	-10.4600%	0.2100%	0.2383%	0.2500%	0.2442%	0.2600%	-6.7300%	-6.7642%	-10.7200%	-13.43%	2.52%	2.93%	-15.95%	-16.36%
Apr-42	-4.0000%	-4.3200%	0.2000%	0.2358%	0.2483%	0.2421%	0.2575%	-4.2000%	-4.2421%	-4.5775%	-11.47%	2.40%	2.91%	-13.87%	-14.38%
May-42	7.9600%	9.5600%	0.1900%	0.2375%	0.2500%	0.2438%	0.2583%	7.7700%	7.7163%	9.3017%	-6.14%	2.28%	2.93%	-8.42%	-9.07%
Jun-42	2.2100%	0.5700%	0.2100%	0.2375%	0.2508%	0.2442%	0.2508%	2.0000%	1.9658%	0.3100%	-9.31%	2.52%	2.93%	-11.83%	-12.24%
Jul-42	3.3700%	0.4000%	0.2100%	0.2358%	0.2492%	0.2425%	0.2583%	3.1600%	3.1275%	0.1417%	-11.38%	2.52%	2.91%	-13.90%	-14.29%
Aug-42	1.6400%	0.2600%	0.2100%	0.2342%	0.2492%	0.2417%	0.2583%	1.4300%	1.3983%	0.0017%	-10.02%	2.52%	2.90%	-12.54%	-12.92%
Sep-42	2.9000%	4.6600%	0.2000%	0.2333%	0.2483%	0.2408%	0.2567%	2.7000%	2.6592%	4.4033%	-6.78%	2.40%	2.89%	-9.18%	-9.67%
Oct-42	6.7800%	13.6200%	0.2100%	0.2333%	0.2458%	0.2396%	0.2567%	6.5700%	6.5404%	13.3633%	6.54%	2.52%	2.88%	4.02%	3.67%
Nov-42	-0.2100%	-0.1500%	0.2000%	0.2325%	0.2450%	0.2388%	0.2558%	-0.4100%	-0.4488%	-0.4058%	9.43%	2.40%	2.87%	7.03%	6.56%
Dec-42	5.4900%	3.2800%	0.2100%	0.2342%	0.2467%	0.2404%	0.2550%	5.2800%	5.2496%	3.0250%	20.33%	2.52%	2.89%	17.81%	17.45%
Jan-43	7.3700%	12.1700%	0.2000%	0.2325%	0.2442%	0.2383%	0.2542%	7.1700%	7.1317%	11.9158%	27.15%	2.40%	2.86%	24.75%	24.29%
Feb-43	5.8300%	7.1900%	0.1900%	0.2308%	0.2408%	0.2358%	0.2517%	5.6400%	5.5942%	6.9383%	36.74%	2.28%	2.83%	34.46%	33.91%
Mar-43	5.4500%	4.1200%	0.2100%	0.2300%	0.2400%	0.2350%	0.2508%	5.2400%	5.2150%	3.8692%	54.25%	2.52%	2.82%	51.73%	51.43%
Apr-43	0.3500%	3.8700%	0.2000%	0.2300%	0.2400%	0.2350%	0.2500%	0.1500%	0.1150%	3.6200%	61.24%	2.40%	2.82%	58.84%	58.42%
May-43	5.5200%	3.4700%	0.1900%	0.2283%	0.2392%	0.2338%	0.2500%	5.3300%	5.2863%	3.2200%	57.60%	2.28%	2.81%	55.32%	54.79%
Jun-43	2.2300%	5.3800%	0.2100%	0.2267%	0.2375%	0.2321%	0.2483%	2.0200%	1.9979%	5.1317%	57.63%	2.52%	2.79%	55.11%	54.84%
Jul-43	-5.2600%	0.3800%	0.2100%	0.2242%	0.2350%	0.2296%	0.2467%	-5.4700%	-5.4896%	0.1333%	44.47%	2.52%	2.76%	41.95%	41.71%
Aug-43	1.7100%	1.0500%	0.2100%	0.2242%	0.2342%	0.2292%	0.2467%	1.5000%	1.4808%	0.8033%	44.57%	2.52%	2.75%	42.05%	41.82%
Sep-43	2.6300%	3.2300%	0.2000%	0.2242%	0.2350%	0.2296%	0.2467%	2.4300%	2.4004%	2.9833%	44.19%	2.40%	2.76%	41.79%	41.43%
Oct-43	-1.0800%	0.8200%	0.2000%	0.2250%	0.2358%	0.2304%	0.2475%	-1.2800%	-1.3104%	0.5725%	33.57%	2.40%	2.77%	31.17%	30.81%
Nov-43	-6.5400%	-7.7500%	0.2100%	0.2258%	0.2367%	0.2313%	0.2483%	-6.7500%	-6.7713%	-7.9983%	25.10%	2.52%	2.78%	22.58%	22.33%
Dec-43	6.1700%	5.7800%	0.2100%	0.2283%	0.2392%	0.2338%	0.2492%	5.9600%	5.9363%	5.5308%	25.91%	2.52%	2.81%	23.39%	23.10%
Jan-44	1.7100%	1.0600%	0.2100%	0.2267%	0.2358%	0.2313%	0.2492%	1.5000%	1.4788%	0.8108%	19.27%	2.52%	2.78%	16.75%	16.50%
Feb-44	0.4200%	1.7900%	0.2000%	0.2283%	0.2358%	0.2321%	0.2492%	0.2200%	0.1879%	1.5408%	13.17%	2.40%	2.79%	10.77%	10.39%
Mar-44	1.9500%	1.0400%	0.2100%	0.2283%	0.2350%	0.2317%	0.2475%	1.7400%	1.7183%	0.7925%	9.42%	2.52%	2.78%	6.90%	6.64%
Apr-44	-1.0000%	-0.9100%	0.2000%	0.2283%	0.2350%	0.2317%	0.2492%	-1.2000%	-1.2317%	-1.1592%	5.74%	2.40%	2.78%	5.16%	5.16%
May-44	5.0500%	3.0100%	0.2200%	0.2275%	0.2342%	0.2308%	0.2492%	4.8300%	4.8192%	2.7608%	7.46%	2.77%	2.77%	4.82%	4.69%
Jun-44	5.4300%	5.2600%	0.2000%	0.2275%	0.2342%	0.2308%	0.2492%	5.2300%	5.1992%	5.0108%	8.03%	2.40%	2.77%	8.43%	8.06%
Jul-44	-1.9300%	0.2900%	0.2100%	0.2267%	0.2333%	0.2300%	0.2467%	-2.1400%	-2.1600%	0.0433%	14.72%	2.52%	2.76%	12.20%	11.96%
Aug-44	1.5700%	3.5700%	0.2100%	0.2258%	0.2325%	0.2292%	0.2450%	1.3600%	1.3408%	3.3250%	14.57%	2.52%	2.75%	12.05%	11.82%
Sep-44	-0.0800%	-1.5000%	0.2000%	0.2267%	0.2325%	0.2296%	0.2442%	-0.2800%	-0.3096%	-1.7442%	11.54%	2.40%	2.76%	9.14%	8.79%
Oct-44	0.2300%	1.3900%	0.2100%	0.2242%	0.2342%	0.2304%	0.2450%	0.0200%	-0.0004%	1.1450%	13.02%	2.52%	2.77%	10.50%	10.25%
Nov-44	1.3300%	-1.3000%	0.2000%	0.2267%	0.2333%	0.2300%	0.2467%	1.1300%	1.1000%	-1.5467%	22.53%	2.40%	2.76%	20.13%	19.77%
Dec-44	3.7400%	3.2400%	0.2000%	0.2250%	0.2300%	0.2275%	0.2475%	3.5400%	3.5125%	2.9925%	19.73%	2.40%	2.73%	17.33%	17.00%
Jan-45	1.5800%	4.9700%	0.2100%	0.2242%	0.2300%	0.2271%	0.2492%	1.3700%	1.3529%	4.7208%	19.58%	2.52%	2.73%	17.06%	16.85%
Feb-45	6.8300%	6.9500%	0.1800%	0.2208%	0.2275%	0.2242%	0.2483%	6.6500%	6.6058%	6.7017%	27.21%	2.16%	2.69%	25.05%	24.52%
Mar-45	-4.4100%	-3.5700%	0.2000%	0.2183%	0.2267%	0.2225%	0.2475%	-4.610							

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP	
Jan-46	7.1400%	11.9900%	0.1700%	0.2117%	0.2183%	0.2150%	0.2242%	6.9700%	6.9250%	11.7658%	43.88%	2.04%	2.58%		41.84%	41.30%
Feb-46	-6.4100%	-6.4000%	0.1500%	0.2067%	0.2133%	0.2100%	0.2225%	-6.5600%	-6.6200%	-6.6225%	26.05%	1.80%	2.52%		24.25%	23.53%
Mar-46	4.8000%	6.3100%	0.1600%	0.2058%	0.2117%	0.2088%	0.2217%	4.6400%	4.5913%	6.0883%	38.19%	1.92%	2.51%		36.27%	35.69%
Apr-46	3.9300%	3.8000%	0.1700%	0.2050%	0.2133%	0.2092%	0.2208%	3.7600%	3.7208%	3.1592%	31.74%	2.04%	2.51%		29.70%	29.23%
May-46	2.8800%	3.0100%	0.1800%	0.2092%	0.2150%	0.2121%	0.2242%	2.7000%	2.6679%	2.7858%	32.94%	2.16%	2.55%		30.78%	30.40%
Jun-46	-3.7000%	-2.7600%	0.1600%	0.2075%	0.2158%	0.2117%	0.2250%	-3.8600%	-3.9117%	-2.9850%	28.11%	1.92%	2.54%		26.19%	25.57%
Jul-46	-2.3900%	-3.9500%	0.1900%	0.2067%	0.2158%	0.2113%	0.2242%	-2.5800%	-2.6013%	-4.1742%	27.34%	2.28%	2.54%		25.06%	24.81%
Aug-46	-6.7400%	-7.2400%	0.1700%	0.2092%	0.2183%	0.2138%	0.2258%	-6.9100%	-6.9538%	-7.4658%	11.61%	2.04%	2.57%		9.57%	9.04%
Sep-46	-9.9700%	-10.5100%	0.1800%	0.2150%	0.2233%	0.2192%	0.2292%	-10.1500%	-10.1892%	-10.7392%	-3.74%	2.16%	2.63%		-5.90%	-6.37%
Oct-46	-0.6000%	2.2000%	0.1900%	0.2167%	0.2250%	0.2208%	0.2300%	-0.7900%	-0.8208%	1.9700%	-7.30%	2.28%	2.65%		-9.58%	-9.95%
Nov-46	-0.2700%	0.5800%	0.1800%	0.2158%	0.2242%	0.2200%	0.2300%	-0.4500%	-0.4900%	0.3500%	-11.07%	2.28%	2.64%		-13.23%	-13.71%
Dec-46	4.5700%	7.0600%	0.1900%	0.2175%	0.2242%	0.2208%	0.2300%	4.3800%	4.3492%	6.8300%	-8.07%	2.28%	2.65%		-10.35%	-10.72%
Jan-47	2.5500%	-0.0200%	0.1800%	0.2142%	0.2208%	0.2175%	0.2267%	2.3700%	2.3325%	-0.2467%	-12.01%	2.16%	2.61%		-14.17%	-14.62%
Feb-47	-0.7700%	-0.8900%	0.1600%	0.2125%	0.2200%	0.2163%	0.2267%	-0.9300%	-0.9663%	-1.1167%	-6.71%	1.92%	2.60%		-8.63%	-9.31%
Mar-47	-1.4900%	-3.6400%	0.1800%	0.2125%	0.2200%	0.2163%	0.2267%	-1.6700%	-1.7063%	-3.8667%	-12.31%	2.16%	2.60%		-14.47%	-14.90%
Apr-47	-3.6300%	-3.2000%	0.1700%	0.2108%	0.2192%	0.2150%	0.2250%	-3.8000%	-3.8450%	-3.4250%	-18.69%	2.04%	2.58%		-20.73%	-21.27%
May-47	0.1400%	-2.7900%	0.1700%	0.2108%	0.2192%	0.2150%	0.2250%	-0.0300%	-0.0750%	-3.0150%	-20.85%	2.04%	2.58%		-22.89%	-23.43%
Jun-47	5.5400%	4.2800%	0.1900%	0.2125%	0.2200%	0.2163%	0.2258%	5.3500%	5.3238%	4.0542%	-13.26%	2.28%	2.60%		-15.54%	-15.85%
Jul-47	3.8100%	2.1400%	0.1800%	0.2125%	0.2200%	0.2163%	0.2275%	3.6300%	3.5938%	1.9125%	-7.75%	2.16%	2.60%		-9.91%	-10.34%
Aug-47	-2.0300%	-0.2200%	0.1700%	0.2133%	0.2200%	0.2167%	0.2275%	-2.2000%	-2.2467%	-0.4475%	-3.09%	2.04%	2.60%		-5.13%	-5.69%
Sep-47	-1.1100%	-1.4200%	0.1800%	0.2175%	0.2242%	0.2208%	0.2333%	-1.2900%	-1.3308%	-1.6533%	6.45%	2.16%	2.65%		4.29%	3.80%
Oct-47	2.3800%	-1.3300%	0.1800%	0.2250%	0.2325%	0.2288%	0.2400%	2.2000%	2.1513%	-1.5700%	9.64%	2.16%	2.75%		7.48%	6.89%
Nov-47	-1.7500%	-8.2400%	0.1700%	0.2308%	0.2375%	0.2342%	0.2442%	-1.9200%	-1.9842%	-8.4842%	8.01%	2.04%	2.81%		5.97%	5.20%
Dec-47	2.3300%	1.8900%	0.2100%	0.2383%	0.2450%	0.2417%	0.2542%	2.1200%	2.0883%	1.6358%	5.70%	2.52%	2.90%		3.18%	2.80%
Jan-48	-3.7900%	0.7000%	0.2000%	0.2383%	0.2450%	0.2417%	0.2542%	-3.9900%	-4.0317%	0.4458%	-0.84%	2.40%	2.90%		-3.74%	-3.74%
Feb-48	-3.8800%	-3.7200%	0.1900%	0.2375%	0.2442%	0.2408%	0.2542%	-4.0700%	-4.1208%	-3.9742%	-3.95%	2.28%	2.89%		-6.23%	-6.84%
Mar-48	7.9300%	6.1700%	0.2200%	0.2358%	0.2417%	0.2388%	0.2517%	7.7100%	7.6913%	5.9183%	5.24%	2.64%	2.87%		2.60%	2.37%
Apr-48	2.9200%	1.6000%	0.2000%	0.2317%	0.2392%	0.2354%	0.2475%	2.7200%	2.6846%	1.3525%	12.39%	2.40%	2.83%		9.99%	9.57%
May-48	8.7900%	5.8300%	0.1800%	0.2300%	0.2383%	0.2342%	0.2450%	8.6100%	8.5558%	5.5850%	22.10%	2.16%	2.81%		19.94%	19.29%
Jun-48	0.5400%	2.1200%	0.2100%	0.2300%	0.2375%	0.2338%	0.2450%	0.3300%	0.3063%	1.8750%	16.32%	2.52%	2.81%		13.80%	13.51%
Jul-48	-5.0800%	-4.4300%	0.1900%	0.2342%	0.2408%	0.2375%	0.2492%	-5.2700%	-5.3175%	-4.6792%	6.35%	2.28%	2.85%		4.07%	3.50%
Aug-48	1.5800%	0.3600%	0.2100%	0.2367%	0.2450%	0.2408%	0.2525%	1.3700%	1.3392%	0.1075%	10.27%	2.52%	2.89%		7.75%	7.38%
Sep-48	-2.7600%	-0.7100%	0.2000%	0.2367%	0.2442%	0.2404%	0.2542%	-2.9600%	-3.0004%	-0.9642%	8.43%	2.40%	2.89%		6.03%	5.55%
Oct-48	7.1000%	4.0300%	0.1900%	0.2367%	0.2450%	0.2408%	0.2525%	6.9100%	6.8592%	3.7775%	13.43%	2.28%	2.89%		11.15%	10.54%
Nov-48	-9.6100%	-9.1300%	0.2100%	0.2367%	0.2433%	0.2400%	0.2558%	-9.8200%	-9.8500%	-9.3858%	4.36%	2.52%	2.88%		1.84%	1.48%
Dec-48	3.4600%	2.2100%	0.2000%	0.2325%	0.2400%	0.2363%	0.2550%	3.2600%	3.2238%	1.9550%	5.51%	2.40%	2.84%		3.11%	2.68%
Jan-49	0.3900%	5.0400%	0.2000%	0.2342%	0.2492%	0.2300%	0.2492%	0.1900%	0.1600%	4.7908%	10.09%	2.40%	2.76%		7.69%	7.33%
Feb-49	-2.9600%	0.0500%	0.1800%	0.2258%	0.2333%	0.2296%	0.2492%	-3.1400%	-3.1896%	-0.1992%	11.15%	2.16%	2.76%		8.99%	8.39%
Mar-49	3.2800%	3.6400%	0.1900%	0.2325%	0.2375%	0.2288%	0.2475%	3.0900%	3.0513%	3.3925%	6.36%	2.28%	2.75%		4.08%	3.61%
Apr-49	-1.7900%	0.5800%	0.1800%	0.2250%	0.2325%	0.2288%	0.2467%	-1.9700%	-2.0188%	0.3333%	1.49%	2.16%	2.75%		-0.67%	-1.25%
May-49	-2.5800%	0.3400%	0.2000%	0.2258%	0.2317%	0.2288%	0.2458%	-2.7800%	-2.8088%	0.0942%	-9.11%	2.40%	2.75%		-11.51%	-11.86%
Jun-49	0.1400%	-1.3400%	0.1900%	0.2258%	0.2317%	0.2288%	0.2450%	-0.0500%	-0.0888%	-1.5850%	-9.48%	2.28%	2.75%		-11.76%	-12.22%
Jul-49	6.5000%	5.6900%	0.1700%	0.2225%	0.2292%	0.2258%	0.2417%	6.3300%	6.2742%	5.4483%	1.57%	2.04%	2.71%		-0.47%	-1.14%
Aug-49	2.1900%	3.4600%	0.1900%	0.2183%	0.2258%	0.2221%	0.2383%	2.0000%	1.9679%	3.2217%	2.18%	2.28%	2.67%		-0.10%	-0.49%
Sep-49	2.6300%	3.7300%	0.1700%	0.2167%	0.2242%	0.2204%	0.2375%	2.4600%	2.4096%	3.4925%	7.84%	2.04%	2.65%		5.80%	5.20%
Oct-49	3.4000%	1.1200%	0.1800%	0.2175%	0.2250%	0.2213%	0.2358%	3.2200%	3.1788%	0.8842%	4.12%	2.16%	2.66%		1.96%	1.46%
Nov-49	1.7500%	1.5900%	0.1700%	0.2167%	0.2233%	0.2200%	0.2342%	1.5800%	1.5300%	1.3558%	17.20%	2.04%	2.64%		15.16%	14.56%
Dec-49	4.8600%	3.9600%	0.1700%	0.2150%	0.2225%	0.2188%	0.2317%	4.6900%	4.6413%	3.7283%	18.79%	2.04%	2.63%		16.75%	16.16%
Jan-50	1.9700%	3.5300%	0.1800%	0.2142%	0.2208%	0.2175%	0.2300%	1.7900%	1.7525%	3.3000%	20.66%	2.16%	2.61%		18.05%	17.50%
Feb-50	1.9900%	1.0000%	0.1600%	0.2150%	0.2208%	0.2179%	0.2300%	1.8300%	1.7721%	0.7700%	26.81%	1.92%	2.62%		24.89%	24.20%
Mar-50	0.7000%	0.8400%	0.1800%	0.2150%	0.2217%	0.2183%	0.2300%	0.5200%	0.4817%	0.6100%	23.64%	2.16%	2.62%		21.48%	21.02%
Apr-50	4.8600%	1.8500%	0.1600%	0.2167%	0.2217%	0.2192%	0.2308%	4.7000%	4.6408%	1.6192%	32.01%	1.92%	2.63%		30.09%	29.38%
May-50	5.0900%	1.9200%	0.1900%	0.2175%	0.2242%	0.2208%	0.2325%	4.9000%	4.8692%	1.6875%	42.41%	2.28%	2.65%		40.13%	39.76%
Jun-50	-5.4800%	-7.7100%	0.1700%	0.2183%	0.2242%	0.2213%	0.2325%	-5.6500%	-5.7013%	-7.9425%	34.42%	2.04%	2.66%		32.38%	31.76%
Jul-50	1.1900%	-4.3600%	0.1800%	0.2208%	0.2267%	0.2238%	0.2325%	1.0100%	0.9663%	-4.5925%	27.71%	2.16%	2.69%		25.55%	25.03%
Aug-50	4.4300%	1.5400%	0.1800%	0.2175%	0.2225%	0.2200%	0.2300%	4.2500%	4.2100%	1.3100%	30.51%	2.16%	2.64%		28.35%	27.87%
Sep-50	5.9200%	4.1800%	0.1700%	0.2200%	0.2258%	0.2229%	0.2333%	5.7500%	5.6971%	3.9467%	34.70%	2.04%	2.68%		32.66%	32.02%
Oct-50	0.9300%	-0.2700%	0.1900%	0.2225%	0.2267%	0.2246%	0.2358%	0.7400%	0.7054%	-0.5058%	31.48%	2.28%	2.70%		29.20%	28.79%
Nov-50	1.6900%	-1.7600%	0.1800%	0.2225%	0.2267%	0.2246%	0.2383%	1.5100%	1.4654%	-1.9983%	31.40%	2.16%	2.70%		29.24%	28.71%
Dec-50	5.1300%	3.1200%	0.1800%	0.2225%	0.2267%	0.2246%	0.2383%	4.9500%	4.9054%	2.8817%	31.74%	2.16%	2.70%		29.58%	29.05%
Jan-51	6.3700%	4.3800%	0.2000%	0.2217%	0.2258%	0.2238%	0.2358%	6.1700%	6.1463%	4.1442%	37.43%	2.40%	2.69%		35.03%	34.74%
Feb-51	1.5700%	2.6800%	0.1700%	0.2217%	0.2258%	0.2238%	0.2367%	1.4000%	1.3463%	2.4433%	36.86%	2.04%	2.69%		34.82%	34.17%
Mar-51	-1.5600%	-1.7400%	0.1900%	0.2317%	0.2350%	0.2333%	0.2458%	-1.7500%	-1.7933%	-1.9858%	33.79%	2.28%	2.80%		31.51%	30.99%
Apr-51	5.0900%	0.0500%	0.2000%	0.2392%	0.2442%	0.2417%	0.2575%	4.8900%	4.8483%	-0.2075%	34.08%	2.40%	2.90%		31.68%	31.18%
May-51	-2.9900%	0.6600%	0.2100%	0.2408%	0.2442%	0.2425%	0.2608%	-3.2000%	-3.2325%	0.3992%	23.77%	2.52%	2.91%		21.25%	20.86%
Jun-51	-2.2800%	-0.4000%	0.2000%	0.2450%	0.2492%	0.2471%	0.2675%	-2.4800%	-2.5271%	-0.6675%	27.96%	2.40%	2.97%		25.56%	25.00%
Jul-51	7.1100%	4.3900%	0.2300%	0.2450%	0.2492%	0.2471%	0.2717%	6.8800%	6.8629%	4.1183%	35.45%	2.76%	2.97%		32.69%	32.48%
Aug-51	4.7800%	1.5200%	0.2100%	0.2400%	0.2433%	0.2417%	0.2658%	4.5700%	4.5383%	1.2542%	35.90%	2.52%	2.90%		33.38%	33.00%
Sep-51	0.1300%	0.8600%	0.1900%	0.2367%	0.2400%	0.2383%	0.2617%	-0.0600%	-0.1083%	0.5983%	28.47%	2.28%	2.86%		26.19%	25.61%
Oct-51	-1.0300%	0.2900%	0.2300%	0.2408%	0.2442%	0.2425%	0.2642%	-1.2600%	-1.2725%	0.0258%	25.98%	2.76%	2.91%		23.22%	

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Oct-52	0.2000%	1.0100%	0.2300%	0.2508%	0.2567%	0.2538%	0.2717%	-0.0300%	-0.0538%	0.7383%	13.49%	2.76%	3.05%	10.73%	10.45%
Nov-52	5.7100%	4.2300%	0.2100%	0.2483%	0.2550%	0.2517%	0.2700%	5.5000%	5.4583%	3.9600%	18.83%	2.52%	3.02%	16.31%	15.81%
Dec-52	3.8200%	2.1300%	0.2400%	0.2542%	0.2508%	0.2508%	0.2683%	3.5800%	3.5692%	1.8617%	18.35%	2.88%	3.01%	15.47%	15.34%
Jan-53	-0.4900%	1.0300%	0.2300%	0.2517%	0.2575%	0.2546%	0.2708%	-0.7200%	-0.7446%	0.7592%	15.68%	2.76%	3.06%	12.92%	12.62%
Feb-53	-1.0600%	-0.6700%	0.2100%	0.2558%	0.2617%	0.2588%	0.2750%	-1.2700%	-1.3188%	-0.9450%	15.25%	2.52%	3.11%	15.25%	14.67%
Mar-53	-2.1200%	-0.4300%	0.2500%	0.2600%	0.2650%	0.2625%	0.2800%	-2.3700%	-2.3825%	-0.7100%	9.75%	3.00%	3.15%	6.75%	6.60%
Apr-53	-2.3700%	-1.9200%	0.2400%	0.2692%	0.2742%	0.2717%	0.2892%	-2.6100%	-2.6417%	-2.2092%	11.64%	2.88%	3.26%	8.76%	8.38%
May-53	0.7700%	0.2400%	0.2400%	0.2783%	0.2842%	0.2813%	0.3025%	0.5300%	0.4888%	-0.0625%	8.77%	2.88%	3.38%	5.89%	5.40%
Jun-53	-1.3400%	-2.7300%	0.2700%	0.2833%	0.2917%	0.2875%	0.3092%	-1.6100%	-1.6275%	-3.0392%	2.30%	3.24%	3.45%	-0.94%	-1.15%
Jul-53	2.7300%	3.4500%	0.2500%	0.2733%	0.2850%	0.2792%	0.3050%	2.4800%	2.4508%	3.1450%	3.07%	3.00%	3.35%	0.07%	-0.28%
Aug-53	-5.0100%	0.1600%	0.2500%	0.2825%	0.2700%	0.2763%	0.3008%	-5.2600%	-5.2863%	-0.1408%	-1.39%	3.00%	3.32%	-4.39%	-4.71%
Sep-53	0.3400%	1.1900%	0.2500%	0.2742%	0.2858%	0.2800%	0.3017%	0.0900%	0.0600%	0.8883%	0.72%	3.00%	3.36%	-2.28%	-2.64%
Oct-53	5.4000%	4.1100%	0.2300%	0.2633%	0.2775%	0.2704%	0.2908%	5.1700%	5.1296%	3.8192%	5.94%	2.76%	3.25%	3.18%	2.70%
Nov-53	2.0400%	2.7400%	0.2400%	0.2592%	0.2725%	0.2658%	0.2833%	1.8000%	1.7742%	2.4567%	2.27%	2.88%	3.19%	-0.61%	-0.92%
Dec-53	0.5300%	0.6400%	0.2400%	0.2608%	0.2733%	0.2671%	0.2817%	0.2900%	0.2629%	0.3583%	-0.98%	2.88%	3.21%	-3.86%	-4.18%
Jan-54	5.3600%	3.2700%	0.2300%	0.2550%	0.2683%	0.2617%	0.2767%	5.1300%	5.0983%	2.9933%	4.85%	2.76%	3.14%	2.09%	1.71%
Feb-54	1.1100%	1.1700%	0.2200%	0.2458%	0.2600%	0.2529%	0.2692%	0.8900%	0.8571%	0.9008%	7.15%	2.64%	3.04%	4.51%	4.11%
Mar-54	3.2500%	2.7000%	0.2500%	0.2383%	0.2525%	0.2454%	0.2633%	3.0000%	3.0046%	2.4367%	13.02%	3.00%	2.95%	10.02%	10.08%
Apr-54	5.1600%	1.2100%	0.2200%	0.2375%	0.2500%	0.2438%	0.2633%	4.9400%	4.9163%	0.9467%	21.74%	2.64%	2.93%	19.10%	18.82%
May-54	4.1800%	2.5700%	0.2000%	0.2400%	0.2525%	0.2463%	0.2617%	3.9800%	3.9338%	2.3083%	25.86%	2.40%	2.96%	23.46%	22.91%
Jun-54	0.3100%	0.9600%	0.2500%	0.2417%	0.2550%	0.2483%	0.2633%	0.0600%	0.0617%	0.6967%	27.97%	3.00%	2.98%	24.99%	24.99%
Jul-54	5.8900%	4.9500%	0.2200%	0.2408%	0.2533%	0.2471%	0.2617%	5.6700%	5.6429%	4.6883%	31.90%	2.64%	2.97%	29.26%	28.94%
Aug-54	-2.7500%	-1.3100%	0.2300%	0.2392%	0.2525%	0.2458%	0.2608%	-2.9800%	-2.9958%	-1.5708%	35.04%	2.76%	2.95%	32.28%	32.09%
Sep-54	8.5100%	1.7800%	0.2200%	0.2408%	0.2533%	0.2471%	0.2600%	8.2900%	8.2629%	1.5200%	46.04%	2.64%	2.97%	43.40%	43.07%
Oct-54	-1.6700%	-3.6800%	0.2100%	0.2392%	0.2533%	0.2463%	0.2600%	-1.8800%	-1.9163%	-3.9400%	36.24%	2.52%	2.96%	33.72%	33.29%
Nov-54	9.0900%	5.6500%	0.2300%	0.2408%	0.2533%	0.2471%	0.2592%	8.8600%	8.8429%	5.3908%	45.65%	2.76%	2.97%	42.89%	42.69%
Dec-54	5.3400%	3.4100%	0.2300%	0.2417%	0.2533%	0.2475%	0.2592%	5.1100%	5.0925%	3.1508%	52.62%	2.76%	2.97%	49.86%	49.65%
Jan-55	1.9700%	1.4300%	0.2200%	0.2442%	0.2550%	0.2496%	0.2608%	1.7500%	1.7204%	1.1692%	47.71%	2.64%	3.00%	45.07%	44.72%
Feb-55	0.9800%	3.4400%	0.2200%	0.2442%	0.2583%	0.2513%	0.2617%	0.7600%	0.7288%	3.1783%	47.52%	2.64%	3.02%	44.88%	44.51%
Mar-55	-0.3000%	-1.1000%	0.2400%	0.2517%	0.2608%	0.2563%	0.2625%	-0.5400%	-0.5563%	-1.3625%	42.45%	2.88%	3.08%	39.57%	39.37%
Apr-55	3.9600%	2.0200%	0.2200%	0.2508%	0.2608%	0.2558%	0.2625%	3.7400%	3.7042%	1.7575%	40.82%	2.64%	3.07%	38.18%	37.75%
May-55	0.5500%	-0.5800%	0.2500%	0.2533%	0.2625%	0.2579%	0.2658%	0.3000%	0.2921%	-0.8458%	35.92%	3.00%	3.10%	32.92%	32.82%
Jun-55	8.4100%	2.1100%	0.2300%	0.2542%	0.2617%	0.2579%	0.2675%	8.1800%	8.1521%	1.8425%	46.89%	2.76%	3.10%	44.13%	43.80%
Jul-55	6.2200%	4.6600%	0.2300%	0.2550%	0.2617%	0.2583%	0.2675%	5.9900%	5.9617%	4.3925%	47.35%	2.76%	3.10%	44.59%	44.25%
Aug-55	-0.2500%	0.5200%	0.2700%	0.2592%	0.2667%	0.2629%	0.2700%	-0.5200%	-0.5129%	0.2500%	51.14%	3.24%	3.16%	47.90%	47.98%
Sep-55	1.3000%	-2.9000%	0.2400%	0.2608%	0.2683%	0.2646%	0.2725%	1.0600%	1.0354%	-3.1725%	41.10%	2.88%	3.18%	38.22%	37.92%
Oct-55	-2.8400%	-0.8500%	0.2500%	0.2583%	0.2658%	0.2621%	0.2750%	-3.0900%	-3.1021%	-1.1250%	39.42%	3.00%	3.15%	36.42%	36.27%
Nov-55	8.2700%	2.9200%	0.2400%	0.2583%	0.2650%	0.2617%	0.2767%	8.0300%	8.0083%	2.6433%	38.37%	2.88%	3.14%	35.49%	35.23%
Dec-55	0.1500%	-0.6700%	0.2400%	0.2625%	0.2683%	0.2654%	0.2792%	-0.0900%	-0.1154%	-0.9492%	31.55%	2.88%	3.19%	28.67%	28.37%
Jan-56	-3.4700%	0.3000%	0.2500%	0.2592%	0.2658%	0.2625%	0.2758%	-3.7200%	-3.7325%	0.0242%	24.53%	3.00%	3.15%	21.53%	21.38%
Feb-56	4.1300%	1.7800%	0.2300%	0.2633%	0.2633%	0.2600%	0.2742%	3.9000%	3.8700%	1.5058%	28.42%	2.76%	3.12%	25.66%	25.30%
Mar-56	7.1000%	3.9400%	0.2300%	0.2583%	0.2650%	0.2617%	0.2742%	6.8700%	6.8383%	3.6658%	37.95%	2.76%	3.14%	35.19%	34.81%
Apr-56	-0.0400%	-2.8700%	0.2600%	0.2700%	0.2750%	0.2725%	0.2833%	-0.3000%	-0.3125%	-3.1533%	32.64%	3.12%	3.27%	29.52%	29.37%
May-56	-5.9300%	-1.3800%	0.2600%	0.2733%	0.2783%	0.2758%	0.2900%	-6.1900%	-6.2058%	-1.6700%	24.09%	3.12%	3.31%	20.97%	20.78%
Jun-56	4.0900%	2.1100%	0.2300%	0.2717%	0.2792%	0.2754%	0.2908%	3.8600%	3.8146%	1.8192%	19.15%	2.76%	3.31%	16.39%	15.84%
Jul-56	5.3000%	5.2500%	0.2600%	0.2733%	0.2825%	0.2779%	0.2958%	5.0400%	5.0221%	4.9542%	18.12%	3.12%	3.34%	15.00%	14.78%
Aug-56	-3.2800%	-2.5900%	0.2600%	0.2858%	0.2917%	0.2888%	0.3025%	-3.5400%	-3.5688%	-2.8925%	14.53%	3.12%	3.47%	11.41%	11.06%
Sep-56	-4.4000%	-3.1900%	0.2500%	0.2967%	0.3025%	0.2996%	0.3100%	-4.6500%	-4.6996%	-3.5000%	8.08%	3.00%	3.60%	5.08%	4.49%
Oct-56	0.6600%	0.6300%	0.2900%	0.2992%	0.3075%	0.3033%	0.3158%	0.3700%	0.3567%	0.3142%	11.98%	3.48%	3.64%	8.50%	8.34%
Nov-56	-0.5000%	0.2800%	0.2700%	0.3075%	0.3133%	0.3104%	0.3183%	-0.7700%	-0.8104%	-0.0383%	2.91%	3.24%	3.73%	-0.33%	-0.82%
Dec-56	3.7000%	1.0400%	0.2800%	0.3125%	0.3208%	0.3167%	0.3258%	3.4200%	3.3833%	0.7142%	6.56%	3.36%	3.80%	3.20%	2.76%
Jan-57	-4.0100%	3.2400%	0.2900%	0.3142%	0.3242%	0.3192%	0.3300%	-4.3000%	-4.3292%	2.9100%	5.96%	3.48%	3.83%	2.48%	2.13%
Feb-57	-2.6400%	-0.6100%	0.2500%	0.3058%	0.3192%	0.3125%	0.3375%	-2.8900%	-2.9525%	-0.9475%	-0.93%	3.00%	3.75%	-3.93%	-4.68%
Mar-57	2.1500%	0.7800%	0.2600%	0.3050%	0.3167%	0.3108%	0.3375%	1.8900%	1.8392%	0.4425%	-5.51%	3.12%	3.73%	-8.63%	-9.24%
Apr-57	3.8800%	4.0200%	0.2900%	0.3058%	0.3158%	0.3108%	0.3342%	3.5900%	3.5692%	3.6858%	-1.80%	3.48%	3.73%	-5.28%	-5.53%
May-57	4.3700%	1.8000%	0.2900%	0.3117%	0.3192%	0.3154%	0.3342%	4.0800%	4.0546%	1.4658%	8.95%	3.48%	3.79%	5.47%	5.16%
Jun-57	0.0400%	-4.1800%	0.2500%	0.3258%	0.3317%	0.3288%	0.3408%	-0.2100%	-0.2888%	-4.5208%	1.71%	3.00%	3.95%	1.71%	0.76%
Jul-57	1.3100%	0.3500%	0.3300%	0.3325%	0.3417%	0.3371%	0.3500%	0.9800%	0.9729%	0.0000%	0.74%	3.96%	4.05%	-3.22%	-3.30%
Aug-57	-5.0500%	-2.9400%	0.3000%	0.3417%	0.3508%	0.3463%	0.3642%	-5.3500%	-5.3963%	-3.3042%	-1.10%	3.60%	4.16%	-4.70%	-5.26%
Sep-57	-6.0200%	-1.3800%	0.3100%	0.3433%	0.3550%	0.3492%	0.3792%	-6.3300%	-6.3692%	-1.7592%	-2.78%	3.72%	4.19%	-6.50%	-6.97%
Oct-57	-3.0200%	-0.7400%	0.3100%	0.3417%	0.3567%	0.3492%	0.3842%	-3.3300%	-3.3692%	-1.1242%	-6.33%	3.72%	4.19%	-10.05%	-10.52%
Nov-57	2.3100%	4.2800%	0.2900%	0.3400%	0.3575%	0.3488%	0.3850%	2.0200%	1.9613%	3.8950%	-3.69%	3.48%	3.19%	-7.17%	-7.87%
Dec-57	-3.9500%	1.9500%	0.2900%	0.3175%	0.3400%	0.3288%	0.3633%	-4.2400%	-4.2788%	1.5867%	-10.79%	3.48%	3.95%	-14.27%	-14.74%
Jan-58	4.4500%	6.0200%	0.2700%	0.3000%	0.3175%	0.3088%	0.3275%	4.1800%	4.1413%	5.6925%	-2.93%	3.24%	3.71%	-6.17%	-6.63%
Feb-58	-1.4100%	1.3700%	0.2500%	0.2992%	0.3142%	0.3067%	0.3300%	-1.6600%	-1.7167%	1.0400%	-1.70%	3.00%	3.68%	-5.38%	-5.80%
Mar-58	3.2800%	2.0000%	0.2700%	0.3025%	0.3150%	0.3088%	0.3442%	3.0100%	2.9713%	1.6558%	-0.62%	3.24%	3.71%	-3.86%	-4.32%
Apr-58	3.3700%	5.1600%	0.2600%	0.3000%	0.3150%	0.3075%	0.3292%	3.1100%	3.0625%	4.8308%	-1.10%	3.12%	3.69%	-4.79%	-5.26%
May-58	2.1200%	1.6400%	0.2400%	0.2975%	0.3150%	0.3063%	0.3342%	1.8800%	1.8138%	1.3058%	-3.24%	2.88%	3.68%	-6.12%	-6.91%
Jun-58	2.7900%	1.7200%	0.2700%	0.2975%	0.3150%	0.3063%	0.3325%	2.5200%	2.4838%	1.3875%	-0.58%	3.24%	3.68%	-3.82%	-4.25%
Jul-58	4.9900%	1.0900%	0.2700%	0.3058%	0.3192%	0.3125%	0.3367%	4.2200%	4.1775%	0.7533%	2.55%	3.24%	3.75%	-0.69%	-1.20%
Aug-58	1.7600%	-0.6700%	0.2700%	0.3208%	0.3317%	0.3263%	0.3575%	1.4900%	1.4338%	-1.0275%	9.90%	3.24%	3.92%	6.66%	5.99%
Sep-58	5.0100%	3.3200%	0.3200%	0.3408%	0.3500%	0.3454%	0.3792%	4.6900%	4.6646%	2.9408%	22.80%</				

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jul-59	3.6300%	3.7100%	0.3500%	0.3725%	0.3817%	0.3771%	0.4067%	3.2800%	3.2529%	3.3033%	32.56%	4.20%	4.53%	28.36%	28.03%
Aug-59	-1.0200%	1.7500%	0.3500%	0.3692%	0.3817%	0.3754%	0.4075%	-1.3700%	-1.3954%	1.3425%	28.94%	4.20%	4.51%	24.74%	24.43%
Sep-59	-4.4300%	-3.9300%	0.3400%	0.3767%	0.3908%	0.3838%	0.4192%	-4.7700%	-4.8138%	-4.3492%	17.35%	4.08%	4.61%	13.27%	12.74%
Oct-59	1.2800%	1.5700%	0.3500%	0.3808%	0.3967%	0.3888%	0.4133%	0.9300%	0.8913%	1.1567%	15.72%	4.20%	4.67%	11.52%	11.06%
Nov-59	1.8600%	0.0100%	0.3500%	0.3800%	0.3917%	0.3858%	0.4083%	1.5100%	1.4742%	-0.3983%	14.62%	4.20%	4.63%	10.42%	9.99%
Dec-59	2.9200%	2.3000%	0.3600%	0.3817%	0.3950%	0.3883%	0.4133%	2.5600%	2.5317%	1.8867%	11.98%	4.32%	4.66%	7.66%	7.32%
Jan-60	-7.0000%	-1.0800%	0.3500%	0.3842%	0.3975%	0.3908%	0.4183%	-7.3500%	-7.3908%	-1.4983%	3.59%	4.20%	4.69%	-0.61%	-1.10%
Feb-60	1.4700%	1.8100%	0.3700%	0.3800%	0.3925%	0.3863%	0.4167%	1.1000%	1.0838%	1.3933%	4.60%	4.44%	4.64%	0.16%	-0.04%
Mar-60	-1.2300%	1.4100%	0.3600%	0.3742%	0.3850%	0.3796%	0.4092%	-1.5900%	-1.6096%	1.0008%	3.11%	4.32%	4.56%	-1.21%	-1.45%
Apr-60	-1.6100%	0.7500%	0.3200%	0.3708%	0.3817%	0.3763%	0.3992%	-1.9300%	-1.9863%	0.3508%	-2.47%	3.84%	4.52%	-6.31%	-6.99%
May-60	3.2600%	2.3300%	0.3700%	0.3717%	0.3842%	0.3779%	0.4050%	2.8900%	2.8821%	1.9250%	-1.65%	4.44%	4.54%	-6.09%	-6.19%
Jun-60	2.1100%	4.0800%	0.3400%	0.3708%	0.3833%	0.3771%	0.4033%	1.7700%	1.7329%	3.6767%	0.64%	4.08%	4.53%	-3.44%	-3.88%
Jul-60	-2.3400%	-1.0000%	0.3200%	0.3675%	0.3800%	0.3738%	0.3992%	-2.6600%	-2.7138%	-1.3992%	-5.16%	3.84%	4.49%	-9.00%	-9.64%
Aug-60	3.1700%	5.0200%	0.3400%	0.3567%	0.3700%	0.3633%	0.3867%	2.8300%	2.8067%	4.6333%	-1.14%	4.08%	4.36%	-5.22%	-5.50%
Sep-60	-5.9000%	-5.1400%	0.3200%	0.3542%	0.3675%	0.3608%	0.3808%	-6.2200%	-6.2608%	-5.5208%	-2.66%	3.84%	4.33%	-6.50%	-6.99%
Oct-60	-0.0700%	-0.1200%	0.3300%	0.3583%	0.3700%	0.3642%	0.3842%	-0.4000%	-0.4342%	-0.5042%	-3.96%	3.96%	4.37%	-7.92%	-8.33%
Nov-60	4.6500%	3.8600%	0.3200%	0.3592%	0.3725%	0.3658%	0.3851%	4.3300%	4.2842%	3.4749%	-1.33%	3.84%	4.39%	-5.17%	-5.72%
Dec-60	4.7900%	7.2400%	0.3300%	0.3625%	0.3750%	0.3688%	0.3875%	4.4600%	4.4213%	6.8525%	0.46%	3.96%	4.43%	-3.50%	-3.96%
Jan-61	6.4500%	6.1900%	0.3300%	0.3600%	0.3733%	0.3667%	0.3867%	6.1200%	6.0833%	5.8033%	14.99%	3.96%	4.40%	11.03%	10.59%
Feb-61	3.1900%	3.5700%	0.3000%	0.3558%	0.3667%	0.3613%	0.3825%	2.8900%	2.8288%	3.1875%	16.94%	3.60%	4.34%	13.34%	12.61%
Mar-61	2.7000%	3.1900%	0.3100%	0.3517%	0.3608%	0.3563%	0.3733%	2.3900%	2.3438%	2.8167%	21.60%	3.72%	4.28%	17.88%	17.32%
Apr-61	0.5100%	1.0900%	0.3100%	0.3542%	0.3642%	0.3592%	0.3733%	0.2000%	0.1508%	0.7167%	24.22%	3.72%	4.31%	20.50%	19.91%
May-61	2.3900%	1.3300%	0.3400%	0.3558%	0.3675%	0.3617%	0.3767%	2.0500%	2.0283%	0.9533%	23.17%	4.08%	4.34%	19.09%	18.83%
Jun-61	-2.7500%	-2.2700%	0.3200%	0.3608%	0.3708%	0.3658%	0.3808%	-3.0700%	-3.1158%	-2.6508%	17.31%	3.84%	4.39%	13.47%	12.92%
Jul-61	3.4200%	4.2400%	0.3300%	0.3675%	0.3775%	0.3725%	0.3875%	3.0900%	3.0475%	3.8525%	20.23%	3.96%	4.47%	20.27%	19.76%
Aug-61	2.4300%	4.5400%	0.3300%	0.3708%	0.3808%	0.3758%	0.3942%	2.1000%	2.0542%	4.1458%	23.34%	3.96%	4.51%	19.38%	18.83%
Sep-61	-1.8400%	-0.6700%	0.3200%	0.3708%	0.3825%	0.3767%	0.3942%	-2.1600%	-2.2167%	-1.0642%	28.66%	3.84%	4.52%	24.82%	24.14%
Oct-61	2.9800%	4.8000%	0.3400%	0.3683%	0.3800%	0.3742%	0.3925%	2.6400%	2.6058%	4.4075%	32.58%	4.08%	4.49%	28.50%	28.09%
Nov-61	4.4700%	3.3500%	0.3200%	0.3658%	0.3783%	0.3721%	0.3900%	4.1500%	4.0979%	2.9600%	32.36%	3.84%	4.47%	28.52%	27.89%
Dec-61	0.4600%	-2.9200%	0.3100%	0.3683%	0.3800%	0.3742%	0.3875%	0.1500%	0.0858%	-3.3075%	26.89%	3.72%	4.49%	23.17%	22.40%
Jan-62	-3.6600%	-3.6600%	0.3700%	0.3683%	0.3792%	0.3738%	0.3875%	-4.0300%	-4.0338%	-4.0475%	14.84%	4.44%	4.49%	10.40%	10.35%
Feb-62	2.0900%	3.0000%	0.3200%	0.3683%	0.3800%	0.3742%	0.3883%	1.7700%	1.7158%	2.6117%	13.61%	3.84%	4.49%	9.77%	9.12%
Mar-62	-0.4600%	0.8100%	0.3300%	0.3658%	0.3775%	0.3717%	0.3867%	-0.7900%	-0.8317%	0.4233%	10.12%	3.96%	4.46%	6.16%	5.66%
Apr-62	-6.0700%	-3.5300%	0.3300%	0.3608%	0.3742%	0.3675%	0.3825%	-6.4000%	-6.4375%	-3.9125%	2.91%	3.96%	4.41%	-1.05%	-1.50%
May-62	-8.1100%	-9.1200%	0.3200%	0.3567%	0.3692%	0.3629%	0.3758%	-8.4300%	-8.4729%	-9.4958%	-7.65%	3.84%	4.36%	-11.49%	-12.00%
Jun-62	-8.0300%	-5.4800%	0.3000%	0.3567%	0.3700%	0.3633%	0.3733%	-8.3300%	-8.3933%	-5.8533%	-12.66%	3.60%	4.36%	-16.26%	-17.02%
Jul-62	6.5200%	6.8900%	0.3400%	0.3617%	0.3742%	0.3679%	0.3750%	6.1800%	6.1521%	6.5150%	-10.04%	4.08%	4.42%	-14.12%	-14.46%
Aug-62	2.0800%	2.7100%	0.3400%	0.3625%	0.3742%	0.3683%	0.3775%	1.7400%	1.7117%	2.3325%	-10.35%	4.08%	4.42%	-14.43%	-14.77%
Sep-62	-4.6500%	-3.3400%	0.3000%	0.3600%	0.3717%	0.3658%	0.3758%	-4.9500%	-5.0158%	-3.7158%	-12.92%	3.60%	4.39%	-16.52%	-17.31%
Oct-62	0.6400%	-0.1400%	0.3500%	0.3567%	0.3675%	0.3621%	0.3742%	0.2900%	0.2779%	-0.5142%	-14.90%	4.20%	4.35%	-19.10%	-19.24%
Nov-62	10.8600%	7.6800%	0.3100%	0.3542%	0.3667%	0.3604%	0.3708%	10.5500%	10.4996%	7.3092%	-9.69%	4.33%	4.40%	-13.41%	-14.01%
Dec-62	1.5300%	3.1200%	0.3200%	0.3533%	0.3650%	0.3592%	0.3700%	1.2100%	1.1708%	2.7500%	-8.73%	3.84%	4.31%	-12.57%	-13.04%
Jan-63	5.0600%	5.5800%	0.3200%	0.3580%	0.3642%	0.3575%	0.3658%	4.7400%	4.7025%	5.2142%	-0.47%	3.84%	4.29%	-4.76%	-4.76%
Feb-63	-2.3900%	-2.0600%	0.2900%	0.3492%	0.3633%	0.3563%	0.3642%	-2.6800%	-2.7463%	-2.4424%	-4.83%	3.48%	4.28%	-8.31%	-9.11%
Mar-63	3.7000%	1.8600%	0.3100%	0.3492%	0.3617%	0.3554%	0.3642%	3.3900%	3.3446%	1.4958%	-0.86%	3.72%	4.27%	-5.12%	-5.12%
Apr-63	5.0000%	2.3200%	0.3400%	0.3508%	0.3625%	0.3567%	0.3642%	4.6600%	4.6433%	1.9558%	10.83%	4.08%	4.28%	6.75%	6.55%
May-63	1.9300%	0.7000%	0.3300%	0.3517%	0.3633%	0.3575%	0.3642%	1.6000%	1.5725%	0.3358%	22.94%	3.96%	4.29%	18.98%	18.65%
Jun-63	-1.8800%	-1.2300%	0.3000%	0.3525%	0.3633%	0.3579%	0.3642%	-2.1800%	-2.2379%	-1.5942%	31.16%	3.60%	4.30%	27.56%	26.86%
Jul-63	-0.2200%	1.2300%	0.3600%	0.3550%	0.3658%	0.3604%	0.3658%	-0.5800%	-0.5804%	0.8642%	22.86%	4.32%	4.33%	18.54%	18.53%
Aug-63	5.3500%	4.2500%	0.3300%	0.3575%	0.3667%	0.3621%	0.3650%	5.0200%	4.9879%	3.8850%	26.79%	3.96%	4.35%	22.83%	22.45%
Sep-63	-0.9700%	-2.5800%	0.3400%	0.3592%	0.3675%	0.3633%	0.3667%	-1.3100%	-1.3333%	-2.9467%	31.69%	4.08%	4.36%	27.61%	27.33%
Oct-63	3.9900%	-0.3300%	0.3400%	0.3600%	0.3692%	0.3646%	0.3675%	3.0500%	3.0254%	-0.6975%	35.29%	4.08%	4.38%	31.21%	30.91%
Nov-63	-0.4600%	-0.8200%	0.3200%	0.3608%	0.3700%	0.3654%	0.3683%	-0.7800%	-0.8254%	-1.1883%	21.47%	3.84%	4.39%	17.63%	17.09%
Dec-63	2.6200%	3.1700%	0.3600%	0.3625%	0.3717%	0.3671%	0.3717%	2.2600%	2.2529%	2.7983%	22.78%	4.32%	4.41%	18.46%	18.37%
Jan-64	2.8300%	1.2700%	0.3500%	0.3642%	0.3742%	0.3692%	0.3742%	2.4800%	2.4608%	0.8958%	20.17%	4.20%	4.43%	15.97%	15.74%
Feb-64	1.4700%	0.3200%	0.3200%	0.3633%	0.3717%	0.3675%	0.3750%	1.1500%	1.1025%	-0.0550%	24.92%	3.84%	4.41%	21.08%	20.51%
Mar-64	1.6500%	-0.3500%	0.3700%	0.3725%	0.3750%	0.3688%	0.3758%	1.2800%	1.2813%	-0.7258%	22.45%	4.44%	4.43%	18.01%	18.03%
Apr-64	0.7500%	0.6700%	0.3500%	0.3667%	0.3742%	0.3704%	0.3767%	0.4000%	0.3796%	0.2933%	17.50%	4.20%	4.45%	13.30%	13.05%
May-64	1.6200%	0.3200%	0.3200%	0.3675%	0.3750%	0.3713%	0.3775%	1.3000%	1.2488%	-0.0575%	17.14%	3.84%	4.46%	13.30%	12.68%
Jun-64	1.7800%	2.3400%	0.3800%	0.3675%	0.3758%	0.3717%	0.3792%	1.4000%	1.4083%	1.9608%	21.51%	4.56%	4.46%	16.95%	17.05%
Jul-64	1.9500%	4.7100%	0.3500%	0.3667%	0.3750%	0.3708%	0.3783%	1.6000%	1.5792%	4.3317%	24.15%	4.20%	4.45%	19.95%	19.70%
Aug-64	-1.1800%	0.3100%	0.3500%	0.3675%	0.3742%	0.3708%	0.3783%	-1.5300%	-1.5508%	-0.0683%	16.46%	4.20%	4.45%	12.26%	12.01%
Sep-64	3.0100%	1.7000%	0.3400%	0.3683%	0.3733%	0.3708%	0.3775%	2.6700%	2.6392%	1.3225%	21.14%	4.08%	4.45%	17.06%	16.69%
Oct-64	0.9600%	1.6500%	0.3400%	0.3683%	0.3742%	0.3713%	0.3758%	0.6200%	0.5888%	1.2742%	18.29%	4.08%	4.46%	14.21%	13.83%
Nov-64	0.0500%	1.1400%	0.3500%	0.3692%	0.3742%	0.3717%	0.3775%	-0.3000%	-0.3217%	0.7625%	18.89%	4.20%	4.46%	14.69%	14.43%
Dec-64	0.5600%	0.8600%	0.3500%	0.3700%	0.3750%	0.3725%	0.3783%	0.2100%	0.1875%	0.4817%	16.51%	4.20%	4.47%	12.31%	12.04%
Jan-65	3.4500%	3.7100%	0.3300%	0.3692%	0.3733%	0.3713%	0.3775%	3.1200%	3.0788%	3.3325%	17.21%	3.96%	4.46%	13.25%	12.76%
Feb-65	0.3100%	0.0900%	0.3200%	0.3675%	0.3717%	0.3696%	0.3758%	-0.0100%	-0.0596%	-0.2858%	15.87%	3.84%	4.44%	12.03%	11.44%
Mar-65	-1.3300%	0.0700%	0.3800%	0.3683%	0.3733%	0.3708%	0.3750%	-1.7100%	-1.7008%	-0.3050%	12.47%	4.56%	4.45%	7.91%	8.02%
Apr-65	3.5600%	1.0900%	0.3300%	0.3692%	0.3733%	0.3713%	0.3742%	3.2300%	3.1888%	0.7158%	15.61%	3.96%	4.46%	11.65%	11.16%
May-65	-0.3000%	-0.8400%	0.3300%	0.3700%	0.3742%	0.3721%	0.3750%	-0.6300%	-0.6721%	-1.2150%	13.43%	3.96%	4.47%	9.47%	8.96%
Jun-65	-4.7300%	-3.4000%	0.3800%	0.3717%	0.3767%	0.3742%	0.3767%	-							

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Apr-66	2.2000%	1.7200%	0.3600%	0.4108%	0.4250%	0.4179%	0.4375%	1.8400%	1.7821%	1.2825%	5.42%	4.32%	5.02%	1.10%	0.41%
May-66	-4.9200%	-2.9600%	0.4100%	0.4150%	0.4250%	0.4200%	0.4375%	-5.3300%	-5.3400%	-3.3975%	0.54%	4.92%	5.04%	-4.38%	-4.50%
Jun-66	-1.4600%	-1.8100%	0.3900%	0.4225%	0.4300%	0.4263%	0.4500%	-1.8500%	-1.8863%	-2.2600%	0.39%	4.68%	5.12%	-0.69%	-1.13%
Jul-66	-1.2000%	0.0900%	0.3800%	0.4300%	0.4375%	0.4338%	0.4542%	-1.5800%	-1.6338%	-0.3642%	1.25%	4.56%	5.21%	-3.31%	-3.95%
Aug-66	-7.2500%	-8.7500%	0.4300%	0.4425%	0.4483%	0.4454%	0.4650%	-7.6800%	-7.6954%	-9.2150%	-8.58%	5.16%	5.35%	-13.74%	-13.92%
Sep-66	-0.5300%	4.7500%	0.4100%	0.4575%	0.4650%	0.4613%	0.4842%	-0.9400%	-0.9913%	4.2658%	-12.00%	4.92%	5.54%	-16.92%	-17.54%
Oct-66	4.9400%	9.7000%	0.4000%	0.4508%	0.4583%	0.4546%	0.4783%	4.5400%	4.4854%	9.2217%	-10.25%	4.80%	5.46%	-15.05%	-15.70%
Nov-66	0.9500%	-0.7600%	0.3800%	0.4458%	0.4550%	0.4504%	0.4692%	0.5700%	0.4996%	-1.2292%	-9.11%	4.56%	5.41%	-13.67%	-14.52%
Dec-66	0.0200%	2.2100%	0.3900%	0.4492%	0.4567%	0.4529%	0.4725%	-0.3700%	-0.4329%	1.7375%	-10.05%	4.68%	5.44%	-14.73%	-15.48%
Jan-67	7.9800%	2.7100%	0.4000%	0.4333%	0.4417%	0.4375%	0.4550%	7.5800%	7.5425%	2.2550%	-3.47%	4.80%	5.25%	-8.27%	-8.72%
Feb-67	0.7200%	-1.5700%	0.3400%	0.4192%	0.4317%	0.4254%	0.4400%	0.3800%	0.2946%	-2.0100%	-1.48%	4.08%	5.11%	-5.56%	-6.59%
Mar-67	4.0900%	1.9700%	0.3900%	0.4275%	0.4358%	0.4317%	0.4533%	3.7000%	3.6583%	1.5167%	4.69%	4.68%	5.18%	0.01%	-0.49%
Apr-67	4.3700%	2.0200%	0.3500%	0.4258%	0.4383%	0.4321%	0.4517%	4.0200%	3.9379%	1.5683%	6.92%	4.20%	5.19%	2.72%	1.73%
May-67	-4.7700%	-5.0600%	0.4300%	0.4367%	0.4517%	0.4442%	0.4717%	-5.2000%	-5.2142%	-5.5317%	7.08%	5.16%	5.33%	1.92%	1.75%
Jun-67	1.9000%	-1.3100%	0.3900%	0.4533%	0.4692%	0.4613%	0.4867%	1.5100%	1.4388%	-1.7967%	10.74%	4.68%	5.54%	6.06%	5.20%
Jul-67	4.6800%	2.0400%	0.4300%	0.4650%	0.4767%	0.4708%	0.4950%	4.2500%	4.2092%	1.5450%	17.33%	5.16%	5.65%	12.17%	11.68%
Aug-67	-0.7000%	-0.6500%	0.4200%	0.4683%	0.4800%	0.4742%	0.4967%	-1.1200%	-1.1742%	-1.1467%	25.61%	5.04%	5.69%	20.57%	19.92%
Sep-67	3.4200%	-0.3700%	0.4000%	0.4708%	0.4892%	0.4800%	0.5042%	3.0200%	2.9400%	-0.8742%	30.60%	4.80%	5.76%	25.80%	24.84%
Oct-67	-2.7600%	-5.7200%	0.4500%	0.4850%	0.5008%	0.4929%	0.5150%	-3.2100%	-3.2529%	-6.2350%	21.02%	5.40%	5.92%	15.62%	15.10%
Nov-67	0.6500%	2.9300%	0.4500%	0.5058%	0.5192%	0.5125%	0.5400%	0.2000%	0.1375%	2.3900%	20.66%	5.40%	6.15%	15.26%	14.51%
Dec-67	2.7800%	2.8600%	0.4400%	0.5158%	0.5292%	0.5225%	0.5558%	2.3400%	2.2575%	2.3042%	23.99%	5.28%	6.27%	18.71%	17.72%
Jan-68	-4.2500%	0.8200%	0.5000%	0.5142%	0.5242%	0.5192%	0.5450%	-4.7500%	-4.7692%	0.2750%	9.94%	6.00%	6.23%	3.94%	3.71%
Feb-68	-2.6100%	-2.3300%	0.4200%	0.5083%	0.5225%	0.5154%	0.5208%	-3.0300%	-3.1254%	-2.8608%	6.31%	5.04%	6.19%	1.27%	0.12%
Mar-68	1.1000%	-3.9900%	0.4300%	0.5092%	0.5233%	0.5163%	0.5342%	0.6700%	0.5838%	-4.5242%	3.26%	5.16%	6.20%	-1.90%	-2.94%
Apr-68	8.3400%	2.7500%	0.4900%	0.5175%	0.5317%	0.5246%	0.5483%	7.8500%	7.8154%	2.2017%	7.18%	5.88%	6.30%	1.30%	0.89%
May-68	1.6100%	-0.6200%	0.4600%	0.5225%	0.5400%	0.5313%	0.5517%	1.1500%	1.0788%	-1.1717%	14.36%	5.52%	6.38%	8.84%	7.99%
Jun-68	1.0500%	8.0700%	0.4200%	0.5233%	0.5417%	0.5325%	0.5517%	0.6300%	0.5175%	7.5183%	13.41%	5.04%	6.39%	8.37%	7.02%
Jul-68	-1.7200%	-0.7000%	0.4800%	0.5200%	0.5375%	0.5288%	0.5442%	-2.2000%	-2.2488%	-1.2442%	6.48%	5.76%	6.35%	0.72%	0.13%
Aug-68	1.6400%	0.0400%	0.4200%	0.5017%	0.5208%	0.5113%	0.5225%	1.2200%	1.1288%	-0.4825%	8.99%	5.04%	6.14%	3.95%	2.85%
Sep-68	4.0000%	1.0000%	0.4400%	0.4975%	0.5192%	0.5083%	0.5225%	3.5600%	3.4917%	0.4775%	9.60%	5.28%	6.10%	4.32%	3.50%
Oct-68	0.8700%	0.8600%	0.4500%	0.5075%	0.5267%	0.5171%	0.5333%	0.4200%	0.3529%	0.3267%	8.29%	5.40%	6.21%	8.29%	7.48%
Nov-68	5.3100%	7.8100%	0.4300%	0.5158%	0.5375%	0.5267%	0.5492%	4.8800%	4.7833%	7.2608%	18.95%	5.16%	6.32%	13.79%	12.63%
Dec-68	-4.0200%	-3.0900%	0.4900%	0.5375%	0.5550%	0.5463%	0.5725%	-4.5100%	-4.5663%	-3.6625%	11.08%	5.88%	6.58%	5.20%	4.53%
Jan-69	-0.6800%	1.6900%	0.5000%	0.5492%	0.5608%	0.5550%	0.5867%	-1.1800%	-1.2350%	1.1033%	15.22%	6.00%	6.66%	9.22%	8.56%
Feb-69	-4.2600%	-5.3200%	0.4600%	0.5550%	0.5642%	0.5596%	0.5942%	-4.7200%	-4.8196%	-5.9142%	13.27%	5.52%	6.72%	7.75%	6.56%
Mar-69	3.5900%	-0.9600%	0.4700%	0.5708%	0.5792%	0.5750%	0.6058%	3.1200%	3.0150%	-1.5658%	16.06%	5.64%	6.90%	10.42%	9.16%
Apr-69	2.2900%	1.3900%	0.5500%	0.5742%	0.5850%	0.5796%	0.6083%	1.7400%	1.7104%	0.7817%	9.58%	6.60%	6.96%	2.98%	2.62%
May-69	0.2600%	-0.0600%	0.4700%	0.5658%	0.5800%	0.5729%	0.5967%	-0.2100%	-0.3129%	-0.6567%	8.12%	5.64%	6.88%	2.48%	1.25%
Jun-69	-5.4200%	-5.1600%	0.5500%	0.5817%	0.5933%	0.5875%	0.6175%	-5.9700%	-6.0075%	-5.7775%	1.20%	6.60%	7.05%	-5.40%	-5.85%
Jul-69	-5.8700%	-3.6300%	0.5200%	0.5900%	0.6033%	0.5967%	0.6267%	-6.3900%	-6.4667%	-4.2567%	-3.07%	6.24%	7.16%	-9.31%	-10.23%
Aug-69	4.5400%	-1.1400%	0.4800%	0.6025%	0.6058%	0.5917%	0.6200%	4.0600%	3.9483%	-1.7600%	-0.31%	5.76%	7.10%	-6.07%	-7.41%
Sep-69	-2.3600%	-3.7200%	0.5500%	0.5950%	0.6133%	0.6042%	0.6358%	-2.9100%	-2.9642%	-4.3558%	-6.40%	6.60%	7.25%	-13.00%	-13.65%
Oct-69	4.5900%	7.9800%	0.5700%	0.6108%	0.6275%	0.6192%	0.6683%	4.0200%	3.9708%	7.3117%	-2.95%	6.84%	7.43%	-9.79%	-10.38%
Nov-69	-2.9700%	-5.8800%	0.4900%	0.6125%	0.6317%	0.6221%	0.6667%	-3.4600%	-3.5921%	-6.5467%	-10.58%	5.88%	7.47%	-16.46%	-18.05%
Dec-69	-1.7700%	-0.9700%	0.6000%	0.6433%	0.6608%	0.6521%	0.7158%	-2.3700%	-2.4221%	-1.6858%	-8.49%	7.20%	7.83%	-15.69%	-16.31%
Jan-70	-7.4300%	-4.5300%	0.5600%	0.6592%	0.6792%	0.6692%	0.7242%	-7.9900%	-8.0992%	-5.2542%	-14.71%	6.72%	8.03%	-21.43%	-22.74%
Feb-70	5.5800%	10.5300%	0.5200%	0.6608%	0.6775%	0.6692%	0.7092%	5.0600%	4.9108%	9.8208%	-5.94%	6.24%	8.03%	-12.18%	-13.97%
Mar-70	0.4400%	2.3200%	0.5600%	0.6533%	0.6717%	0.6625%	0.6925%	-0.1200%	-0.2225%	1.6275%	-8.80%	6.72%	7.95%	-15.52%	-16.75%
Apr-70	-8.7500%	-9.2900%	0.5400%	0.6525%	0.6692%	0.6608%	0.6925%	-9.2900%	-9.4108%	-9.9825%	-18.64%	6.48%	7.93%	-25.12%	-26.57%
May-70	-5.7800%	-5.1500%	0.5500%	0.6758%	0.6867%	0.6813%	0.7225%	-6.3300%	-6.4613%	-5.8725%	-23.54%	6.60%	8.18%	-30.14%	-31.72%
Jun-70	-4.6600%	-5.8200%	0.6400%	0.7150%	0.7108%	0.7108%	0.7533%	-5.3000%	-5.3708%	-6.5733%	-22.93%	7.68%	8.53%	-30.61%	-31.46%
Jul-70	7.6900%	9.7300%	0.5900%	0.7033%	0.7200%	0.7117%	0.7550%	7.1000%	6.9783%	8.9750%	-11.83%	7.08%	8.54%	-18.91%	-20.37%
Aug-70	4.7800%	5.8100%	0.5700%	0.6775%	0.7075%	0.6925%	0.7400%	4.2100%	4.0875%	5.0700%	-11.62%	6.84%	8.31%	-18.46%	-19.93%
Sep-70	3.6200%	-1.1400%	0.5600%	0.6742%	0.7058%	0.6900%	0.7350%	3.0600%	2.9300%	-1.8750%	-6.21%	6.72%	8.28%	-12.93%	-14.49%
Oct-70	-0.8300%	-1.4900%	0.5500%	0.6692%	0.7033%	0.6863%	0.7300%	-1.3800%	-1.5163%	-2.2200%	-11.07%	6.60%	8.24%	-17.67%	-19.31%
Nov-70	5.0600%	9.7500%	0.5800%	0.6708%	0.7017%	0.6863%	0.7325%	4.4800%	4.3738%	9.0175%	-3.71%	6.96%	8.24%	-10.67%	-11.95%
Dec-70	5.9700%	7.3500%	0.5300%	0.6367%	0.6775%	0.6571%	0.7067%	5.4400%	5.3129%	6.6433%	3.87%	6.36%	7.89%	-2.49%	-4.01%
Jan-71	4.3200%	2.5700%	0.5100%	0.6133%	0.6583%	0.6358%	0.6792%	3.8100%	3.6842%	1.8908%	17.06%	6.12%	7.63%	10.94%	9.43%
Feb-71	1.1700%	-2.7700%	0.4600%	0.5900%	0.6392%	0.6146%	0.6575%	0.7100%	0.5554%	-3.4275%	12.17%	5.52%	7.38%	6.65%	4.79%
Mar-71	3.9400%	3.3100%	0.5600%	0.6008%	0.6442%	0.6225%	0.6708%	3.3800%	3.3175%	2.6392%	16.08%	6.72%	7.47%	9.36%	8.61%
Apr-71	3.8900%	-3.4900%	0.4800%	0.6042%	0.6450%	0.6246%	0.6725%	3.4100%	3.2654%	-4.1625%	32.16%	5.76%	7.50%	26.40%	24.66%
May-71	-3.9100%	-3.5100%	0.4700%	0.6275%	0.6533%	0.6404%	0.6950%	-4.3800%	-4.5504%	-4.2050%	34.78%	5.64%	7.69%	29.14%	27.10%
Jun-71	0.3300%	3.9800%	0.5600%	0.6367%	0.6633%	0.6500%	0.7042%	-0.2300%	-0.3200%	3.2758%	41.83%	6.72%	7.80%	35.11%	34.03%
Jul-71	-3.8700%	-2.2500%	0.5200%	0.6367%	0.6633%	0.6500%	0.7042%	-4.3900%	-4.5200%	-2.9542%	26.61%	6.24%	7.80%	20.37%	18.81%
Aug-71	3.8800%	-2.4700%	0.5500%	0.6325%	0.6608%	0.6467%	0.7000%	3.3300%	3.2333%	-3.1700%	25.52%	6.60%	7.76%	18.92%	17.76%
Sep-71	-0.4400%	-1.4600%	0.5000%	0.6200%	0.6508%	0.6354%	0.6817%	-0.9400%	-1.0754%	-2.1417%	20.60%	6.00%	7.63%	14.60%	12.98%
Oct-71	-3.9200%	1.7000%	0.4700%	0.6158%	0.6408%	0.6283%	0.6750%	-4.3900%	-4.5483%	1.0250%	16.85%	5.64%	7.54%	11.21%	9.31%
Nov-71	0.0200%	-0.5500%	0.5100%	0.6050%	0.6300%	0.6175%	0.6633%	-0.4900%	-0.5975%	-1.2133%	11.24%	6.12%	7.41%	5.12%	3.83%
Dec-71	8.8800%	8.0600%	0.5000%	0.6042%	0.6308%	0.6175%	0.6583%	8.3800%	8.2625%	7.4017%	14.30%	6.00%	7.41%	8.30%	6.89%
Jan-72	2.0600%	-0.7400%	0.5000%	0.5992%	0.6267%	0.6129%	0.6492%	1.5600%	1.4471%	-1.3892%	11.82%	6.00%	7.36%	5.82%	4.46%
Feb-72	2.7700%	-2.4000%	0.4700%	0.6058%	0.6267%	0.6163%	0.6483%	2.3000%	2.1538%	-3.0483%	13.59%	5.64%	7.40%	7.95%	6.19%
Mar-72	0.8300%	-0.3600%	0.4900%	0.6033%	0.6275%	0.6154%	0.6475%	0.3400%	0.2146%	-1.0075%	10.19%				

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jan-73	-1.4900%	-4.3900%	0.5400%	0.5958%	0.6142%	0.6050%	0.6267%	-2.0300%	-2.0950%	-5.0167%	14.87%	6.48%	7.26%	8.39%	7.61%
Feb-73	-3.5200%	-2.3400%	0.5100%	0.6017%	0.6225%	0.6121%	0.6350%	-4.0300%	-4.1321%	-2.9750%	7.84%	6.12%	7.35%	1.72%	0.49%
Mar-73	0.0800%	-1.3500%	0.5600%	0.6075%	0.6242%	0.6158%	0.6383%	-0.4800%	-0.5358%	-1.9883%	7.03%	6.72%	7.39%	0.31%	-0.36%
Apr-73	-3.8300%	-0.4900%	0.5700%	0.6050%	0.6242%	0.6146%	0.6358%	-4.4000%	-4.4446%	-1.1258%	2.24%	6.84%	7.38%	-4.60%	-5.14%
May-73	-1.6300%	0.6700%	0.5800%	0.6075%	0.6242%	0.6158%	0.6358%	-2.2100%	-2.2458%	0.0342%	-1.37%	6.96%	7.39%	-8.33%	-8.76%
Jun-73	-0.4000%	-1.6700%	0.5500%	0.6142%	0.6292%	0.6217%	0.6425%	-0.9500%	-1.0217%	-2.3125%	0.18%	6.60%	7.46%	-6.42%	-7.28%
Jul-73	4.0700%	-1.9900%	0.6100%	0.6208%	0.6367%	0.6208%	0.6517%	3.4600%	3.4413%	-2.6417%	3.76%	7.32%	7.55%	-3.56%	-3.79%
Aug-73	-3.4100%	-2.8400%	0.6200%	0.6400%	0.6533%	0.6467%	0.6700%	-4.0300%	-4.0567%	-3.5100%	-3.35%	7.44%	7.76%	-10.79%	-11.11%
Sep-73	4.2700%	7.7100%	0.5500%	0.6358%	0.6550%	0.6454%	0.6700%	3.7200%	3.6246%	7.0400%	1.03%	6.60%	7.75%	-5.75%	-6.71%
Oct-73	0.1700%	-3.8800%	0.6300%	0.6333%	0.6533%	0.6433%	0.6683%	-0.4600%	-0.4733%	-4.5483%	0.02%	7.56%	7.72%	-7.54%	-7.70%
Nov-73	-11.0900%	-11.7200%	0.5600%	0.6392%	0.6583%	0.6488%	0.6792%	-11.6500%	-11.7388%	-12.3992%	-15.15%	6.72%	7.79%	-21.87%	-22.93%
Dec-73	1.9800%	3.7500%	0.6000%	0.6400%	0.6600%	0.6500%	0.6867%	1.3800%	1.3300%	3.0633%	-14.68%	7.20%	7.80%	-21.88%	-22.48%
Jan-74	-0.7200%	4.1800%	0.6100%	0.6525%	0.6667%	0.6596%	0.6967%	-1.3300%	-1.3796%	3.4833%	-14.01%	7.32%	7.92%	-21.33%	-21.93%
Feb-74	-0.0700%	0.6000%	0.5500%	0.6542%	0.6708%	0.6625%	0.7017%	-0.6200%	-0.7325%	-0.1017%	-10.94%	6.60%	7.95%	-17.54%	-18.89%
Mar-74	-2.0500%	-3.8900%	0.5900%	0.6675%	0.6817%	0.6746%	0.7050%	-2.6400%	-2.7246%	-4.5950%	-12.83%	7.08%	8.10%	-19.91%	-20.93%
Apr-74	-3.5900%	-12.9600%	0.6800%	0.6875%	0.7025%	0.6950%	0.7308%	-4.2700%	-4.2850%	-13.6908%	-12.62%	8.16%	8.34%	-20.78%	-20.96%
May-74	-3.0200%	-4.8400%	0.6800%	0.6975%	0.7150%	0.7063%	0.7500%	-3.7000%	-3.7263%	-5.5900%	-12.85%	8.16%	8.48%	-22.01%	-22.33%
Jun-74	-1.1300%	-5.7000%	0.6100%	0.7058%	0.7292%	0.7175%	0.7767%	-1.7400%	-1.8475%	-6.4767%	-14.48%	7.32%	8.61%	-21.80%	-23.09%
Jul-74	-7.4200%	-0.8900%	0.7200%	0.7267%	0.7508%	0.7388%	0.8050%	-8.1400%	-8.1588%	-1.6950%	-23.92%	8.64%	8.87%	-32.56%	-32.79%
Aug-74	-8.6400%	-8.7100%	0.6500%	0.7500%	0.7733%	0.7617%	0.8358%	-9.2900%	-9.4017%	-9.5458%	-28.04%	7.80%	9.14%	-35.84%	-37.18%
Sep-74	-11.5200%	-0.8600%	0.7100%	0.8050%	0.8050%	0.7875%	0.8708%	-12.2300%	-12.3075%	-1.7308%	-38.94%	8.52%	9.45%	-47.46%	-48.39%
Oct-74	16.8100%	11.9900%	0.7000%	0.7725%	0.8033%	0.7879%	0.8983%	16.1100%	16.0221%	11.0917%	-28.80%	8.40%	9.46%	-37.20%	-38.25%
Nov-74	-4.8900%	-1.1900%	0.6200%	0.7408%	0.7783%	0.7596%	0.8717%	-5.5100%	-5.6496%	-2.0617%	-23.83%	7.44%	9.12%	-31.27%	-32.95%
Dec-74	-1.5600%	0.4400%	0.6700%	0.7408%	0.7667%	0.7538%	0.8558%	-2.2300%	-2.3138%	-0.4158%	-26.48%	8.04%	9.05%	-34.52%	-35.52%
Jan-75	12.7200%	18.9700%	0.6800%	0.7358%	0.7608%	0.7483%	0.8642%	12.0400%	11.9717%	18.1058%	-16.52%	8.16%	8.98%	-24.68%	-25.50%
Feb-75	6.3800%	1.4300%	0.6000%	0.7183%	0.7425%	0.7304%	0.8325%	5.7800%	5.6496%	0.5975%	-11.14%	7.20%	8.77%	-18.34%	-19.90%
Mar-75	2.5400%	-2.1600%	0.6600%	0.7225%	0.7433%	0.7329%	0.8100%	1.8800%	1.8071%	-2.9700%	-6.97%	7.92%	8.80%	-14.89%	-15.77%
Apr-75	5.1000%	-1.4000%	0.6700%	0.7458%	0.7658%	0.7558%	0.8383%	4.4300%	4.3442%	-2.2383%	1.41%	8.04%	9.07%	-6.63%	-7.66%
May-75	4.7600%	8.6600%	0.6700%	0.7417%	0.7700%	0.7558%	0.8525%	4.0900%	4.0042%	7.8075%	9.55%	8.04%	9.07%	1.51%	0.48%
Jun-75	4.7700%	10.6700%	0.7000%	0.7308%	0.7608%	0.7458%	0.8417%	4.0700%	4.0242%	9.8283%	16.09%	8.40%	9.95%	7.69%	7.14%
Jul-75	-6.4400%	-5.1000%	0.6800%	0.7367%	0.7608%	0.7488%	0.8342%	-7.1200%	-7.1888%	-5.9342%	17.32%	8.16%	9.99%	9.16%	8.33%
Aug-75	-1.7600%	-2.1200%	0.6500%	0.7458%	0.7692%	0.7575%	0.8433%	-2.4100%	-2.5175%	-2.9633%	26.15%	7.80%	9.09%	18.35%	17.06%
Sep-75	-3.1200%	-0.4900%	0.7300%	0.7458%	0.7792%	0.7625%	0.8492%	-3.8500%	-3.8825%	-1.3392%	38.13%	8.76%	9.15%	29.37%	28.98%
Oct-75	6.5300%	7.0800%	0.7200%	0.7383%	0.7767%	0.7575%	0.8467%	5.8100%	5.7725%	6.2333%	25.97%	8.64%	9.09%	17.33%	16.88%
Nov-75	2.8200%	3.5000%	0.6100%	0.7317%	0.7692%	0.7504%	0.8367%	2.2100%	2.0696%	2.6633%	36.18%	7.32%	9.01%	28.86%	27.18%
Dec-75	-0.8100%	0.7700%	0.7500%	0.7325%	0.7713%	0.7519%	0.8425%	-1.5600%	-1.5619%	-0.0725%	37.22%	9.00%	9.02%	28.22%	28.20%
Jan-76	12.1700%	8.9400%	0.6500%	0.7167%	0.7608%	0.7388%	0.8250%	11.5200%	11.4313%	8.1150%	36.55%	7.80%	8.87%	28.75%	27.69%
Feb-76	-0.8400%	-3.5600%	0.6100%	0.7125%	0.7517%	0.7321%	0.8092%	-1.4500%	-1.5721%	-4.3692%	27.28%	7.32%	8.79%	19.96%	18.50%
Mar-76	3.3700%	1.0000%	0.7100%	0.7100%	0.7508%	0.7304%	0.8058%	2.6600%	2.6396%	0.1942%	28.31%	8.52%	8.77%	19.79%	19.55%
Apr-76	-0.7800%	0.3700%	0.6400%	0.7000%	0.7408%	0.7204%	0.7942%	-1.4200%	-1.5004%	-0.4242%	21.13%	7.68%	8.65%	13.45%	12.49%
May-76	-1.1100%	-1.3900%	0.5900%	0.7150%	0.7433%	0.7292%	0.7958%	-1.7000%	-1.8392%	-2.1858%	14.35%	7.08%	8.75%	7.27%	5.60%
Jun-76	4.4300%	3.3700%	0.7300%	0.7183%	0.7408%	0.7296%	0.7950%	3.7000%	3.7004%	2.5750%	13.98%	8.76%	8.76%	5.22%	5.22%
Jul-76	-0.4800%	3.4100%	0.6500%	0.7133%	0.7342%	0.7238%	0.7808%	-1.1300%	-1.2038%	2.6292%	21.24%	7.80%	8.69%	13.44%	12.55%
Aug-76	-0.1800%	3.8300%	0.6900%	0.7042%	0.7217%	0.7129%	0.7608%	-0.8700%	-0.8929%	3.0692%	23.19%	8.28%	8.56%	14.91%	14.63%
Sep-76	2.5800%	3.8100%	0.6400%	0.6983%	0.7117%	0.7050%	0.7417%	1.9400%	1.8750%	3.0683%	30.43%	7.68%	8.46%	22.75%	21.97%
Oct-76	-1.8600%	-0.2100%	0.6100%	0.6933%	0.7067%	0.7000%	0.7325%	-2.4700%	-2.5600%	-0.9425%	20.16%	7.32%	8.40%	12.84%	11.76%
Nov-76	-0.4100%	2.6800%	0.6600%	0.6875%	0.7050%	0.6963%	0.7300%	-1.0700%	-1.1063%	1.9500%	16.39%	7.92%	8.36%	8.47%	8.03%
Dec-76	5.6100%	6.3100%	0.6300%	0.6650%	0.6871%	0.6760%	0.7183%	4.9800%	4.9340%	5.5917%	23.92%	7.56%	8.11%	16.36%	15.81%
Jan-77	-4.7300%	0.3500%	0.5900%	0.6633%	0.6800%	0.6717%	0.7175%	-5.3200%	-5.4017%	-0.3675%	5.25%	7.08%	8.06%	-1.83%	-2.81%
Feb-77	-1.8200%	-3.7200%	0.5700%	0.6700%	0.6883%	0.6792%	0.7208%	-2.3900%	-2.4992%	-4.4408%	4.21%	6.84%	8.15%	-2.63%	-3.94%
Mar-77	-1.0500%	1.0200%	0.6500%	0.6750%	0.6900%	0.6825%	0.7250%	-1.7000%	-1.7325%	0.2950%	-0.25%	7.80%	8.19%	-8.05%	-8.44%
Apr-77	0.4200%	2.0900%	0.6100%	0.6700%	0.6900%	0.6800%	0.7258%	-0.1900%	-0.2600%	1.3642%	0.96%	7.32%	8.16%	-6.36%	-7.20%
May-77	-1.9600%	2.1100%	0.6700%	0.6708%	0.6900%	0.6804%	0.7258%	-2.6300%	-2.6404%	1.3842%	0.09%	8.04%	8.17%	-7.95%	-8.07%
Jun-77	4.9400%	5.3100%	0.6200%	0.6625%	0.6825%	0.6725%	0.7150%	4.3200%	4.2675%	4.5950%	0.58%	7.44%	8.07%	-6.86%	-7.49%
Jul-77	-1.2400%	1.6400%	0.5900%	0.6617%	0.6767%	0.6692%	0.7092%	-1.8300%	-1.9092%	0.9308%	-0.19%	7.08%	8.03%	-7.27%	-8.22%
Aug-77	-1.7200%	-3.5300%	0.6700%	0.6650%	0.6808%	0.6729%	0.7075%	-2.3900%	-2.3929%	-4.2375%	-1.73%	8.04%	8.08%	-9.77%	-9.80%
Sep-77	0.1600%	2.4700%	0.6100%	0.6600%	0.6792%	0.6696%	0.7050%	-0.4500%	-0.5096%	1.7650%	-4.05%	7.32%	8.04%	-11.37%	-12.08%
Oct-77	-3.9000%	-2.9600%	0.6300%	0.6700%	0.6883%	0.6792%	0.7175%	-4.5300%	-4.5792%	-3.6775%	-6.04%	7.56%	8.15%	-13.60%	-14.19%
Nov-77	3.1600%	3.8100%	0.6300%	0.6733%	0.6950%	0.6842%	0.7200%	2.5300%	2.4758%	3.0900%	-2.67%	7.56%	8.21%	-10.23%	-10.88%
Dec-77	0.7500%	0.1900%	0.6200%	0.6825%	0.7004%	0.6915%	0.7200%	0.1300%	0.0585%	-0.5300%	-7.15%	7.44%	8.30%	-14.59%	-15.45%
Jan-78	-5.7400%	-5.3300%	0.6900%	0.7008%	0.7158%	0.7083%	0.7433%	-6.4300%	-6.4483%	-6.0733%	-8.13%	8.28%	8.50%	-16.41%	-16.63%
Feb-78	-2.0300%	-0.6200%	0.6000%	0.7058%	0.7208%	0.7133%	0.7475%	-2.6300%	-2.7433%	-1.3675%	-8.33%	7.20%	8.56%	-15.53%	-16.89%
Mar-78	2.9400%	3.0900%	0.6900%	0.7058%	0.7217%	0.7138%	0.7483%	2.2500%	2.2263%	2.3417%	-4.63%	8.28%	8.57%	-12.91%	-13.20%
Apr-78	9.0200%	1.0600%	0.6300%	0.7133%	0.7275%	0.7204%	0.7575%	8.3900%	8.2996%	0.3025%	3.53%	7.56%	8.65%	-4.03%	-5.11%
May-78	0.9200%	0.4300%	0.7500%	0.7242%	0.7367%	0.7304%	0.7683%	0.1700%	0.1896%	-0.3383%	6.57%	9.00%	8.77%	-2.43%	-2.19%
Jun-78	-1.3800%	0.3600%	0.6900%	0.7300%	0.7458%	0.7379%	0.7833%	-2.0700%	-2.1179%	-0.4233%	0.16%	8.28%	8.86%	-8.12%	-8.70%
Jul-78	5.8300%	3.1600%	0.7300%	0.7400%	0.7558%	0.7479%	0.7925%	5.1000%	5.0821%	2.3675%	7.33%	8.76%	9.98%	-1.43%	-1.65%
Aug-78	3.0100%	-0.0300%	0.7000%	0.7242%	0.7467%	0.7354%	0.7767%	2.3100%	2.2746%	-0.8067%	12.49%	8.40%	8.83%	4.09%	3.67%
Sep-78	-0.3200%	-0.5600%	0.6500%	0.7242%	0.7433%	0.7338%	0.7733%	-0.9700%	-1.0538%	-1.3333%	11.95%	7.80%	8.81%	4.15%	3.15%
Oct-78	-8.7200%	-6.8400%	0.7300%	0.7408%	0.7558%	0.7483%	0.7883%	-9.4500%	-9.4683%	-7.6283%	6.34%	8.76%	9.98%	-2.42%	-2.64%
Nov-78	2.1500%	3.5600%	0.7100%	0.7525%	0.7700%	0.7613%	0.8067%	1.4400%	1.3888%	2.7533%	5.30%	8.52%	9.14%	-3.22%	-3.84%
Dec-78	1.9600%	-1.4900%	0.6800%	0.7633%	0.7775%	0.7704%	0.8083%	1.2800%							

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Oct-79	-6.4000%	-5.0500%	0.8200%	0.8442%	0.8717%	0.8579%	0.9500%	-7.2200%	-7.2579%	-6.0000%	15.46%	9.84%	10.30%	5.62%	5.17%
Nov-79	4.7500%	6.0700%	0.8300%	0.8967%	0.9350%	0.9158%	0.9908%	3.9200%	3.8342%	5.0792%	18.40%	9.96%	10.99%	8.44%	7.41%
Dec-79	2.1400%	0.2200%	0.8300%	0.8950%	0.9292%	0.9121%	1.0125%	1.3100%	1.2279%	-0.7925%	18.61%	9.96%	10.95%	8.65%	7.67%
Jan-80	6.2200%	-0.2300%	0.8300%	0.9242%	0.9633%	0.9438%	1.0177%	5.3900%	5.2763%	-1.2477%	20.64%	9.96%	11.33%	10.68%	9.32%
Feb-80	-0.0100%	-2.4700%	0.8400%	1.0317%	1.0608%	1.0463%	1.1028%	-0.8500%	-1.0563%	-3.5728%	24.63%	10.08%	12.56%	14.55%	12.08%
Mar-80	-9.7200%	-5.2900%	0.9900%	1.0800%	1.1258%	1.1029%	1.2158%	-10.7100%	-10.8229%	-6.5058%	6.19%	11.88%	13.24%	-5.69%	-7.05%
Apr-80	4.6200%	11.8600%	1.0000%	1.0033%	1.0883%	1.0458%	1.1908%	3.6200%	3.5742%	10.6692%	10.40%	12.00%	12.55%	-1.60%	-2.15%
May-80	5.1500%	3.2300%	0.8700%	0.9158%	0.9925%	0.9542%	1.0613%	4.2800%	4.1958%	2.1687%	18.66%	10.44%	11.45%	8.22%	7.21%
Jun-80	3.1600%	3.3700%	0.8600%	0.8817%	0.9492%	0.9154%	1.0331%	2.3000%	2.2446%	2.3369%	17.31%	10.32%	10.99%	6.99%	6.32%
Jul-80	6.9600%	-0.4100%	0.8400%	0.9225%	0.9525%	0.9375%	1.0127%	6.1200%	6.0225%	-1.4227%	23.81%	10.08%	11.25%	13.73%	12.56%
Aug-80	1.0100%	-1.3900%	0.8100%	0.9700%	1.0075%	0.9888%	1.0550%	0.2000%	0.0212%	-2.4450%	18.24%	9.72%	11.87%	8.52%	6.38%
Sep-80	2.9400%	-1.1400%	0.9700%	1.0017%	1.0433%	1.0225%	1.1077%	1.9700%	1.9175%	-2.2477%	21.20%	11.64%	12.27%	9.56%	8.93%
Oct-80	2.0200%	2.7400%	0.9700%	1.0258%	1.0567%	1.0413%	1.1280%	1.0500%	0.9788%	1.6120%	32.10%	11.64%	12.50%	20.46%	19.60%
Nov-80	10.6500%	5.0100%	0.9100%	1.0808%	1.1117%	1.0963%	1.1677%	9.7400%	9.5538%	3.8423%	39.54%	10.92%	13.16%	28.62%	26.38%
Dec-80	-3.0200%	-0.1400%	1.0800%	1.1008%	1.1483%	1.1246%	1.2217%	-4.1000%	-4.1446%	-1.3617%	32.49%	12.96%	13.50%	19.53%	18.99%
Jan-81	-4.1800%	-1.8600%	0.9400%	1.0675%	1.1267%	1.0971%	1.1895%	-5.1200%	-5.2771%	-3.0495%	19.52%	11.28%	13.17%	8.24%	6.35%
Feb-81	1.7400%	-2.2400%	0.8800%	1.1125%	1.1575%	1.1350%	1.2233%	0.8600%	0.6050%	-3.4633%	21.61%	10.56%	13.62%	11.05%	7.99%
Mar-81	4.0000%	4.2000%	1.1100%	1.1108%	1.1583%	1.1346%	1.2604%	2.8900%	2.8654%	2.9396%	40.09%	13.32%	13.62%	26.77%	26.47%
Apr-81	-1.9300%	-0.9600%	1.0100%	1.1567%	1.1992%	1.1779%	1.2708%	-2.9400%	-3.1079%	-2.2308%	31.32%	12.12%	14.14%	19.70%	17.18%
May-81	0.2600%	2.9100%	1.0400%	1.1933%	1.2400%	1.2167%	1.3430%	-0.7800%	-0.9567%	1.5670%	25.21%	12.48%	14.60%	12.73%	10.61%
Jun-81	-0.6300%	1.7200%	1.0900%	1.1458%	1.2008%	1.1733%	1.3160%	-1.7200%	-1.8033%	1.4040%	20.61%	13.08%	14.08%	7.53%	6.53%
Jul-81	0.2100%	3.4100%	1.0900%	1.1983%	1.2325%	1.2154%	1.3393%	-0.8800%	-1.0054%	2.0707%	13.00%	13.08%	14.59%	-0.08%	-1.58%
Aug-81	-5.7700%	-0.2400%	1.1000%	1.2408%	1.2850%	1.2629%	1.3706%	-6.8700%	-7.0329%	-1.6106%	5.42%	13.20%	15.16%	-7.78%	-9.74%
Sep-81	-4.9300%	-4.0900%	1.1400%	1.2908%	1.3292%	1.3100%	1.4192%	-6.0700%	-6.2400%	-5.5092%	-2.64%	13.68%	15.72%	-16.32%	-18.36%
Oct-81	5.4000%	6.1700%	1.1700%	1.2833%	1.3183%	1.3008%	1.4379%	4.2300%	4.0992%	4.7321%	0.58%	14.04%	15.61%	-13.46%	-15.03%
Nov-81	4.1300%	4.8100%	1.1300%	1.1850%	1.2475%	1.2163%	1.3679%	3.0000%	2.9138%	3.4421%	-5.35%	13.56%	14.60%	-18.91%	-19.94%
Dec-81	-2.5600%	-3.0500%	1.0000%	1.1858%	1.2500%	1.2179%	1.3468%	-3.5600%	-3.7779%	-4.3968%	-4.90%	12.00%	14.62%	-16.90%	-19.51%
Jan-82	-1.3100%	0.3700%	1.0800%	1.2650%	1.3125%	1.2888%	1.4000%	-2.3900%	-2.5988%	-1.0300%	-2.05%	12.96%	15.47%	-15.01%	-17.51%
Feb-82	-5.5900%	-0.3500%	1.0300%	1.2725%	1.3100%	1.2913%	1.4096%	-6.6200%	-6.8813%	-1.7596%	-9.10%	12.36%	15.50%	-21.46%	-24.60%
Mar-82	-0.5200%	1.6800%	1.2400%	1.2150%	1.2675%	1.2413%	1.3740%	-1.7600%	-1.7613%	0.3060%	-13.06%	14.88%	14.90%	-27.94%	-27.95%
Apr-82	4.5200%	5.4800%	1.1200%	1.2050%	1.2417%	1.2233%	1.3665%	3.4000%	3.2967%	4.1135%	-7.34%	13.44%	14.68%	-20.78%	-22.02%
May-82	-3.4100%	-1.8700%	1.0100%	1.1883%	1.2308%	1.2096%	1.3400%	-4.4200%	-4.6196%	-3.2100%	-10.73%	12.12%	14.52%	-22.85%	-25.24%
Jun-82	-1.5000%	-1.6100%	1.2000%	1.2342%	1.2717%	1.2529%	1.3617%	-2.7000%	-2.7529%	-2.9717%	-11.51%	14.40%	15.04%	-25.91%	-26.55%
Jul-82	-1.7800%	-1.9800%	1.1400%	1.2175%	1.2675%	1.2425%	1.3717%	-2.9200%	-3.0225%	-3.3517%	-13.27%	13.68%	14.91%	-26.95%	-28.18%
Aug-82	12.1400%	12.1100%	1.1200%	1.1425%	1.2067%	1.1746%	1.3267%	11.0200%	10.9654%	10.7833%	3.22%	13.44%	14.10%	-10.22%	-10.88%
Sep-82	1.2500%	0.5200%	1.0000%	1.0783%	1.1433%	1.1108%	1.2875%	0.2500%	0.1392%	-0.7675%	9.93%	12.00%	13.33%	-2.07%	-3.40%
Oct-82	11.5100%	6.5900%	0.9100%	1.0100%	1.0808%	1.0454%	1.2487%	10.6000%	10.4646%	5.3413%	16.30%	10.92%	12.55%	5.38%	3.75%
Nov-82	4.0400%	0.1700%	0.9500%	0.9733%	1.0425%	1.0079%	1.2052%	3.0900%	3.0321%	-1.0352%	16.20%	11.40%	12.10%	4.80%	4.10%
Dec-82	1.9300%	3.6000%	0.9300%	0.9858%	1.0367%	1.0113%	1.2021%	1.0000%	0.9188%	2.3979%	21.55%	11.16%	12.14%	10.39%	9.42%
Jan-83	3.7200%	3.7200%	0.8700%	0.9825%	1.0292%	1.0058%	1.1868%	2.8500%	2.7142%	2.5333%	27.75%	10.44%	12.07%	17.31%	15.68%
Feb-83	2.2900%	-0.0500%	0.8100%	1.0483%	1.0843%	1.0246%	1.1898%	1.4800%	1.2654%	-1.2398%	38.41%	9.72%	12.30%	28.69%	26.12%
Mar-83	3.6900%	0.1700%	0.8900%	0.9775%	1.0267%	1.0021%	1.1690%	2.8000%	2.6879%	-0.9990%	44.27%	10.68%	12.03%	33.59%	32.24%
Apr-83	7.8800%	5.7100%	0.8500%	0.9592%	1.0050%	0.9821%	1.1365%	7.0300%	6.8979%	4.5735%	48.91%	10.20%	11.79%	38.71%	37.12%
May-83	-0.8700%	1.2400%	0.9100%	0.9550%	0.9958%	0.9754%	1.1243%	-1.7800%	-1.8454%	0.1157%	52.82%	10.92%	11.71%	41.90%	41.12%
Jun-83	3.8900%	-1.2300%	0.9000%	0.9783%	1.0125%	0.9954%	1.0125%	2.9900%	2.8946%	-2.3673%	61.18%	10.80%	11.95%	50.38%	49.24%
Jul-83	-2.9500%	3.3900%	0.8800%	1.0125%	1.0325%	1.0225%	1.1310%	-3.8300%	-3.9725%	2.2590%	59.26%	10.56%	12.27%	48.70%	46.99%
Aug-83	1.5000%	0.4000%	1.0300%	1.0425%	1.0600%	1.0513%	1.1306%	0.4700%	0.4488%	-0.7306%	44.15%	12.36%	13.62%	31.79%	31.54%
Sep-83	1.3800%	4.4500%	0.9600%	1.0308%	1.0517%	1.0413%	1.1197%	0.4200%	0.3388%	3.3303%	44.34%	11.52%	12.50%	32.82%	31.84%
Oct-83	-1.1600%	5.3200%	0.9500%	1.0208%	1.0408%	1.0308%	1.1044%	-2.1100%	-2.1908%	4.2156%	27.94%	11.40%	12.37%	16.54%	15.57%
Nov-83	2.1100%	-2.0400%	0.9400%	1.0342%	1.0508%	1.0425%	1.1153%	1.1700%	1.0675%	-3.1553%	25.57%	11.28%	12.51%	14.29%	13.06%
Dec-83	-0.5200%	-2.2600%	0.9400%	1.0475%	1.0633%	1.0554%	1.1264%	-1.4600%	-1.5754%	-3.3864%	22.55%	11.28%	12.67%	11.27%	9.88%
Jan-84	-0.5600%	4.8200%	1.0300%	1.0167%	1.0592%	1.0379%	1.1167%	-1.5900%	-1.5979%	3.7033%	17.49%	12.36%	12.46%	5.13%	5.04%
Feb-84	-3.5200%	-4.1100%	0.9200%	1.0067%	1.0583%	1.0325%	1.1164%	-4.4400%	-4.5525%	-5.2264%	10.82%	11.04%	12.39%	-0.22%	-1.57%
Mar-84	1.7300%	-0.5500%	0.9800%	1.0475%	1.1017%	1.0746%	1.1477%	0.7500%	0.6554%	-1.6977%	8.72%	11.76%	12.90%	-3.04%	-4.17%
Apr-84	0.9500%	1.5900%	1.0400%	1.0675%	1.1233%	1.0954%	1.1774%	-0.0900%	-0.1454%	0.4126%	1.74%	12.48%	13.15%	-10.74%	-11.41%
May-84	-5.5400%	-2.3000%	1.0300%	1.1067%	1.1750%	1.1408%	1.2400%	-6.5700%	-6.6808%	-3.5400%	-3.05%	12.36%	13.69%	-15.41%	-16.74%
Jun-84	2.1700%	0.6900%	1.0600%	1.1292%	1.1942%	1.1617%	1.2581%	1.1100%	1.0083%	-0.5681%	-4.66%	12.72%	13.94%	-17.38%	-18.60%
Jul-84	-1.2400%	4.3300%	1.1600%	1.1200%	1.1767%	1.1483%	1.2384%	-2.4000%	-2.3883%	3.0916%	-2.98%	13.92%	13.78%	-16.90%	-16.76%
Aug-84	11.0400%	6.4600%	1.0600%	1.0725%	1.1225%	1.0975%	1.2024%	9.9800%	9.9425%	5.2576%	6.14%	12.72%	13.17%	-6.58%	-7.03%
Sep-84	0.0200%	4.3800%	0.9400%	1.0550%	1.1058%	1.0804%	1.1823%	-0.9200%	-1.0604%	3.1977%	4.72%	11.28%	12.97%	-6.56%	-8.25%
Oct-84	0.3900%	2.7200%	1.0800%	1.0525%	1.0925%	1.0725%	1.1525%	-0.6900%	-0.6825%	1.5675%	6.36%	12.96%	12.87%	-6.60%	-6.51%
Nov-84	-1.1200%	2.7000%	0.9100%	1.0242%	1.0550%	1.0396%	1.1039%	-2.0300%	-2.1596%	1.5961%	2.99%	10.92%	12.48%	-7.93%	-9.48%
Dec-84	2.6300%	3.1600%	0.9800%	1.0108%	1.0417%	1.0263%	1.0891%	1.6500%	1.6038%	2.0709%	6.25%	11.76%	12.32%	-5.51%	-6.06%
Jan-85	7.7900%	2.3500%	0.9600%	1.0067%	1.0358%	1.0213%	1.0822%	6.8300%	6.7688%	1.2678%	15.18%	11.52%	12.26%	3.66%	2.92%
Feb-85	1.2200%	1.9300%	0.8200%	1.0108%	1.0408%	1.0258%	1.0862%	0.4000%	0.1942%	0.8438%	20.83%	9.84%	12.31%	10.99%	8.52%
Mar-85	0.0700%	3.6200%	0.9400%	1.0467%	1.0758%	1.0613%	1.1501%	-0.8700%	-0.9913%	2.4699%	18.86%	11.28%	12.74%	7.58%	6.13%
Apr-85	-0.0900%	2.0700%	1.0200%	1.0192%	1.0575%	1.0383%	1.1322%	-1.1100%	-1.1283%	0.9378%	17.64%	12.24%	12.46%	5.40%	5.18%
May-85	5.7800%	6.0600%	0.9700%	0.9767%	1.0250%	1.0008%	1.0978%	4.8100%	4.7792%	4.9622%	31.74%	11.64%	12.01%	20.10%	19.73%
Jun-85	1.5700%	2.7900%	0.8000%	0.9117%	0.9550%	0.9333%	1.0120%	0.7700%	0.6367%	1.7780%	30.96%	9.60%	11.20%	21.36%	19.76%
Jul-85	-0.1500%	-4.2700%	0.9400%	0.9142%	0.9517%	0.9329%	1.0054%	-1.0900%	-1.0829%	-5.2754%	32.41%	11.28%	11.20%	21.13%	21.21%
Aug-85	-0.8500%	1.8100%	0.8500%	0.9558%	0.9558%	0.9383%	1.0114%	-1.7000%	-1.7883%	0.7986%	18.23%	1			

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jul-86	-5.900%	2.8300%	0.660%	0.7400%	0.7733%	0.7567%	0.7795%	-6.2500%	-6.3467%	2.0505%	28.41%	7.92%	9.08%	20.49%	19.33%
Aug-86	7.4200%	8.8400%	0.630%	0.7267%	0.7683%	0.7475%	0.7756%	6.7900%	6.6725%	8.0644%	39.12%	7.56%	8.97%	31.56%	30.15%
Sep-86	-8.2700%	-11.3700%	0.650%	0.7408%	0.7800%	0.7604%	0.7919%	-8.9200%	-9.0304%	-12.1619%	31.74%	7.80%	9.13%	23.94%	22.62%
Oct-86	5.7700%	5.0500%	0.690%	0.7383%	0.7775%	0.7579%	0.7940%	5.0800%	5.0121%	4.2561%	33.19%	8.28%	9.10%	24.91%	24.09%
Nov-86	2.4300%	2.1100%	0.590%	0.7233%	0.7667%	0.7450%	0.7745%	1.8400%	1.6850%	1.3355%	27.67%	7.08%	8.94%	20.59%	18.73%
Dec-86	-2.5500%	-2.5400%	0.700%	0.7075%	0.7517%	0.7296%	0.7600%	-3.2500%	-3.2796%	-3.3000%	18.67%	8.40%	8.76%	10.27%	9.91%
Jan-87	13.4700%	9.8400%	0.640%	0.6967%	0.7383%	0.7175%	0.7454%	12.8300%	12.7525%	9.0946%	33.90%	7.68%	8.61%	26.22%	25.29%
Feb-87	3.9500%	-3.0100%	0.590%	0.6983%	0.7400%	0.7192%	0.7503%	3.3600%	3.2308%	-3.7603%	29.52%	7.08%	8.63%	22.44%	20.89%
Mar-87	2.8900%	-1.8900%	0.660%	0.6967%	0.7367%	0.7167%	0.7441%	2.2300%	2.1733%	-2.6341%	26.22%	7.92%	8.60%	18.30%	17.62%
Apr-87	-0.8900%	-4.1400%	0.650%	0.7375%	0.7625%	0.7500%	0.7794%	-1.5400%	-1.6400%	-4.9194%	26.52%	7.80%	9.00%	18.72%	17.52%
May-87	0.8700%	-0.6400%	0.660%	0.7775%	0.7992%	0.7883%	0.8221%	0.2100%	0.0817%	-1.4621%	21.18%	7.92%	9.46%	13.26%	11.72%
Jun-87	5.0500%	4.3900%	0.750%	0.7767%	0.8042%	0.7904%	0.8349%	4.3000%	4.2596%	3.5552%	25.18%	9.00%	9.49%	16.18%	15.70%
Jul-87	5.0700%	-0.2500%	0.730%	0.7850%	0.8042%	0.7946%	0.8446%	4.3400%	4.2754%	-1.0946%	39.32%	8.76%	9.54%	30.56%	29.78%
Aug-87	3.7300%	5.2700%	0.750%	0.8058%	0.8217%	0.8138%	0.8703%	2.9800%	2.9163%	4.3997%	34.53%	9.00%	9.77%	25.53%	24.77%
Sep-87	-2.1900%	0.2100%	0.750%	0.8483%	0.8625%	0.8554%	0.9314%	-2.9400%	-3.0454%	-0.7214%	43.45%	9.00%	10.27%	34.45%	33.18%
Oct-87	-21.5400%	-7.0500%	0.790%	0.8767%	0.8950%	0.8858%	0.9466%	-22.3300%	-22.4258%	-7.9966%	6.41%	9.48%	10.63%	-3.07%	-4.22%
Nov-87	-8.2400%	-5.5500%	0.750%	0.8342%	0.8558%	0.8450%	0.9020%	-8.9900%	-9.0850%	-6.4520%	-4.68%	9.00%	10.14%	-13.68%	-14.82%
Dec-87	7.6100%	1.0800%	0.780%	0.8425%	0.8608%	0.8517%	0.9114%	6.8300%	6.7583%	0.1686%	5.26%	9.36%	10.22%	-4.10%	-4.96%
Jan-88	4.2100%	11.5300%	0.720%	0.8233%	0.8408%	0.8321%	0.8998%	3.4900%	3.3779%	10.6302%	-3.33%	8.64%	9.99%	-11.97%	-13.31%
Feb-88	4.6600%	-1.7500%	0.710%	0.7833%	0.8000%	0.7917%	0.8430%	3.9500%	3.8683%	-2.5930%	-2.67%	8.52%	9.50%	-11.19%	-12.17%
Mar-88	-3.0900%	-5.2700%	0.720%	0.7825%	0.7992%	0.7908%	0.8396%	-3.8100%	-3.8808%	-6.1096%	-8.32%	8.64%	9.49%	-16.96%	-17.81%
Apr-88	1.1100%	0.1900%	0.700%	0.8058%	0.8217%	0.8138%	0.8768%	0.4100%	0.2963%	-0.6868%	-6.47%	8.40%	9.77%	-14.87%	-16.24%
May-88	0.8600%	4.6000%	0.780%	0.8250%	0.8417%	0.8333%	0.8993%	0.0800%	0.0267%	3.7007%	-6.48%	9.36%	10.00%	-15.84%	-16.48%
Jun-88	4.9500%	3.1500%	0.760%	0.8217%	0.8442%	0.8329%	0.9005%	3.8300%	3.7571%	2.2495%	-6.89%	9.12%	10.00%	-16.01%	-16.89%
Jul-88	-0.3800%	0.1700%	0.710%	0.8300%	0.8550%	0.8425%	0.9187%	-1.0900%	-1.2225%	-0.7487%	-11.72%	8.52%	10.11%	-20.42%	-21.83%
Aug-88	-3.9000%	-1.3700%	0.830%	0.8425%	0.8642%	0.8533%	0.9308%	-4.2200%	-4.2433%	-2.3008%	-17.78%	9.96%	10.24%	-27.74%	-28.02%
Sep-88	4.2600%	4.1300%	0.760%	0.8183%	0.8383%	0.8283%	0.8889%	3.5000%	3.4317%	3.2412%	-12.36%	9.12%	9.94%	-21.48%	-22.30%
Oct-88	2.7800%	2.6200%	0.760%	0.7917%	0.8083%	0.8000%	0.8318%	2.0200%	1.9800%	1.7882%	14.81%	9.12%	9.60%	5.69%	5.21%
Nov-88	-1.4300%	-0.7900%	0.700%	0.7875%	0.8100%	0.7988%	0.8242%	-2.1300%	-2.2288%	-1.6142%	8.40%	9.29%	9.59%	14.93%	13.74%
Dec-88	1.7400%	0.6300%	0.750%	0.7975%	0.8175%	0.8075%	0.8377%	0.9900%	0.9325%	-0.2077%	16.60%	9.00%	9.69%	7.60%	6.91%
Jan-89	7.3200%	5.7100%	0.800%	0.8017%	0.8175%	0.8096%	0.8404%	6.5200%	6.5104%	4.8696%	20.08%	9.60%	9.72%	10.48%	10.36%
Feb-89	-2.4900%	-2.1500%	0.690%	0.8033%	0.8192%	0.8113%	0.8383%	-3.1800%	-3.3013%	-2.9883%	11.88%	8.28%	9.74%	3.60%	2.14%
Mar-89	2.3300%	2.6900%	0.790%	0.8167%	0.8317%	0.8242%	0.8535%	1.5400%	1.5058%	1.8366%	18.13%	9.48%	8.89%	8.65%	8.24%
Apr-89	5.1900%	6.3400%	0.700%	0.8158%	0.8283%	0.8221%	0.8492%	4.4900%	4.3679%	5.4908%	22.90%	9.40%	9.87%	14.50%	13.03%
May-89	4.0500%	5.8000%	0.800%	0.7975%	0.8125%	0.8050%	0.8334%	3.2500%	3.2450%	4.9666%	26.79%	9.60%	9.66%	17.19%	17.13%
Jun-89	-0.5700%	1.6100%	0.700%	0.7583%	0.7742%	0.7663%	0.8049%	-1.2700%	-1.3363%	0.8052%	20.53%	8.40%	9.20%	12.13%	11.34%
Jul-89	9.0300%	8.0400%	0.680%	0.7442%	0.7617%	0.7529%	0.7617%	8.3500%	8.2771%	7.2480%	31.92%	8.16%	9.04%	23.76%	22.88%
Aug-89	1.9500%	-0.5700%	0.660%	0.7467%	0.7617%	0.7542%	0.7929%	1.2900%	1.1958%	-1.3629%	39.21%	7.92%	9.05%	31.29%	30.16%
Sep-89	-0.4100%	1.7000%	0.650%	0.7508%	0.7692%	0.7600%	0.7987%	-1.0600%	-1.1700%	0.9013%	32.97%	7.80%	9.12%	25.17%	23.85%
Oct-89	-2.3200%	0.4500%	0.720%	0.7433%	0.7658%	0.7546%	0.7949%	-3.0400%	-3.0746%	-0.3449%	26.37%	8.64%	9.06%	17.73%	17.32%
Nov-89	2.0400%	3.3600%	0.640%	0.7617%	0.7800%	0.7513%	0.7880%	1.4000%	1.2888%	2.5670%	30.82%	7.68%	9.02%	23.14%	21.81%
Dec-89	2.4000%	7.3100%	0.640%	0.7383%	0.7592%	0.7488%	0.7861%	1.7600%	1.6513%	6.5239%	31.67%	7.68%	8.99%	23.99%	22.69%
Jan-90	-6.7100%	-8.0900%	0.730%	0.7492%	0.7725%	0.7608%	0.7956%	-7.4400%	-7.4708%	-8.8856%	14.46%	8.76%	9.13%	5.70%	5.33%
Feb-90	1.2900%	-1.0900%	0.660%	0.7683%	0.7867%	0.7775%	0.8130%	0.6300%	0.5125%	-1.9030%	18.90%	7.92%	9.33%	10.98%	9.57%
Mar-90	2.6500%	1.8700%	0.710%	0.7808%	0.7925%	0.7867%	0.7925%	1.9400%	1.8633%	1.0495%	19.27%	8.52%	9.44%	10.75%	9.83%
Apr-90	-2.4900%	-3.8500%	0.750%	0.7883%	0.8033%	0.7958%	0.8259%	-3.2400%	-3.2858%	-4.6759%	10.56%	9.00%	9.55%	1.56%	1.01%
May-90	9.7500%	6.8200%	0.750%	0.7892%	0.8083%	0.7988%	0.8338%	9.0000%	8.9513%	5.9862%	16.62%	9.00%	9.59%	7.62%	7.03%
Jun-90	-0.6700%	-2.1100%	0.680%	0.7717%	0.7908%	0.7813%	0.8175%	-1.3500%	-1.4513%	-2.9275%	16.50%	8.16%	9.38%	8.34%	7.12%
Jul-90	-0.3200%	-0.3200%	0.740%	0.7892%	0.7982%	0.7796%	0.8132%	-1.0600%	-1.0996%	-1.1332%	6.51%	8.88%	9.36%	-2.37%	-2.85%
Aug-90	-9.0400%	-7.9200%	0.710%	0.7842%	0.8025%	0.7933%	0.8246%	-9.7500%	-9.8333%	-8.7446%	-4.97%	8.52%	9.52%	-13.49%	-14.49%
Sep-90	-4.8700%	4.1100%	0.690%	0.7967%	0.8142%	0.8054%	0.8431%	-5.5600%	-5.6754%	3.2669%	-9.23%	8.28%	9.67%	-17.51%	-18.89%
Oct-90	-0.4300%	6.5300%	0.810%	0.7942%	0.8142%	0.8042%	0.8386%	-1.2400%	-1.2342%	5.6915%	-7.47%	9.72%	9.65%	-17.19%	-17.12%
Nov-90	6.4600%	1.9300%	0.710%	0.7750%	0.7992%	0.7871%	0.8260%	5.7500%	5.6729%	1.1040%	-3.46%	8.52%	9.45%	-11.98%	-12.91%
Dec-90	2.7900%	0.8600%	0.720%	0.7542%	0.7825%	0.7683%	0.8109%	2.0700%	2.0217%	0.0491%	-3.10%	8.64%	9.22%	-11.74%	-12.32%
Jan-91	4.3600%	-3.0100%	0.710%	0.7533%	0.7808%	0.7671%	0.8094%	3.6500%	3.5929%	-3.8194%	8.40%	8.52%	9.21%	-0.12%	-0.80%
Feb-91	7.1500%	3.4900%	0.640%	0.7358%	0.7633%	0.7496%	0.7898%	6.5100%	6.4004%	2.7002%	14.67%	7.68%	9.00%	6.99%	5.68%
Mar-91	2.4200%	1.9800%	0.640%	0.7442%	0.7675%	0.7558%	0.7961%	1.7800%	1.6642%	1.1839%	14.42%	7.68%	9.07%	6.74%	5.35%
Apr-91	0.2400%	-1.6200%	0.760%	0.7383%	0.7600%	0.7492%	0.7887%	-0.5200%	-0.5092%	-2.4087%	17.62%	9.12%	8.99%	8.50%	8.63%
May-91	4.3100%	-1.3000%	0.680%	0.7383%	0.7625%	0.7504%	0.7860%	3.6300%	3.5596%	-2.0860%	11.79%	9.16%	9.01%	3.63%	2.78%
Jun-91	-4.5800%	-1.3900%	0.630%	0.7508%	0.7733%	0.7621%	0.7986%	-5.2100%	-5.3421%	-2.1886%	7.39%	7.56%	9.15%	-0.17%	-1.76%
Jul-91	4.6600%	3.0700%	0.760%	0.7500%	0.7708%	0.7604%	0.7956%	3.9000%	3.8996%	2.2744%	12.75%	9.12%	9.13%	3.63%	3.63%
Aug-91	2.3700%	2.5800%	0.680%	0.7292%	0.7492%	0.7392%	0.7754%	1.6900%	1.6308%	1.8046%	26.90%	8.16%	8.87%	18.74%	18.03%
Sep-91	-1.6700%	2.0200%	0.680%	0.7175%	0.7383%	0.7279%	0.7638%	-2.3500%	-2.3979%	1.2562%	31.17%	8.74%	9.13%	23.01%	22.43%
Oct-91	1.3400%	2.0000%	0.650%	0.7125%	0.7358%	0.7242%	0.7601%	0.6900%	0.6158%	1.2399%	33.50%	8.69%	8.69%	25.70%	24.81%
Nov-91	-4.0300%	-0.9800%	0.600%	0.7067%	0.7317%	0.7192%	0.7545%	-4.6300%	-4.7492%	-1.7345%	20.34%	7.20%	8.63%	13.14%	11.71%
Dec-91	11.4400%	7.3300%	0.680%	0.6925%	0.7175%	0.7050%	0.7416%	10.7600%	10.7350%	6.5884%	30.47%	8.16%	8.46%	22.31%	22.01%
Jan-92	-1.8600%	-5.3600%	0.610%	0.6833%	0.7092%	0.6963%	0.7360%	-2.4700%	-2.5563%	-6.0960%	22.69%	7.32%	8.36%	15.37%	14.34%
Feb-92	1.3000%	-2.7300%	0.590%	0.6908%	0.7225%	0.7067%	0.7442%	0.7100%	0.5933%	-3.4742%	16.00%	7.08%	8.48%	8.92%	7.52%
Mar-92	-1.9400%	-1.4300%	0.670%	0.6958%	0.7275%	0.7117%	0.7473%	-2.6100%	-2.6517%	-2.1773%	11.06%	8.04%	8.54%	3.02%	2.52%
Apr-92	2.9400%	6.4500%	0.650%	0.6942%	0.7242%	0.7092%	0.7438%	2.2900%	2.2308%	5.7062%	14.05%	7.80%	8.51%	6.25%	5.54%
May-92	0.4900%	-0.1500%	0.610%	0.6900%	0.7192%	0.7046%	0.7400%	-0.1200%	-0.2146%	-0.8900%	9.87%	7.32%	8.46%	2.55%	1.42%
Jun-92	-1.4900%	1.4100%	0.670%	0.6850%	0.7133%	0.6992%	0.7323%	-2.1600%	-2.1892%	0.6777%	13.43%	8.04%	8.39		

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Apr-93	-2.4200%	-0.2700%	0.5700%	0.6217%	0.6350%	0.6283%	0.6515%	-2.9900%	-3.0483%	-0.9215%	9.25%	6.84%	7.54%	2.41%	1.71%
May-93	2.6800%	-1.9100%	0.5200%	0.6192%	0.6342%	0.6267%	0.6549%	2.1600%	2.0533%	-2.5649%	11.63%	6.24%	7.52%	5.39%	4.11%
Jun-93	0.2900%	0.4300%	0.6200%	0.6108%	0.6258%	0.6183%	0.6469%	-0.3300%	-0.3283%	3.9831%	7.44%	7.44%	7.44%	6.21%	6.23%
Jul-93	-0.4000%	2.2600%	0.5400%	0.5975%	0.6125%	0.6050%	0.6285%	-0.9400%	-1.0050%	1.6316%	8.75%	6.48%	7.26%	2.27%	1.49%
Aug-93	3.7900%	4.8400%	0.5600%	0.5708%	0.5883%	0.5796%	0.6059%	3.2300%	3.2104%	4.2341%	15.23%	6.96%	6.96%	8.51%	8.28%
Sep-93	-0.7700%	-0.2000%	0.5000%	0.5550%	0.5708%	0.5629%	0.5864%	-1.2700%	-1.3329%	-0.7864%	13.01%	6.00%	6.76%	7.01%	6.26%
Oct-93	2.0700%	-0.2100%	0.4900%	0.5558%	0.5725%	0.5642%	0.5857%	1.5800%	1.5058%	-0.7957%	14.95%	5.88%	7.33%	9.07%	8.18%
Nov-93	-0.9500%	-5.0700%	0.5300%	0.5775%	0.5933%	0.5854%	0.6067%	-1.4800%	-1.5354%	-5.6767%	10.10%	6.36%	7.03%	3.74%	3.08%
Dec-93	1.2100%	-0.5300%	0.5500%	0.5775%	0.5933%	0.5854%	0.6113%	0.6600%	0.6246%	-1.1413%	10.08%	6.60%	7.03%	3.48%	3.05%
Jan-94	3.4000%	0.7200%	0.5500%	0.5767%	0.5933%	0.5850%	0.6110%	2.8500%	2.8150%	0.1090%	12.87%	6.60%	7.02%	6.27%	5.85%
Feb-94	-2.7100%	-5.6700%	0.4900%	0.5900%	0.6075%	0.5988%	0.6205%	-3.2000%	-3.3088%	-6.2905%	8.34%	5.88%	7.19%	2.46%	1.16%
Mar-94	-4.3600%	-3.3800%	0.5800%	0.5900%	0.6075%	0.5988%	0.6528%	-4.9400%	-4.9588%	-4.0328%	1.48%	6.96%	7.19%	-5.48%	-5.71%
Apr-94	1.2800%	2.4600%	0.5700%	0.6233%	0.6408%	0.6321%	0.6851%	0.7100%	0.6479%	1.7749%	5.32%	6.84%	7.59%	-1.52%	-2.26%
May-94	1.6400%	-2.6800%	0.6300%	0.6658%	0.6825%	0.6742%	0.6939%	1.0100%	0.9658%	-3.3739%	4.26%	7.56%	8.09%	-3.30%	-3.83%
Jun-94	-2.4500%	0.2100%	0.6100%	0.6642%	0.6808%	0.6725%	0.6923%	-3.0600%	-3.1225%	-0.4823%	1.41%	7.32%	8.07%	-5.91%	-6.66%
Jul-94	3.2800%	3.3600%	0.6000%	0.6758%	0.6925%	0.6842%	0.7063%	2.6800%	2.5958%	2.6537%	5.16%	7.20%	8.21%	-2.04%	-3.05%
Aug-94	4.1000%	-0.2800%	0.6600%	0.6725%	0.6875%	0.6800%	0.7006%	3.4400%	3.4200%	-0.9806%	5.47%	7.92%	8.16%	-2.45%	-2.69%
Sep-94	-2.4500%	-2.5400%	0.6100%	0.6950%	0.7075%	0.7013%	0.7187%	-3.0600%	-3.1513%	-3.2587%	3.68%	7.32%	8.42%	-3.64%	-4.73%
Oct-94	2.2500%	0.8600%	0.6600%	0.7142%	0.7258%	0.7200%	0.7377%	1.5900%	1.5300%	0.1223%	3.87%	7.92%	8.64%	-4.05%	-4.77%
Nov-94	-3.6400%	-1.4600%	0.6400%	0.7233%	0.7358%	0.7296%	0.7486%	-4.2800%	-4.3696%	-2.2086%	1.05%	7.68%	8.76%	-6.63%	-7.71%
Dec-94	1.4800%	0.5200%	0.6600%	0.7050%	0.7183%	0.7117%	0.7307%	0.8200%	0.7683%	-0.2107%	1.32%	7.92%	8.54%	-6.60%	-7.22%
Jan-95	2.5900%	7.7900%	0.7000%	0.7050%	0.7167%	0.7108%	0.7288%	1.8900%	1.8792%	7.0612%	0.52%	8.40%	8.53%	-7.88%	-8.01%
Feb-95	3.9000%	-0.1500%	0.5900%	0.6883%	0.6992%	0.6883%	0.7108%	3.3100%	3.2063%	-0.8608%	7.35%	8.08%	8.33%	0.27%	-0.97%
Mar-95	2.9500%	-0.6000%	0.6400%	0.6767%	0.6867%	0.6817%	0.6979%	2.3100%	2.2683%	-1.2979%	15.56%	7.68%	8.18%	7.88%	7.38%
Apr-95	2.9400%	3.6500%	0.5800%	0.6692%	0.6767%	0.6729%	0.6898%	2.3600%	2.2671%	2.9602%	17.45%	6.96%	8.08%	10.49%	9.38%
May-95	4.0000%	3.1600%	0.6500%	0.6375%	0.6450%	0.6413%	0.6610%	3.3500%	3.3588%	2.4990%	20.18%	7.80%	7.70%	12.38%	12.48%
Jun-95	2.3200%	0.4700%	0.5400%	0.6083%	0.6192%	0.6138%	0.6363%	1.7800%	1.7063%	-0.1636%	26.05%	6.48%	7.37%	19.57%	18.69%
Jul-95	3.3200%	2.5500%	0.5600%	0.6175%	0.6283%	0.6229%	0.6408%	2.7600%	2.6971%	1.9092%	26.10%	6.72%	7.48%	19.38%	18.63%
Aug-95	0.2500%	0.0200%	0.5700%	0.6308%	0.6408%	0.6358%	0.6532%	-0.3200%	-0.3858%	1.3668%	21.44%	6.84%	7.63%	14.60%	13.81%
Sep-95	4.2200%	6.3800%	0.5200%	0.6100%	0.6208%	0.6154%	0.6350%	3.7000%	3.6046%	5.7450%	29.74%	6.24%	7.39%	23.50%	22.36%
Oct-95	-0.3600%	2.3800%	0.5700%	0.5933%	0.6058%	0.5996%	0.6224%	-0.9300%	-0.9596%	1.7576%	26.43%	6.84%	7.20%	19.59%	19.24%
Nov-95	4.3900%	1.3600%	0.5100%	0.5850%	0.5983%	0.5917%	0.6200%	3.8800%	3.7983%	7.0400%	36.97%	6.12%	7.10%	30.85%	29.87%
Dec-95	1.9300%	7.0800%	0.4900%	0.5683%	0.5825%	0.5754%	0.6045%	1.4400%	1.3546%	6.4755%	37.57%	5.88%	6.91%	31.69%	30.67%
Jan-96	3.4000%	1.2900%	0.5400%	0.5675%	0.5825%	0.5750%	0.6006%	2.8600%	2.8250%	0.6894%	38.66%	6.48%	6.90%	32.18%	31.76%
Feb-96	0.9300%	-3.9500%	0.4800%	0.5825%	0.5967%	0.5896%	0.6125%	0.4500%	0.3404%	-4.5625%	34.70%	5.76%	7.08%	27.62%	27.62%
Mar-96	0.9600%	-2.0300%	0.5200%	0.6125%	0.6267%	0.6196%	0.6435%	0.4400%	0.3404%	-2.6735%	32.09%	6.24%	7.44%	25.85%	24.66%
Apr-96	1.4700%	1.1000%	0.5900%	0.6250%	0.6400%	0.6325%	0.6570%	0.8800%	0.8375%	0.4430%	30.21%	7.08%	7.59%	23.13%	22.62%
May-96	2.5800%	-0.2500%	0.5800%	0.6350%	0.6475%	0.6413%	0.6650%	2.0000%	1.9388%	-0.9150%	28.43%	6.96%	7.70%	21.47%	20.73%
Jun-96	0.3800%	4.1600%	0.5400%	0.6425%	0.6558%	0.6492%	0.6720%	-0.1600%	-0.2692%	3.4880%	25.99%	6.48%	7.79%	19.51%	18.20%
Jul-96	-4.2200%	-6.2800%	0.6200%	0.6375%	0.6517%	0.6446%	0.6688%	-5.0400%	-5.0646%	-6.9488%	16.56%	7.44%	7.74%	9.12%	8.82%
Aug-96	2.1100%	2.1300%	0.5700%	0.6217%	0.6358%	0.6288%	0.6532%	1.5400%	1.4813%	1.4768%	18.72%	6.84%	7.55%	11.88%	11.17%
Sep-96	5.6300%	0.9500%	0.6000%	0.6383%	0.6517%	0.6450%	0.6681%	5.0300%	4.9850%	0.2819%	20.32%	7.20%	7.74%	13.12%	12.58%
Oct-96	2.7600%	5.0800%	0.5800%	0.6158%	0.6317%	0.6238%	0.6482%	2.1800%	2.1363%	4.4318%	24.09%	6.96%	7.49%	17.13%	16.61%
Nov-96	7.5600%	2.1100%	0.5200%	0.5917%	0.6092%	0.6004%	0.6253%	7.0400%	6.9596%	1.4847%	27.86%	6.24%	7.21%	21.62%	20.66%
Dec-96	-1.9800%	-0.6000%	0.5600%	0.6175%	0.6308%	0.6175%	0.6389%	-2.5400%	-2.5888%	-1.2309%	22.96%	6.72%	7.31%	16.24%	15.65%
Jan-97	6.2500%	0.6600%	0.5600%	0.6183%	0.6358%	0.6271%	0.6472%	5.6900%	5.6229%	0.0128%	26.35%	6.72%	7.53%	19.63%	18.82%
Feb-97	0.7800%	-0.9500%	0.5100%	0.6092%	0.6283%	0.6188%	0.6392%	0.2700%	0.1613%	-1.5869%	26.16%	6.12%	7.43%	20.04%	18.73%
Mar-97	-4.1100%	-3.0100%	0.5900%	0.6292%	0.6475%	0.6383%	0.6555%	-4.7000%	-4.7483%	-3.6655%	19.82%	7.08%	7.66%	12.74%	12.16%
Apr-97	5.9700%	-1.5000%	0.5900%	0.6442%	0.6608%	0.6525%	0.6697%	5.3800%	5.3175%	-2.1697%	25.14%	7.08%	7.83%	18.06%	17.31%
May-97	6.0900%	4.2300%	0.5800%	0.6317%	0.6500%	0.6408%	0.6575%	5.5100%	5.4492%	3.5725%	29.42%	6.96%	7.69%	22.46%	21.73%
Jun-97	4.4800%	3.1400%	0.5900%	0.6175%	0.6350%	0.6263%	0.6437%	3.8900%	3.8538%	2.4963%	34.70%	7.08%	7.52%	27.62%	27.19%
Jul-97	7.9600%	2.3000%	0.5800%	0.5950%	0.6133%	0.6042%	0.6241%	7.3800%	7.3558%	1.6759%	52.15%	6.96%	7.25%	45.19%	44.90%
Aug-97	-5.6000%	-1.8300%	0.4900%	0.6017%	0.6167%	0.6092%	0.6248%	-6.0900%	-6.2092%	-2.4548%	40.66%	5.88%	7.31%	34.78%	33.35%
Sep-97	5.4800%	4.3300%	0.5800%	0.5950%	0.6117%	0.6033%	0.6229%	4.9000%	4.8767%	3.7071%	40.46%	6.96%	7.24%	33.50%	33.22%
Oct-97	-3.3400%	0.9800%	0.5400%	0.5833%	0.6000%	0.5917%	0.6130%	-3.8800%	-3.9317%	0.3670%	32.12%	6.48%	7.10%	25.64%	25.02%
Nov-97	4.6300%	7.0700%	0.4700%	0.5725%	0.5892%	0.5808%	0.6039%	4.1600%	4.0492%	6.4661%	28.53%	5.64%	6.97%	22.89%	21.56%
Dec-97	1.7200%	7.5200%	0.5400%	0.5633%	0.5825%	0.5729%	0.5970%	1.1800%	1.1471%	6.9230%	33.38%	6.48%	6.88%	26.90%	26.50%
Jan-98	1.1100%	-3.9500%	0.4800%	0.5508%	0.5683%	0.5596%	0.5878%	0.6300%	0.5504%	-4.5378%	26.92%	5.76%	6.72%	21.16%	20.21%
Feb-98	7.2100%	3.4100%	0.4400%	0.5558%	0.5733%	0.5646%	0.5932%	6.7700%	6.6454%	2.8168%	35.02%	5.28%	6.54%	29.74%	28.25%
Mar-98	5.1200%	6.4200%	0.5200%	0.5592%	0.5775%	0.5683%	0.5968%	4.6000%	4.5517%	5.8232%	48.02%	6.24%	6.82%	41.78%	41.20%
Apr-98	1.0100%	-1.9300%	0.4900%	0.5575%	0.5750%	0.5663%	0.5968%	0.5200%	0.4438%	-2.5268%	41.09%	5.88%	6.80%	35.21%	34.30%
May-98	-1.7200%	-0.5000%	0.4800%	0.5575%	0.5758%	0.5667%	0.5969%	-2.2000%	-2.2867%	-1.0969%	30.70%	5.76%	6.80%	24.94%	23.90%
Jun-98	4.0600%	3.6900%	0.5200%	0.5442%	0.5650%	0.5546%	0.5864%	3.5400%	3.5054%	3.1036%	30.18%	6.24%	6.66%	23.94%	23.52%
Jul-98	-1.0600%	-4.9300%	0.4900%	0.5458%	0.5650%	0.5554%	0.5853%	-1.5500%	-1.6154%	-5.5153%	19.30%	5.88%	6.67%	13.42%	12.64%
Aug-98	-14.4600%	1.6100%	0.4800%	0.5433%	0.5642%	0.5538%	0.5835%	-14.9400%	-15.0138%	1.0265%	8.11%	5.76%	6.65%	2.35%	1.46%
Sep-98	6.4100%	8.3500%	0.4400%	0.5333%	0.5567%	0.5450%	0.5780%	5.9700%	5.8650%	7.7720%	9.06%	5.28%	6.54%	3.78%	2.52%
Oct-98	8.1300%	-1.6600%	0.4200%	0.5308%	0.5583%	0.5446%	0.5796%	7.7100%	7.5854%	-2.2396%	22.00%	5.04%	6.54%	16.96%	15.47%
Nov-98	6.0600%	1.3400%	0.4500%	0.5342%	0.5658%	0.5500%	0.5864%	5.6100%	5.5100%	0.7536%	23.67%	5.40%	6.60%	18.27%	17.07%
Dec-98	5.7600%	2.9500%	0.4500%	0.5342%	0.5542%	0.5363%	0.5757%	5.3100%	5.2238%	2.3743%	28.58%	5.40%	6.44%	23.18%	22.14%
Jan-99	4.1800%	-4.5100%	0.4200%	0.5200%	0.5567%	0.5383%	0.5808%	3.7600%	3.6417%	-5.0908%	32.48%	5.04%	6.46%	27.44%	26.02%
Feb-99	-3.1100%	-3.6400%	0.4000%	0.5333%	0.5658%	0.5496%	0.5897%	-3.5100%	-3.6596%	-4.2297%	19.73%	4.80%	6.60%	14.93%	13.14%
Mar-99	4.0000%	-1.4800%	0.5300%	0.5517%	0.5817%	0.5667%	0.6046%	3.4700%							

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jan-00	-5.0200%	10.8500%	0.5700%	0.6483%	0.6633%	0.6558%	0.6956%	-5.5900%	-5.6758%	10.1544%	10.36%	6.84%	7.87%	3.52%	2.49%
Feb-00	-1.8900%	-5.7800%	0.5100%	0.6400%	0.6517%	0.6458%	0.6874%	-2.4000%	-2.5358%	-6.4674%	11.75%	6.12%	7.75%	5.63%	4.00%
Mar-00	9.7800%	3.4900%	0.5400%	0.6400%	0.6525%	0.6463%	0.6906%	9.2400%	9.1338%	2.7994%	17.96%	6.48%	7.76%	11.48%	10.20%
Apr-00	-3.0100%	7.9400%	0.4700%	0.6367%	0.6517%	0.6442%	0.6898%	-3.4800%	-3.6542%	7.2502%	10.14%	5.64%	7.73%	4.50%	2.41%
May-00	-2.0500%	4.8600%	0.5600%	0.6658%	0.6867%	0.6763%	0.7244%	-2.6100%	-2.7263%	4.1356%	10.49%	6.72%	7.73%	3.77%	2.38%
Jun-00	2.4700%	-5.7500%	0.5200%	0.6392%	0.6558%	0.6475%	0.6980%	1.9500%	1.8225%	-6.4480%	7.27%	6.24%	7.77%	1.03%	-0.50%
Jul-00	-1.5600%	6.7700%	0.5200%	0.6375%	0.6508%	0.6442%	0.6882%	-2.0800%	-2.2042%	6.0818%	9.00%	6.24%	7.73%	2.76%	1.27%
Aug-00	6.2100%	13.7200%	0.5000%	0.6292%	0.6417%	0.6354%	0.6774%	5.7100%	5.5746%	13.0426%	16.33%	6.00%	7.63%	10.33%	8.71%
Sep-00	-5.2800%	9.1500%	0.4600%	0.6350%	0.6525%	0.6438%	0.6853%	-5.7400%	-5.9238%	8.4647%	13.30%	5.52%	7.73%	7.78%	5.57%
Oct-00	-0.4200%	-3.5700%	0.5300%	0.6292%	0.6508%	0.6400%	0.6787%	-0.9500%	-1.0600%	-4.2487%	6.10%	6.36%	7.68%	-0.26%	-1.58%
Nov-00	-7.8800%	-1.3200%	0.4800%	0.6208%	0.6458%	0.6333%	0.6772%	-8.3600%	-8.5133%	-1.9972%	-4.20%	5.76%	7.60%	-9.96%	-11.80%
Dec-00	0.4900%	9.8200%	0.4500%	0.6008%	0.6233%	0.6121%	0.6547%	0.0400%	-0.1221%	9.1654%	-9.09%	5.40%	7.35%	-14.49%	-16.43%
Jan-01	3.5500%	-9.6700%	0.4900%	0.5958%	0.6150%	0.6054%	0.6499%	3.0600%	2.9446%	-10.3199%	-0.88%	5.88%	7.27%	-6.76%	-8.15%
Feb-01	-9.1200%	3.5300%	0.4200%	0.5917%	0.6100%	0.6008%	0.6449%	-9.5400%	-9.7208%	2.8851%	-8.19%	5.04%	7.21%	-13.23%	-15.40%
Mar-01	-6.3400%	-0.6300%	0.4500%	0.5817%	0.6017%	0.5917%	0.6394%	-6.7900%	-6.9317%	-1.2694%	-21.67%	5.40%	7.10%	-27.07%	-28.77%
Apr-01	7.7700%	6.0500%	0.4700%	0.6000%	0.6192%	0.6096%	0.6603%	7.3000%	7.1604%	5.3897%	-12.96%	5.64%	7.32%	-18.60%	-20.28%
May-01	0.6700%	-3.4300%	0.5000%	0.6075%	0.6250%	0.6163%	0.6663%	0.1700%	0.0538%	-4.0963%	-10.55%	6.00%	7.40%	-16.55%	-17.94%
Jun-01	-2.4300%	-7.9100%	0.4700%	0.5983%	0.6117%	0.6050%	0.6546%	-2.9000%	-3.0350%	-8.5646%	-14.82%	5.64%	7.26%	-20.46%	-22.08%
Jul-01	-0.9800%	-4.4800%	0.5200%	0.5942%	0.6058%	0.6000%	0.6494%	-1.5000%	-1.5800%	-5.1294%	-14.32%	6.24%	7.20%	-20.56%	-21.52%
Aug-01	-6.2600%	-2.9000%	0.4600%	0.6000%	0.5925%	0.5963%	0.6329%	-6.7200%	-6.8563%	-3.5329%	-24.38%	5.52%	7.16%	-29.90%	-31.54%
Sep-01	-8.0800%	-11.5200%	0.4100%	0.5975%	0.6058%	0.6017%	0.6423%	-8.4900%	-8.6817%	-12.1623%	-26.62%	4.92%	7.22%	-31.54%	-33.84%
Oct-01	1.9100%	-0.1700%	0.4800%	0.5858%	0.5942%	0.5900%	0.6373%	1.4300%	1.3200%	-0.8073%	-24.90%	5.76%	7.08%	-30.66%	-31.98%
Nov-01	7.6700%	-5.5200%	0.4100%	0.5808%	0.5842%	0.5825%	0.6287%	7.2600%	7.0875%	-6.1487%	-12.22%	5.69%	7.10%	-17.14%	-19.21%
Dec-01	0.8800%	2.6000%	0.4600%	0.5633%	0.5992%	0.5813%	0.6526%	0.4200%	0.2988%	1.9474%	-11.88%	5.52%	6.98%	-17.40%	-18.86%
Jan-02	-1.4600%	-5.6500%	0.4800%	0.5458%	0.5858%	0.5658%	0.6287%	-1.9400%	-2.0258%	-6.2887%	-16.15%	5.76%	6.79%	-21.91%	-22.94%
Feb-02	-1.9300%	-2.3500%	0.4300%	0.5425%	0.5792%	0.5608%	0.6283%	-2.3600%	-2.4908%	-2.9783%	-9.51%	5.16%	6.73%	-14.67%	-16.24%
Mar-02	3.7600%	12.2300%	0.4300%	0.5675%	0.6017%	0.5846%	0.6453%	3.3300%	3.1754%	11.5847%	0.25%	5.16%	7.02%	-4.91%	-6.77%
Apr-02	-6.0600%	-1.7100%	0.5400%	0.5633%	0.5967%	0.5800%	0.6316%	-6.6000%	-6.6400%	-2.3416%	-12.62%	6.48%	6.96%	-19.10%	-19.58%
May-02	-0.7400%	-9.0200%	0.4900%	0.5625%	0.6000%	0.5813%	0.6272%	-1.2300%	-1.3213%	-9.6472%	-13.84%	5.88%	6.98%	-19.72%	-20.82%
Jun-02	-7.1200%	-7.1000%	0.4400%	0.5533%	0.5900%	0.5717%	0.6180%	-7.5600%	-7.6917%	-7.7180%	-17.98%	5.28%	6.86%	-23.26%	-24.84%
Jul-02	-7.8000%	-13.8000%	0.5100%	0.5442%	0.5817%	0.5629%	0.6101%	-8.3100%	-8.3629%	-14.4101%	-23.63%	6.12%	6.76%	-29.75%	-30.39%
Aug-02	0.6600%	3.5000%	0.4400%	0.5308%	0.5700%	0.5504%	0.5979%	0.2200%	0.1096%	2.9021%	-18.00%	5.28%	6.61%	-23.28%	-24.60%
Sep-02	-10.8700%	-12.8300%	0.4200%	0.5125%	0.5525%	0.5325%	0.5906%	-11.2900%	-11.4025%	-13.4206%	-20.48%	5.04%	6.39%	-25.52%	-26.87%
Oct-02	8.8000%	-1.7300%	0.4000%	0.5275%	0.5617%	0.5446%	0.6016%	8.4000%	8.2554%	-2.3316%	-15.11%	4.80%	6.54%	-19.91%	-21.64%
Nov-02	5.8900%	2.4900%	0.4000%	0.5258%	0.5592%	0.5425%	0.5952%	5.4900%	5.3475%	1.8948%	-16.51%	4.80%	6.51%	-21.31%	-23.02%
Dec-02	-5.8700%	4.1600%	0.4500%	0.5175%	0.5525%	0.5350%	0.5896%	-6.3200%	-6.4050%	3.5704%	-22.10%	5.40%	6.42%	-27.50%	-28.52%
Jan-03	-2.6200%	-2.9200%	0.4100%	0.5142%	0.5492%	0.5317%	0.5887%	-3.0300%	-3.1517%	-3.5087%	-23.01%	4.92%	6.38%	-27.93%	-29.39%
Feb-03	-1.5000%	-4.9000%	0.3800%	0.4958%	0.5283%	0.5121%	0.5778%	-1.8800%	-2.0121%	-5.4778%	-22.68%	4.56%	6.15%	-27.24%	-28.82%
Mar-03	0.9700%	5.0500%	0.4000%	0.5233%	0.5663%	0.5071%	0.6070%	0.5700%	0.4629%	4.4837%	-24.76%	4.80%	6.09%	-29.56%	-30.84%
Apr-03	8.2400%	8.8500%	0.4000%	0.4783%	0.5183%	0.4983%	0.5540%	7.8400%	7.7417%	8.2960%	-13.30%	4.80%	5.98%	-18.10%	-19.28%
May-03	5.2700%	10.2100%	0.3900%	0.4875%	0.5310%	0.4613%	0.5710%	4.8800%	4.8088%	9.6790%	-8.05%	4.68%	5.54%	-12.73%	-13.59%
Jun-03	1.2800%	1.1900%	0.3600%	0.4142%	0.4767%	0.4454%	0.5173%	0.9200%	0.8346%	0.6727%	0.26%	4.32%	5.35%	-4.06%	-5.08%
Jul-03	1.7600%	-6.5000%	0.3800%	0.4575%	0.5058%	0.4817%	0.5457%	1.3800%	1.2783%	-7.0457%	10.66%	4.56%	5.78%	6.10%	4.88%
Aug-03	1.9500%	1.7500%	0.4200%	0.4892%	0.5258%	0.5075%	0.5659%	1.5300%	1.4425%	1.1841%	12.08%	5.04%	6.09%	7.04%	5.99%
Sep-03	-1.0600%	4.5700%	0.4600%	0.4767%	0.5108%	0.4938%	0.5487%	-1.5200%	-1.5538%	4.0213%	24.41%	5.52%	5.93%	18.89%	18.49%
Oct-03	5.6600%	1.1200%	0.4100%	0.4750%	0.5092%	0.4921%	0.5350%	5.2500%	5.1679%	0.5850%	20.82%	4.92%	5.91%	15.90%	14.92%
Nov-03	0.8800%	-0.0500%	0.3900%	0.4708%	0.5067%	0.4888%	0.5067%	0.4900%	0.3913%	-0.5809%	15.11%	4.68%	5.87%	10.43%	9.24%
Dec-03	5.2400%	6.7500%	0.4700%	0.4708%	0.5017%	0.4863%	0.5233%	4.7700%	4.7538%	6.2268%	28.69%	5.64%	5.84%	23.05%	22.86%
Jan-04	1.8400%	2.1600%	0.4200%	0.4617%	0.4925%	0.4771%	0.5128%	1.4200%	1.3629%	1.6472%	34.58%	5.04%	5.73%	29.54%	28.86%
Feb-04	1.3900%	1.8100%	0.3800%	0.4583%	0.4892%	0.4738%	0.5125%	1.0100%	0.9163%	1.2975%	38.53%	4.56%	5.69%	33.97%	32.85%
Mar-04	-1.5100%	1.0400%	0.4300%	0.4442%	0.4750%	0.4596%	0.4975%	-1.9400%	-1.9696%	0.5425%	35.13%	5.16%	5.52%	29.97%	29.62%
Apr-04	-1.5700%	-3.6200%	0.3900%	0.4775%	0.5083%	0.4929%	0.5271%	-1.9600%	-2.0629%	-4.1471%	22.88%	4.68%	5.92%	18.20%	16.97%
May-04	1.3700%	0.7900%	0.4000%	0.5033%	0.5333%	0.5183%	0.5517%	0.9700%	0.8517%	0.2383%	18.33%	4.80%	6.22%	13.53%	12.11%
Jun-04	1.9400%	1.5500%	0.4800%	0.5008%	0.5175%	0.5092%	0.5388%	1.4600%	1.4308%	1.0112%	19.10%	5.76%	6.11%	13.34%	12.99%
Jul-04	-3.3100%	1.7300%	0.4300%	0.4850%	0.5017%	0.4933%	0.5227%	-3.7400%	-3.8033%	1.2073%	13.17%	5.16%	5.92%	8.01%	7.25%
Aug-04	0.4000%	3.9300%	0.4500%	0.4708%	0.4892%	0.4800%	0.5124%	-0.0500%	-0.0800%	3.4177%	11.45%	5.40%	5.76%	6.05%	5.69%
Sep-04	1.0800%	0.9100%	0.4000%	0.4775%	0.4892%	0.4663%	0.4985%	0.6800%	0.6138%	0.4115%	13.86%	4.80%	5.60%	9.06%	8.26%
Oct-04	1.5300%	4.9500%	0.3800%	0.4558%	0.4742%	0.4650%	0.4992%	1.1500%	1.0650%	4.4508%	9.41%	4.56%	5.58%	4.85%	3.83%
Nov-04	4.0500%	4.0700%	0.4100%	0.4600%	0.4767%	0.4683%	0.4963%	3.6400%	3.5817%	3.5737%	12.85%	4.92%	5.62%	7.93%	7.23%
Dec-04	3.4000%	2.6500%	0.4300%	0.4558%	0.4742%	0.4650%	0.4939%	2.9700%	2.9350%	2.1561%	10.87%	5.16%	5.58%	5.71%	5.29%
Jan-05	-2.4400%	2.2100%	0.4100%	0.4467%	0.4650%	0.4558%	0.4828%	-2.8500%	-2.8958%	1.7272%	6.21%	4.92%	5.47%	1.29%	0.74%
Feb-05	2.1000%	1.9700%	0.3500%	0.4333%	0.4533%	0.4433%	0.4679%	1.7500%	1.6567%	1.5022%	6.96%	4.20%	5.32%	2.76%	1.64%
Mar-05	-1.7700%	1.0800%	0.4100%	0.4500%	0.4700%	0.4600%	0.4855%	-2.1800%	-2.2300%	0.5945%	6.67%	4.92%	5.52%	1.75%	1.15%
Apr-05	-1.9000%	3.2100%	0.3900%	0.4442%	0.4533%	0.4488%	0.4708%	-2.2900%	-2.3488%	2.7392%	6.32%	4.68%	5.39%	1.64%	0.93%
May-05	3.1800%	0.0800%	0.4000%	0.4292%	0.4408%	0.4350%	0.4616%	2.7800%	2.7450%	-0.3816%	8.22%	4.80%	5.22%	3.42%	3.00%
Jun-05	0.1400%	5.7600%	0.3600%	0.4133%	0.4183%	0.4158%	0.4502%	-0.2200%	-0.2758%	5.3098%	6.30%	4.32%	4.99%	1.98%	1.31%
Jul-05	3.7200%	2.3300%	0.3400%	0.4217%	0.4283%	0.4250%	0.4583%	3.3800%	3.2950%	1.8717%	14.03%	4.08%	5.10%	9.95%	8.93%
Aug-05	-0.9100%	0.7300%	0.4000%	0.4242%	0.4333%	0.4288%	0.4591%	-1.3100%	-1.3388%	0.2709%	12.55%	4.80%	5.15%	7.75%	7.40%
Sep-05	0.8100%	4.0200%	0.3500%	0.4275%	0.4367%	0.4321%	0.4585%	0.4600%	0.3779%	3.5615%	12.24%	4.20%	5.19%	8.04%	7.06%
Oct-05	-1.6700%	-6.1700%	0.3900%	0.4450%	0.4550%	0.4500%	0.4812%	-2.0600%	-2.1200%	-6.6512%	8.71%	4.68%	5.40%	4.03%	3.31%
Nov-05	3.7800%	-0.3900%	0.3900%	0.4521%	0.4625%	0.4573%	0.4899%	3.3900%	3.3227%	-0.8799%	8.43%	4.68%	5.49%	3.75%	2.94%
Dec-05	0.0300%	1.1000%	0.3900%	0.4483%	0.4592%	0.4538%	0.4848%	-0.3							

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Oct-06	3.2600%	5.6026%	0.4200%	0.4592%	0.4783%	0.4688%	0.4983%	2.8400%	2.7913%	5.1043%	16.34%	5.04%	5.63%		11.30%
Nov-06	1.9000%	2.1405%	0.3900%	0.4442%	0.4642%	0.4542%	0.4833%	1.5100%	1.4458%	1.6572%	14.23%	4.68%	5.45%		9.55%
Dec-06	1.4000%	1.1817%	0.3600%	0.4408%	0.4608%	0.4529%	0.4842%	1.0400%	0.9471%	0.6975%	15.79%	4.32%	5.44%		11.47%
Jan-07	1.5100%	-0.1134%	0.4300%	0.4500%	0.4792%	0.4646%	0.4967%	1.0800%	1.0454%	-0.6101%	14.51%	5.16%	5.58%		9.35%
Feb-07	-1.9600%	5.0341%	0.3800%	0.4492%	0.4767%	0.4629%	0.4917%	-2.3400%	-2.4229%	4.5424%	11.96%	4.56%	5.56%		6.41%
Mar-07	1.1200%	4.1373%	0.3900%	0.4417%	0.4717%	0.4567%	0.4875%	0.7300%	0.6633%	3.6498%	11.83%	4.68%	5.48%		7.15%
Apr-07	4.4300%	4.3759%	0.4200%	0.4558%	0.4858%	0.4708%	0.4975%	4.0100%	3.9592%	3.8784%	15.24%	5.04%	5.65%		9.59%
May-07	3.4900%	0.5145%	0.4100%	0.4558%	0.4875%	0.4717%	0.4992%	3.0800%	3.0183%	0.0153%	22.80%	4.92%	5.66%		17.14%
Jun-07	-1.6600%	-5.0621%	0.4000%	0.4483%	0.5142%	0.2812%	0.5250%	-2.0600%	-1.9412%	-5.5871%	20.59%	4.80%	5.37%		17.21%
Jul-07	-3.1000%	-3.5666%	0.4600%	0.4775%	0.5075%	0.4925%	0.5208%	-3.5600%	-3.5925%	-4.0874%	16.13%	5.52%	5.91%		10.61%
Aug-07	1.5000%	2.0956%	0.4200%	0.4825%	0.5050%	0.4938%	0.5200%	1.0800%	1.0063%	1.5756%	15.13%	5.04%	5.93%		10.09%
Sep-07	3.7400%	3.5427%	0.3700%	0.4783%	0.5017%	0.4900%	0.5150%	3.3700%	3.2500%	3.0277%	16.43%	4.44%	5.88%		11.99%
Oct-07	1.5900%	6.8641%	0.4300%	0.4717%	0.4950%	0.4833%	0.5092%	1.1600%	1.1067%	6.3549%	14.55%	5.16%	5.80%		9.39%
Nov-07	-4.1800%	0.3405%	0.3900%	0.4533%	0.4817%	0.4675%	0.4975%	-4.5700%	-4.6475%	-0.1570%	7.72%	4.68%	5.61%		3.04%
Dec-07	-0.6900%	0.2754%	0.3700%	0.4575%	0.4925%	0.4750%	0.5133%	-1.0600%	-1.1650%	-0.2379%	5.50%	4.44%	5.70%		-0.20%
Jan-08	-6.0000%	-6.8133%	0.4000%	0.4442%	0.4817%	0.4629%	0.5017%	-6.4000%	-6.4629%	-7.3150%	-2.31%	4.80%	5.56%		-7.11%
Feb-08	-3.2500%	-4.9956%	0.3400%	0.4608%	0.4975%	0.4792%	0.5175%	-3.5900%	-3.7292%	-5.5131%	-3.59%	4.08%	5.75%		-9.34%
Mar-08	-0.4300%	1.7056%	0.3700%	0.4592%	0.4917%	0.4754%	0.5175%	-0.8000%	-0.9054%	1.1881%	-5.07%	4.44%	5.71%		-9.51%
Apr-08	4.8700%	5.5163%	0.3500%	0.4625%	0.4942%	0.4783%	0.5242%	4.5200%	4.3917%	4.9921%	-4.67%	4.20%	5.74%		-10.41%
May-08	1.3000%	3.1987%	0.3700%	0.4642%	0.5000%	0.4821%	0.5225%	0.9300%	0.8179%	2.6762%	-6.69%	4.44%	5.79%		-11.13%
Jun-08	-8.4300%	-0.8668%	0.4000%	0.4733%	0.5092%	0.4913%	0.5317%	-8.8300%	-8.9213%	-1.3985%	-13.11%	4.80%	5.90%		-19.01%
Jul-08	-0.8400%	-6.1108%	0.3900%	0.4725%	0.5042%	0.4883%	0.5333%	-1.2300%	-1.3283%	-6.6441%	-11.09%	4.68%	5.86%		-15.77%
Aug-08	-1.4500%	-1.6602%	0.3600%	0.4700%	0.5008%	0.4854%	0.5088%	1.0900%	0.9646%	-2.1910%	-11.13%	4.32%	5.83%		-15.45%
Sep-08	-8.9100%	-11.4823%	0.3900%	0.4708%	0.5025%	0.4867%	0.5408%	-9.3000%	-9.3967%	-12.0231%	-21.97%	4.68%	5.84%		-26.65%
Oct-08	-16.7900%	-11.6128%	0.3700%	0.5233%	0.5658%	0.5446%	0.6300%	-17.1600%	-17.3346%	-12.2428%	-36.08%	4.44%	6.54%		-40.52%
Nov-08	-7.1800%	2.7894%	0.3600%	0.5100%	0.5608%	0.5354%	0.6333%	-7.5400%	-7.7154%	2.1561%	-38.09%	4.32%	6.43%		-42.41%
Dec-08	1.0600%	-1.6797%	0.3300%	0.4217%	0.4842%	0.4529%	0.5450%	0.7300%	0.6071%	-2.2247%	-36.99%	3.96%	5.71%		-40.95%
Jan-09	-8.4300%	-0.4541%	0.2400%	0.4208%	0.4867%	0.4538%	0.5325%	-8.6700%	-8.8838%	-0.9866%	-38.62%	2.88%	5.45%		-44.07%
Feb-09	-10.6500%	-12.5708%	0.3000%	0.4392%	0.5017%	0.4704%	0.5250%	-10.9500%	-11.1204%	-13.0958%	-43.32%	3.60%	5.65%		-48.92%
Mar-09	8.7600%	2.5255%	0.3500%	0.4583%	0.5092%	0.4838%	0.5350%	8.4100%	8.2763%	1.9905%	-38.09%	4.20%	5.81%		-42.29%
Apr-09	9.5700%	0.8462%	0.2900%	0.4492%	0.5142%	0.4817%	0.5400%	9.2800%	9.0883%	0.3062%	-35.31%	3.48%	5.78%		-38.79%
May-09	5.9900%	3.5287%	0.3300%	0.4617%	0.5200%	0.4908%	0.5408%	5.2600%	5.0992%	2.9879%	-32.57%	3.96%	5.89%		-36.53%
Jun-09	0.2000%	5.5202%	0.3800%	0.4675%	0.5100%	0.4888%	0.5167%	-0.1800%	-0.2888%	5.0035%	-26.22%	4.56%	5.87%		-32.08%
Jul-09	7.5600%	4.0755%	0.3600%	0.4508%	0.4758%	0.4633%	0.4975%	7.2000%	7.0967%	3.5780%	-19.97%	4.32%	5.56%		-24.29%
Aug-09	3.6100%	0.5460%	0.3600%	0.4542%	0.4758%	0.4463%	0.4542%	3.2500%	3.1638%	0.0702%	-18.26%	4.32%	5.36%		-22.58%
Sep-09	3.7300%	1.4284%	0.3400%	0.4275%	0.4342%	0.4308%	0.4608%	3.3900%	3.2992%	0.9676%	-6.92%	4.08%	5.17%		-11.00%
Oct-09	-1.8600%	-2.8427%	0.3300%	0.4292%	0.4367%	0.4329%	0.4625%	-2.1900%	-2.2929%	-3.3052%	9.78%	3.96%	5.20%		4.58%
Nov-09	6.0000%	4.5586%	0.3500%	0.4325%	0.4408%	0.4367%	0.4700%	5.6500%	5.5633%	4.0886%	25.37%	4.20%	5.24%		20.13%
Dec-09	1.9300%	5.5813%	0.3400%	0.4533%	0.4833%	0.4458%	0.4833%	1.5900%	1.4842%	5.0988%	26.45%	4.08%	5.35%		22.37%
Jan-10	-3.6000%	-4.7493%	0.3600%	0.4383%	0.4583%	0.4483%	0.4808%	-3.9600%	-4.0483%	-5.2301%	33.12%	4.32%	5.38%		28.80%
Feb-10	3.1000%	-1.4896%	0.3300%	0.4458%	0.4683%	0.4571%	0.4892%	2.7700%	2.6429%	-1.9788%	53.60%	3.96%	5.49%		49.64%
Mar-10	6.0300%	2.7978%	0.4000%	0.4392%	0.4642%	0.4517%	0.4867%	5.6300%	5.5783%	2.3111%	49.75%	4.80%	5.42%		44.33%
Apr-10	1.5800%	2.8058%	0.3800%	0.4642%	0.4808%	0.4525%	0.4842%	1.2000%	1.1275%	2.3216%	38.83%	4.56%	5.43%		34.27%
May-10	-7.9900%	-5.7600%	0.3400%	0.4133%	0.4375%	0.4254%	0.4583%	-8.3300%	-8.4154%	-6.2183%	20.97%	4.08%	5.11%		16.89%
Jun-10	-5.2300%	-0.6360%	0.3700%	0.4067%	0.4300%	0.4183%	0.4550%	-5.6000%	-5.6483%	-1.0910%	14.42%	4.44%	5.02%		9.98%
Jul-10	7.0100%	7.7413%	0.3100%	0.3933%	0.4133%	0.4033%	0.4383%	6.7000%	6.6067%	7.3030%	13.83%	3.72%	4.84%		10.11%
Aug-10	-4.5100%	1.2496%	0.3200%	0.3742%	0.3933%	0.3838%	0.4175%	-4.8300%	-4.8938%	0.8321%	4.91%	3.84%	4.61%		1.07%
Sep-10	8.9200%	2.9575%	0.2600%	0.3775%	0.3933%	0.3854%	0.4175%	8.6600%	8.5346%	2.5400%	10.16%	3.12%	4.63%		7.04%
Oct-10	3.8000%	1.2869%	0.2700%	0.3900%	0.4025%	0.3963%	0.4250%	3.5300%	3.4038%	0.8619%	16.51%	3.24%	4.76%		13.27%
Nov-10	0.0100%	-2.3233%	0.3200%	0.4058%	0.4225%	0.4142%	0.4475%	-0.3100%	-0.4042%	-3.6798%	9.93%	3.84%	4.97%		6.09%
Dec-10	6.6800%	3.1151%	0.3200%	0.4183%	0.4383%	0.4283%	0.4633%	6.3600%	6.2517%	2.6518%	15.05%	3.84%	5.14%		11.21%
Jan-11	2.3700%	1.4241%	0.3500%	0.4200%	0.4383%	0.4292%	0.4642%	2.0200%	1.9408%	0.9599%	22.18%	4.20%	5.15%		17.98%
Feb-11	3.4300%	1.1235%	0.3200%	0.4350%	0.4475%	0.4413%	0.4733%	3.1100%	2.9888%	0.6502%	22.57%	3.84%	5.30%		18.73%
Mar-11	0.0400%	0.1474%	0.3600%	0.4275%	0.4400%	0.4338%	0.4633%	-0.3200%	-0.3938%	-0.3159%	15.64%	4.32%	5.21%		11.32%
Apr-11	2.9600%	4.1878%	0.3400%	0.4300%	0.4408%	0.4354%	0.4625%	2.6200%	2.5246%	3.7253%	17.21%	4.08%	5.23%		13.13%
May-11	-1.1300%	1.9754%	0.3600%	0.4133%	0.4217%	0.4175%	0.4433%	-1.4900%	-1.5475%	1.5321%	25.95%	4.32%	5.01%		21.63%
Jun-11	-1.6700%	-0.1283%	0.3200%	0.4158%	0.4200%	0.4179%	0.4383%	-1.9900%	-2.0879%	-0.5666%	30.68%	3.84%	5.02%		26.84%
Jul-11	-2.0300%	-0.7538%	0.3200%	0.4108%	0.4192%	0.4150%	0.4392%	-2.3500%	-2.4450%	-1.1930%	19.64%	3.84%	4.98%		15.80%
Aug-11	-5.4300%	2.0388%	0.3400%	0.3642%	0.3725%	0.3683%	0.3908%	-5.7700%	-5.7983%	1.6480%	18.49%	4.08%	4.42%		14.41%
Sep-11	-7.0300%	0.2271%	0.2600%	0.3408%	0.3525%	0.3467%	0.3733%	-7.2900%	-7.3767%	-0.1462%	1.14%	4.16%	4.16%		-1.98%
Oct-11	10.9300%	3.8747%	0.2200%	0.3317%	0.3467%	0.3392%	0.3767%	10.7100%	10.5908%	3.4980%	8.09%	2.64%	4.07%		4.02%
Nov-11	-0.2200%	0.8014%	0.2400%	0.3225%	0.3308%	0.3267%	0.3542%	-0.4600%	-0.5467%	0.4472%	7.84%	2.88%	3.92%		4.96%
Dec-11	1.0200%	3.3767%	0.2200%	0.3275%	0.3358%	0.3317%	0.3608%	0.8000%	0.6883%	3.0159%	2.12%	2.64%	3.98%		-1.86%
Jan-12	4.8000%	-3.3237%	0.2100%	0.3342%	0.3442%	0.3342%	0.3617%	4.2700%	4.1458%	-3.6854%	4.22%	2.52%	4.01%		1.70%
Feb-12	4.3200%	0.3451%	0.2000%	0.3325%	0.3358%	0.3325%	0.3633%	4.1200%	3.9875%	-0.0182%	5.12%	2.26%	3.99%		1.13%
Mar-12	3.2900%	1.3720%	0.2200%	0.3325%	0.3450%	0.3388%	0.3733%	3.0700%	2.9513%	0.9987%	8.53%	2.64%	4.07%		5.89%
Apr-12	-0.6300%	2.1237%	0.2500%	0.3300%	0.3400%	0.3350%	0.3667%	-0.8800%	-0.9650%	1.7570%	4.75%	3.00%	4.02%		0.73%
May-12	-6.0100%	0.2161%	0.2300%	0.3167%	0.3258%	0.3213%	0.3500%	-6.2400%	-6.3313%	-0.1339%	-0.42%	2.76%	3.86%		-3.18%
Jun-12	4.1200%	4.1004%	0.1800%	0.3033%	0.3150%	0.3092%	0.3400%	3.9400%	3.8108%	3.7604%	5.44%	2.16%	3.71%		1.73%
Jul-12	1.3900%	2.8439%	0.2000%	0.2833%	0.2950%	0.2892%	0.3275%	1.1900%	1.1008%	2.5164%	9.12%	2.40%	3.47%		6.72%
Aug-12	2.2500%	-4.4721%	0.1800%	0.2900%	0.3008%	0.2954%	0.3303%	2.0700%	1.9546%	-4.8054%	17.99%	2.16%	3.55%		15.83%
Sep-12	2.5800%	1.2281%	0.1700%	0.2908%	0.3067%	0.2988%	0.3350%	2.4100%	2.2813%	0.8931%	30.18%	2.04%	3.59%		28.14%
Oct-12	-1.8500%	1.7240%	0.2100%	0.2892%	0.3025%	0.2958%	0.3258%	-2.0600%	-2.1458%	1.3982%	15.18%	2.52%	3.55%		12.66%
Nov-12	0.5800%	-4.6428%	0.1900%	0.2917%	0.2975%	0.2946%	0.3200%	0.3900%	0.2854%	-4.9628%	16.11%	2.28%	3.54%		13

	Market Return	S&P Return	Ibbot LT RF	Aaa Corp	Aa Corp	Avg Aaa and Aa Corp	A PU	RPMKT	RPAAAA	RPSPA	Mkt Annlized Return	RF Annualized Yield	AAAAA Annualized Yield	MRP RP	AAAAA RP
Jul-13	5.0900%	3.8500%	0.3000%	0.3617%	0.3717%	0.3667%	0.3900%	4.7900%	4.7233%	3.4600%	25.00%	3.60%	4.40%	21.40%	20.60%
Aug-13	-2.9000%	-5.0000%	0.2800%	0.3783%	0.3858%	0.3821%	0.3942%	-3.1800%	-3.2821%	-5.3942%	18.70%	3.36%	4.59%	15.34%	14.12%
Sep-13	3.1400%	1.0800%	0.2900%	0.3867%	0.3908%	0.3888%	0.4000%	2.8500%	2.7513%	0.6800%	19.35%	3.48%	4.67%	15.87%	14.68%
Oct-13	4.6000%	3.7700%	0.2900%	0.3775%	0.3825%	0.3800%	0.3917%	4.3100%	4.2200%	3.3783%	27.19%	3.48%	4.56%	23.71%	22.63%
Nov-13	3.0500%	-1.9900%	0.2700%	0.3858%	0.3892%	0.3875%	0.3975%	2.7800%	2.6625%	-2.3875%	30.32%	3.24%	4.65%	20.32%	25.67%
Dec-13	2.5300%	0.7600%	0.3100%	0.3850%	0.3900%	0.3875%	0.4008%	2.2200%	2.1425%	0.3592%	32.41%	3.72%	4.65%	28.69%	27.06%
Jan-14	-3.4600%	2.8100%	0.3200%	0.3742%	0.3775%	0.3758%	0.3858%	-3.7800%	-3.8358%	2.4242%	21.53%	3.84%	4.51%	17.69%	17.72%
Feb-14	4.5700%	3.3500%	0.2600%	0.3708%	0.3717%	0.3713%	0.3775%	4.3100%	4.1988%	2.9725%	25.38%	3.12%	4.46%	22.26%	20.93%
Mar-14	0.8400%	3.3700%	0.2900%	0.3650%	0.3700%	0.3675%	0.3758%	0.5500%	0.4725%	2.9942%	21.86%	3.48%	4.41%	18.38%	17.45%
Apr-14	0.7400%	4.2600%	0.2800%	0.3533%	0.3608%	0.3571%	0.3675%	0.4600%	0.3829%	3.8925%	20.44%	3.36%	4.29%	17.08%	16.16%
May-14	2.3500%	-1.0500%	0.2800%	0.3467%	0.3500%	0.3483%	0.3550%	2.0700%	2.0017%	-1.4050%	20.45%	3.36%	4.18%	17.09%	16.27%
Jun-14	2.0700%	4.4800%	0.2500%	0.3542%	0.3550%	0.3546%	0.3575%	1.8200%	1.7154%	4.1225%	24.62%	3.00%	4.26%	21.62%	20.36%
Jul-14	-1.3800%	-6.8000%	0.2700%	0.3467%	0.3500%	0.3483%	0.3525%	-1.6500%	-1.7283%	-7.1525%	16.94%	3.24%	4.18%	13.70%	12.76%
Aug-14	4.0000%	4.9500%	0.2600%	0.3400%	0.3417%	0.3408%	0.3442%	3.7400%	3.6592%	4.6058%	25.25%	3.12%	4.09%	22.13%	21.16%
Sep-14	-1.4000%	-1.8600%	0.2300%	0.3425%	0.3492%	0.3458%	0.3533%	-1.6300%	-1.7458%	-2.2133%	19.74%	2.76%	4.15%	16.98%	15.59%
Oct-14	2.4400%	8.0200%	0.2500%	0.3267%	0.3325%	0.3296%	0.3383%	2.1900%	2.1104%	7.6817%	17.27%	3.00%	3.96%	14.27%	13.31%
Nov-14	2.6900%	1.2000%	0.2300%	0.3267%	0.3367%	0.3317%	0.3408%	2.4600%	2.3583%	0.8592%	16.86%	2.76%	3.98%	14.10%	12.88%
Dec-14	-0.2500%	3.5000%	0.2200%	0.3158%	0.3242%	0.3200%	0.3292%	-0.4700%	-0.5700%	3.1708%	13.69%	2.64%	3.84%	11.05%	9.85%
Jan-15	-3.0000%	2.3300%	0.2000%	0.2883%	0.2950%	0.2917%	0.2983%	-3.2000%	-3.2917%	2.0317%	14.23%	2.40%	3.50%	11.83%	10.73%
Feb-15	5.7500%	-6.3300%	0.1500%	0.3008%	0.3033%	0.3021%	0.3058%	5.6000%	5.4479%	-6.6358%	15.52%	1.80%	3.63%	13.72%	11.90%
Mar-15	-1.5800%	-0.4900%	0.2100%	0.3033%	0.3083%	0.3058%	0.3117%	-1.7900%	-1.8858%	-0.8017%	12.75%	2.52%	3.67%	10.23%	9.08%
Apr-15	0.9600%	-1.2900%	0.1900%	0.2933%	0.3033%	0.2983%	0.3125%	0.7700%	0.6617%	-1.6025%	12.99%	2.28%	3.58%	10.71%	9.41%
May-15	1.2900%	0.6500%	0.2000%	0.3317%	0.3400%	0.3358%	0.3475%	1.0900%	0.9542%	0.3025%	11.82%	2.40%	4.03%	9.42%	7.79%
Jun-15	-1.9400%	-6.0000%	0.2300%	0.3492%	0.3558%	0.3525%	0.3658%	-2.1700%	-2.2925%	-6.3658%	7.43%	2.76%	4.23%	8.34%	3.20%
Jul-15	2.1000%	4.8100%	0.2400%	0.3458%	0.3542%	0.3500%	0.3667%	1.8600%	1.7500%	4.4433%	11.22%	2.88%	4.20%	8.34%	7.02%
Aug-15	-6.0300%	-3.9700%	0.2200%	0.3367%	0.3442%	0.3404%	0.3542%	-6.2500%	-6.3704%	-4.3242%	0.50%	2.64%	4.09%	-2.14%	-3.59%
Sep-15	-2.4700%	2.9000%	0.2100%	0.3392%	0.3508%	0.3450%	0.3658%	-2.6800%	-2.8150%	2.5342%	-0.60%	2.52%	4.14%	-3.12%	-4.74%
Oct-15	8.4400%	1.0800%	0.2100%	0.3292%	0.3425%	0.3358%	0.3575%	8.2300%	8.1042%	0.7225%	5.23%	2.52%	4.03%	2.71%	1.20%
Nov-15	0.3000%	-2.1300%	0.2200%	0.3383%	0.3508%	0.3446%	0.3667%	0.0800%	-0.0446%	-2.4967%	2.78%	2.64%	4.14%	0.14%	-1.36%
Dec-15	-1.5800%	2.1600%	0.2200%	0.3308%	0.3467%	0.3388%	0.3625%	-1.8000%	-1.9188%	1.7975%	1.41%	2.64%	4.07%	-1.23%	-2.66%
Jan-16	-4.9600%	4.9223%	0.2100%	0.3333%	0.3433%	0.3383%	0.3558%	-5.1700%	-5.2983%	4.5665%	-0.64%	2.52%	4.06%	-3.16%	-4.70%
Feb-16	-0.1300%	1.9408%	0.2000%	0.3300%	0.3317%	0.3308%	0.3425%	-0.3300%	-0.4608%	1.5983%	-6.17%	2.40%	3.97%	-8.57%	-10.14%
Mar-16	6.7800%	8.1400%	0.1800%	0.3183%	0.3258%	0.3221%	0.3467%	6.6000%	6.4579%	7.7933%	1.80%	2.16%	3.87%	-0.36%	-2.06%
Apr-16	0.3900%	-2.4100%	0.1700%	0.3183%	0.3258%	0.3221%	0.3467%	0.2200%	0.0679%	-2.7567%	1.23%	2.04%	3.87%	-0.81%	-2.64%
May-16	1.8000%	1.5100%	0.2000%	0.3042%	0.3083%	0.3063%	0.3275%	1.6000%	1.4938%	1.1825%	1.74%	2.40%	3.68%	-0.66%	-1.94%
Jun-16	0.2600%	7.7900%	0.1800%	0.2917%	0.3000%	0.2958%	0.3150%	0.0800%	-0.0358%	7.4750%	4.02%	2.16%	3.55%	1.86%	0.47%
Jul-16	3.6900%	-0.8000%	0.1400%	0.2733%	0.2825%	0.2779%	0.2975%	3.5500%	3.4121%	-1.0975%	5.64%	1.68%	3.34%	3.96%	2.31%
Aug-16	0.1400%	-5.5100%	0.1600%	0.2767%	0.2850%	0.2808%	0.2992%	-0.0200%	-0.1408%	-5.8092%	12.58%	1.92%	3.37%	10.66%	9.21%
Sep-16	0.0200%	0.4000%	0.1500%	0.2842%	0.2917%	0.2879%	0.3050%	-0.1300%	-0.2679%	0.0950%	15.45%	1.80%	3.46%	13.65%	12.00%
Oct-16	-1.8200%	0.8600%	0.1600%	0.2842%	0.2917%	0.2879%	0.3050%	-1.9800%	-2.1079%	0.5550%	4.53%	1.92%	3.46%	2.61%	1.07%
Nov-16	3.7000%	-5.3900%	0.1800%	0.3217%	0.3275%	0.3246%	0.3400%	3.5200%	3.3754%	-5.7300%	8.07%	2.16%	3.90%	5.91%	4.18%
Dec-16	1.9800%	4.9400%	0.2200%	0.3383%	0.3433%	0.3408%	0.3558%	1.7600%	1.6392%	4.5842%	11.98%	2.64%	4.09%	9.34%	7.89%
Jan-17	1.9000%	1.2600%	0.2400%	0.3317%	0.3317%	0.3292%	0.3300%	1.6600%	1.5708%	0.9300%	20.06%	2.88%	3.95%	17.18%	16.11%
Feb-17	3.9700%	5.2600%	0.2100%	0.3292%	0.3342%	0.3317%	0.3325%	3.7600%	3.6383%	4.9275%	24.99%	2.52%	3.98%	22.47%	21.01%
Mar-17	0.1200%	2.9800%	0.2300%	0.3292%	0.3342%	0.3317%	0.3325%	-0.1100%	-0.2117%	2.6475%	17.20%	2.76%	3.98%	14.44%	13.22%
Apr-17	1.0300%	0.7800%	0.2100%	0.3225%	0.3275%	0.3250%	0.3275%	0.8200%	0.7050%	0.4525%	17.94%	2.52%	3.90%	15.42%	14.04%
May-17	1.4100%	4.2200%	0.2400%	0.3208%	0.3275%	0.3242%	0.3275%	1.1700%	1.0858%	3.8925%	17.49%	2.88%	3.89%	14.61%	13.60%
Jun-17	0.6200%	-2.7000%	0.2100%	0.3067%	0.3142%	0.3104%	0.3142%	0.4100%	0.3096%	-3.0142%	17.91%	2.52%	3.73%	15.39%	14.19%
Jul-17	2.0600%	2.4400%	0.2200%	0.3150%	0.3225%	0.3188%	0.3233%	1.8400%	1.7413%	2.1167%	16.06%	2.64%	3.83%	13.42%	12.24%
Aug-17	0.3100%	3.2400%	0.2200%	0.3083%	0.3167%	0.3125%	0.3183%	0.0900%	-0.0025%	2.9217%	16.26%	2.64%	3.75%	13.62%	12.51%
Sep-17	2.0600%	-2.7300%	0.1900%	0.3025%	0.3100%	0.3063%	0.3058%	1.8700%	1.7538%	-3.0358%	18.63%	2.28%	3.68%	16.35%	14.95%
Oct-17	2.3300%	3.9000%	0.2200%	0.3000%	0.3117%	0.3058%	0.3117%	2.1100%	2.0242%	3.5883%	23.64%	2.64%	3.67%	21.00%	19.97%
Nov-17	3.0700%	2.7500%	0.2100%	0.3000%	0.3117%	0.3058%	0.3117%	2.8600%	2.7642%	2.4383%	22.89%	2.52%	3.67%	20.37%	19.22%
Dec-17	1.1100%	-6.1300%	0.2000%	0.2925%	0.3008%	0.2967%	0.3017%	0.9100%	0.8133%	-6.4317%	21.84%	2.40%	3.56%	19.44%	18.28%
Jan-18	5.7300%	-3.0700%	0.2400%	0.2925%	0.3008%	0.2967%	0.3158%	5.4900%	5.4333%	-3.3858%	26.42%	2.88%	3.56%	23.54%	22.86%
Feb-18	-3.6900%	-3.8400%	0.2200%	0.2958%	0.3067%	0.3013%	0.3217%	-3.9100%	-3.9913%	-4.1617%	17.11%	2.64%	3.62%	14.47%	13.49%
Mar-18	-2.5400%	3.7700%	0.2400%	0.3225%	0.3325%	0.3275%	0.3442%	-2.7800%	-2.8675%	3.4258%	14.00%	2.88%	3.93%	11.12%	10.07%
Apr-18	0.3800%	2.1000%	0.2500%	0.3208%	0.3342%	0.3275%	0.3475%	0.1300%	0.0525%	1.7525%	13.26%	3.00%	3.93%	10.26%	9.33%
May-18	2.4100%	-1.1400%	0.2500%	0.3325%	0.3433%	0.3379%	0.3567%	2.1600%	2.0721%	-1.4967%	14.38%	3.00%	4.06%	11.38%	10.33%
Jun-18	0.6200%	2.7300%	0.2300%	0.3300%	0.3425%	0.3363%	0.3558%	0.3900%	0.2838%	2.3742%	14.38%	2.76%	4.04%	11.62%	10.35%
Jul-18	3.7200%	1.8600%	0.2500%	0.3392%	0.3508%	0.3308%	0.3558%	3.4700%	3.3892%	1.5042%	16.24%	3.00%	3.97%	13.24%	12.27%
Aug-18	3.2600%	1.1300%	0.2500%	0.3233%	0.3375%	0.3304%	0.3550%	3.0100%	2.9296%	0.7750%	19.66%	3.00%	3.97%	16.66%	15.70%
Sep-18	0.5700%	-0.6000%	0.2200%	0.3233%	0.3375%	0.3304%	0.3550%	0.3500%	0.2396%	-0.9550%	17.91%	2.64%	3.97%	15.27%	13.95%
Oct-18	-6.8400%	1.9500%	0.3000%	0.3450%	0.3567%	0.3508%	0.3708%	-7.1400%	-7.1908%	1.5792%	7.35%	3.60%	4.21%	3.75%	3.14%
Nov-18	2.0400%	3.5500%	0.2800%	0.3517%	0.3683%	0.3600%	0.3775%	1.7600%	1.6800%	3.1725%	6.27%	3.36%	4.32%	2.91%	1.95%
Dec-18	-9.0300%	-4.0100%	0.2700%	0.3517%	0.3642%	0.3579%	0.3775%	-9.3000%	-9.3879%	-4.3875%	-4.38%	3.24%	4.30%	-7.62%	-8.68%
Jan-19	8.0100%	4.8400%	0.2500%	0.3275%	0.3450%	0.3363%	0.3625%	7.7600%	7.6738%	4.4775%	-2.32%	3.00%	4.04%	-5.32%	-6.36%
Feb-19	3.2100%	4.1100%	0.2200%	0.3158%	0.3325%	0.3242%	0.3542%	2.9900%	2.8858%	3.7558%	4.68%	2.64%	3.89%	2.04%	0.79%
Mar-19	1.9400%	2.8800%	0.2300%	0.3158%	0.3325%	0.3242%	0.3542%	1.7100%	1.6158%	2.5258%	9.49%	2.76%	3.89%	6.73%	5.60%
Apr-19	4.0500%	0.9300%	0.2300%	0.3075%	0.3208%	0.3142%	0.3400%	3.8200%	3.7358%	0.5900%	13.49%	3.77%	3.77%	10.73%	9.72%
May-19	-6.3500%	-0.7800%	0.2300%	0.3058%	0.3167%	0.3113%	0.3317%	-6.5800%	-6.6613%	-1.1117%	3.78%	2.76%	3.74%	1.02%	0.05%
Jun-19	7.0500%	3.2200%	0.1800%	0.3058%	0.3167%	0.3113%	0.3317%	6.8700%	6.7						

SUMMARY OUTPUT

Regression Statistics

Multiple R 0.1283466
R Square 0.0164728
Adjusted R Square 0.0155908
Standard Error 0.2106203
Observation 1117

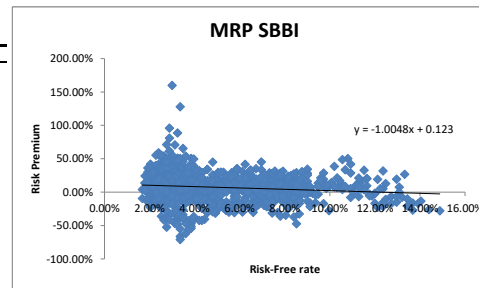
ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.828433217	0.8284332	18.67484764	1.68848E-05
Residual	1115	49.46241351	0.0443609		
Total	1116	50.29084673			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.1230087	0.013206047	9.3145702	6.3269E-20	0.097097147	0.1489202	0.0970971	0.1489202
X Variable 1	-1.0047825	0.23251102	-4.3214405	1.68848E-05	-1.460990971	-0.5485741	-1.460991	-0.5485741

S&P U Annulized Yield A Annualized Yield SPA RP

57.48% 5.05% 52.43%
71.90% 5.05% 66.85%
69.27% 5.10% 64.17%
56.12% 5.14% 50.98%
47.04% 5.14% 41.90%
50.81% 5.14% 45.67%
91.33% 5.23% 86.10%
110.24% 5.24% 105.00%
117.15% 5.30% 111.85%
111.18% 5.38% 105.80%
48.73% 5.34% 43.39%
5.00% 5.29% -0.29%
11.03% 5.23% 5.80%
5.30% 5.26% 0.04%
17.34% 5.29% 12.05%
29.22% 5.18% 24.04%
29.14% 5.15% 23.99%
20.43% 5.04% 15.39%
-19.93% 5.01% -24.94%
-25.28% 4.99% -30.27%
-31.76% 4.95% -36.71%
-39.34% 4.86% -44.20%
-20.19% 4.88% -25.07%
-13.73% 4.96% -18.69%
-21.96% 5.11% -27.07%
-23.41% 5.01% -28.42%
-18.92% 5.01% -23.93%
-27.33% 4.98% -32.31%
-37.13% 4.86% -41.99%
-42.24% 4.84% -47.08%
-18.87% 4.87% -23.74%
-25.23% 4.83% -30.06%
-23.90% 4.81% -28.71%
-41.36% 5.05% -46.41%
-29.82% 5.54% -35.36%
-28.94% 5.51% -34.45%
-35.88% 6.24% -42.12%
-40.38% 6.17% -46.55%
-44.14% 6.41% -50.55%
-48.82% 6.06% -54.88%
-51.57% 6.83% -58.40%
-61.17% 7.36% -68.53%
-65.55% 7.57% -73.12%



Risk-Free Rate 2.11% RP 10.18%

SUMMARY OUTPUT

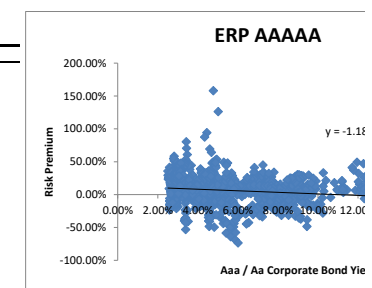
Regression Statistics

Multiple R 0.1579858
R Square 0.0249595
Adjusted R Square 0.0240658
Standard Error 0.2103241
Observation 1093

ANOVA

	df	SS	MS	F	Significance F
Regression	1	1.2354248	1.2354248	27.92790078	1.51995E-07
Residual	1091	48.261718	0.0442362		
Total	1092	49.497143			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.1291992	0.0146702	8.8069203	4.96487E-18	0.100414231	0.1579842
X Variable 1	-1.182957	0.2238462	-5.2846855	1.51995E-07	-1.622174848	-0.7437392



AAA Bond 2.96% RP 9.42%

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
-51.07%	7.28%	-58.35%		
-33.07%	6.35%	-39.42%		
-4.94%	5.91%	-10.85%		
-22.56%	5.81%	-28.37%		
-20.42%	5.88%	-26.30%		
-0.55%	5.85%	-6.40%		
-1.68%	5.39%	-7.07%		
-27.02%	5.77%	-32.79%		
-27.19%	6.34%	-33.53%		
8.67%	6.89%	1.78%		
77.22%	6.50%	70.72%		
100.69%	6.11%	94.58%		
32.54%	5.91%	26.63%		
-6.06%	5.98%	-12.04%		
-20.43%	6.36%	-26.79%		
-17.46%	6.36%	-23.82%		
-15.97%	7.06%	-23.03%		
-21.88%	7.22%	-29.10%		
-5.30%	6.56%	-11.86%		
15.28%	5.78%	9.50%		
27.80%	5.66%	22.14%		
-2.40%	5.44%	-7.84%		
-23.17%	5.39%	-28.56%		
-29.55%	5.40%	-34.95%		
-32.74%	5.29%	-38.03%		
-30.54%	5.43%	-35.97%		
-14.92%	5.56%	-20.48%		
-14.50%	5.40%	-19.90%		
-13.35%	5.38%	-18.73%		
-20.43%	5.36%	-25.79%		
-33.82%	5.18%	-39.00%		
-39.88%	4.96%	-44.84%		
-32.87%	4.88%	-37.75%		
-22.23%	4.79%	-27.02%		
-6.47%	4.61%	-11.08%		
-1.49%	4.53%	-6.02%		
27.52%	4.42%	23.10%		
31.17%	4.44%	26.73%		
28.35%	4.43%	23.92%		
54.34%	4.40%	49.94%		
56.76%	4.35%	52.41%		
76.65%	4.29%	72.36%		
100.77%	4.21%	96.56%		
118.76%	4.17%	114.59%		
98.75%	4.17%	94.58%		
63.33%	4.17%	59.16%		
58.26%	4.14%	54.12%		
48.42%	4.12%	44.30%		
50.32%	4.07%	46.25%		
42.05%	4.06%	37.99%		
40.57%	4.05%	36.52%		
32.33%	4.04%	28.29%		
28.70%	3.95%	24.75%		
20.68%	3.83%	16.85%		
10.81%	3.82%	6.99%		
10.69%	3.89%	6.80%		
4.00%	4.00%	0.00%		
4.88%	4.07%	0.81%		
-7.56%	4.00%	-11.56%		
-14.86%	3.99%	-18.85%		
-9.74%	3.94%	-13.68%		
-17.74%	3.89%	-21.63%		
-25.73%	3.96%	-29.69%		
-33.33%	4.09%	-37.42%		
-31.64%	4.08%	-35.72%		
-37.05%	4.03%	-41.08%		
-40.53%	4.01%	-44.54%		
-36.25%	4.03%	-40.28%		
-45.79%	3.99%	-49.78%		
-32.48%	4.08%	-36.56%		
-27.52%	3.95%	-31.47%		
-11.64%	3.95%	-15.59%		
-23.17%	3.86%	-27.03%		
-20.25%	3.84%	-24.09%		
-7.91%	3.88%	-11.79%		
14.58%	3.79%	10.79%		
6.63%	3.73%	2.90%		
22.44%	3.74%	18.70%		
29.22%	3.68%	25.54%		
34.96%	3.59%	31.37%		
45.17%	3.54%	41.63%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
29.40%	3.55%	25.85%		
35.55%	3.50%	32.05%		
11.70%	3.47%	8.23%		
23.37%	3.43%	19.94%		
22.19%	3.41%	18.78%		
24.95%	3.71%	21.24%		
7.26%	3.58%	3.68%		
12.55%	3.41%	9.14%		
11.26%	3.38%	7.88%		
10.21%	3.34%	6.87%		
1.00%	3.35%	-2.35%		
18.24%	3.34%	14.90%		
13.91%	3.25%	10.66%		
-14.17%	3.30%	-17.47%		
3.12%	3.34%	-0.22%		
-7.40%	3.23%	-10.63%		
-1.92%	3.21%	-5.13%		
-7.87%	3.18%	-11.05%		
-6.17%	3.15%	-9.32%		
-16.18%	3.11%	-19.29%		
-17.14%	3.10%	-20.24%		
-18.40%	3.15%	-21.55%		
-19.48%	3.20%	-22.68%		
-22.47%	3.16%	-25.63%		
-28.35%	3.14%	-31.49%		
-13.84%	3.08%	-16.92%		
-23.20%	3.03%	-26.23%		
-19.59%	3.00%	-22.59%		
-20.38%	2.98%	-23.36%		
-20.96%	3.00%	-23.96%		
-29.89%	3.00%	-32.89%		
-25.46%	2.98%	-28.44%		
-31.57%	3.06%	-34.63%		
-29.25%	3.09%	-32.34%		
-30.02%	3.09%	-33.11%		
-35.53%	3.12%	-38.65%		
-32.63%	3.09%	-35.72%		
-23.62%	3.10%	-26.72%		
-25.11%	3.12%	-28.23%		
-28.65%	3.10%	-31.75%		
-27.06%	3.10%	-30.16%		
-21.44%	3.08%	-24.52%		
-2.48%	3.08%	-5.56%		
4.17%	3.07%	1.10%		
15.41%	3.06%	12.35%		
26.28%	3.05%	23.23%		
40.10%	3.02%	37.08%		
62.92%	3.01%	59.91%		
76.86%	3.00%	73.86%		
67.03%	3.00%	64.03%		
75.02%	2.98%	72.04%		
74.99%	2.96%	72.03%		
76.36%	2.96%	73.40%		
73.95%	2.96%	70.99%		
54.36%	2.97%	51.39%		
42.61%	2.98%	39.63%		
46.06%	2.99%	43.07%		
31.59%	2.99%	28.60%		
24.96%	2.99%	21.97%		
21.27%	2.97%	18.30%		
15.69%	2.99%	12.70%		
15.17%	2.99%	12.18%		
15.04%	2.99%	12.05%		
14.94%	2.96%	11.98%		
17.81%	2.94%	14.87%		
12.41%	2.93%	9.48%		
13.04%	2.94%	10.10%		
20.95%	2.96%	17.99%		
18.04%	2.97%	15.07%		
22.61%	2.99%	19.62%		
28.82%	2.98%	25.84%		
22.95%	2.97%	19.98%		
37.30%	2.95%	34.35%		
35.57%	2.92%	32.65%		
37.32%	2.87%	34.45%		
36.23%	2.83%	33.40%		
31.94%	2.80%	29.14%		
43.85%	2.79%	41.06%		
50.97%	2.79%	48.18%		
60.16%	2.77%	57.39%		
53.32%	2.75%	50.57%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
63.57%	2.69%	60.88%		
43.16%	2.67%	40.49%		
57.82%	2.66%	55.16%		
47.44%	2.65%	44.79%		
49.32%	2.69%	46.63%		
36.19%	2.70%	33.49%		
31.48%	2.69%	28.79%		
21.58%	2.71%	18.87%		
1.32%	2.75%	-1.43%		
-2.69%	2.76%	-5.45%		
-6.53%	2.76%	-9.29%		
1.25%	2.76%	-1.51%		
-9.60%	2.72%	-12.32%		
-4.28%	2.72%	-7.00%		
-13.24%	2.72%	-15.96%		
-18.76%	2.70%	-21.46%		
-23.34%	2.70%	-26.04%		
-17.79%	2.71%	-20.50%		
-12.58%	2.73%	-15.31%		
-5.96%	2.73%	-8.69%		
3.59%	2.80%	0.79%		
0.02%	2.88%	-2.86%		
-8.76%	2.93%	-11.69%		
-13.16%	3.05%	-16.21%		
-12.54%	3.05%	-15.59%		
-15.03%	3.05%	-18.08%		
-6.38%	3.02%	-9.40%		
-1.74%	2.97%	-4.71%		
6.97%	2.94%	4.03%		
4.76%	2.94%	1.82%		
-1.98%	2.99%	-4.97%		
-1.41%	3.03%	-4.44%		
-0.70%	3.05%	-3.75%		
4.69%	3.03%	1.66%		
3.68%	3.07%	0.61%		
4.00%	3.06%	0.94%		
8.48%	2.99%	5.49%		
12.73%	2.99%	9.74%		
10.05%	2.97%	7.08%		
8.94%	2.96%	5.98%		
3.29%	2.95%	0.34%		
-0.21%	2.94%	-3.15%		
10.36%	2.90%	7.46%		
13.77%	2.86%	10.91%		
18.85%	2.85%	16.00%		
15.53%	2.83%	12.70%		
29.16%	2.81%	26.35%		
31.37%	2.78%	28.59%		
29.48%	2.76%	26.72%		
30.71%	2.76%	27.95%		
27.18%	2.76%	24.42%		
28.78%	2.77%	26.01%		
30.81%	2.79%	28.02%		
22.37%	2.79%	19.58%		
10.73%	2.79%	7.94%		
8.68%	2.76%	5.92%		
9.15%	2.80%	6.35%		
7.65%	2.83%	4.82%		
4.10%	2.86%	1.24%		
3.26%	2.86%	0.40%		
4.10%	2.83%	1.27%		
5.83%	2.84%	2.99%		
3.13%	2.95%	0.18%		
1.30%	3.09%	-1.79%		
0.05%	3.13%	-3.08%		
7.98%	3.21%	4.77%		
17.86%	3.26%	14.60%		
17.83%	3.19%	14.64%		
14.08%	3.14%	10.94%		
14.72%	3.17%	11.55%		
18.17%	3.24%	14.93%		
18.63%	3.29%	15.34%		
17.12%	3.29%	13.83%		
14.74%	3.23%	11.51%		
18.82%	3.25%	15.57%		
16.94%	3.23%	13.71%		
18.38%	3.22%	15.16%		
19.43%	3.22%	16.21%		
16.77%	3.22%	13.55%		
17.35%	3.24%	14.11%		
16.53%	3.24%	13.29%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
17.37%	3.26%	14.11%		
20.88%	3.24%	17.64%		
19.26%	3.22%	16.04%		
16.92%	3.25%	13.67%		
15.45%	3.30%	12.15%		
12.97%	3.36%	9.61%		
12.53%	3.47%	9.06%		
10.70%	3.63%	7.07%		
7.15%	3.71%	3.44%		
8.61%	3.66%	4.95%		
6.62%	3.61%	3.01%		
7.73%	3.62%	4.11%		
11.04%	3.49%	7.55%		
9.45%	3.40%	6.05%		
7.85%	3.38%	4.47%		
10.24%	3.32%	6.92%		
12.28%	3.23%	9.05%		
15.81%	3.16%	12.65%		
19.51%	3.16%	16.35%		
22.29%	3.14%	19.15%		
26.93%	3.16%	23.77%		
28.77%	3.14%	25.63%		
26.88%	3.13%	23.75%		
27.62%	3.12%	24.50%		
18.07%	3.12%	14.95%		
21.41%	3.11%	18.30%		
24.75%	3.11%	21.64%		
22.53%	3.13%	19.40%		
25.28%	3.14%	22.14%		
20.65%	3.15%	17.50%		
21.61%	3.15%	18.46%		
17.88%	3.19%	14.69%		
19.22%	3.21%	16.01%		
18.89%	3.21%	15.68%		
21.09%	3.24%	17.85%		
15.53%	3.27%	12.26%		
18.92%	3.30%	15.62%		
15.85%	3.32%	12.53%		
11.28%	3.35%	7.93%		
10.04%	3.31%	6.73%		
8.27%	3.29%	4.98%		
13.79%	3.29%	10.50%		
8.33%	3.40%	4.93%		
7.46%	3.48%	3.98%		
7.46%	3.49%	3.97%		
8.07%	3.55%	4.52%		
4.73%	3.63%	1.10%		
4.41%	3.72%	0.69%		
5.97%	3.79%	2.18%		
3.25%	3.82%	-0.57%		
5.03%	3.91%	1.12%		
8.11%	3.96%	4.15%		
5.57%	4.05%	1.52%		
2.36%	4.05%	-1.69%		
9.62%	4.01%	5.61%		
13.16%	4.01%	9.15%		
6.19%	4.09%	2.10%		
1.24%	4.20%	-2.96%		
0.88%	4.37%	-3.49%		
2.76%	4.55%	-1.79%		
1.37%	4.61%	-3.24%		
5.41%	4.62%	0.79%		
6.36%	4.36%	2.00%		
9.22%	3.93%	5.29%		
11.40%	3.96%	7.44%		
12.75%	4.13%	8.62%		
13.98%	3.95%	10.03%		
13.80%	4.01%	9.79%		
20.81%	3.99%	16.82%		
21.70%	4.04%	17.66%		
24.55%	4.29%	20.26%		
30.48%	4.55%	25.93%		
36.79%	4.56%	32.23%		
34.63%	4.47%	30.16%		
40.70%	4.49%	36.21%		
34.49%	4.52%	29.97%		
35.41%	4.50%	30.91%		
34.11%	4.47%	29.64%		
27.17%	4.56%	22.61%		
23.62%	4.77%	18.85%		
20.46%	4.86%	15.60%		

Multiple R 0.1579858

S&P U	Annulized Yield	A Annulized Yield	SPA RP	Multiple R	0.1283466
	23.58%	4.88%	18.70%		
	26.59%	4.89%	21.70%		
	17.71%	5.03%	12.68%		
	14.89%	4.96%	9.93%		
	11.96%	4.90%	7.06%		
	7.49%	4.96%	2.53%		
	4.92%	5.02%	-0.10%		
	4.67%	5.00%	-0.33%		
	5.07%	4.91%	0.16%		
	6.16%	4.79%	1.37%		
	9.95%	4.86%	5.09%		
	15.45%	4.84%	10.61%		
	10.21%	4.79%	5.42%		
	13.75%	4.64%	9.11%		
	12.32%	4.57%	7.75%		
	10.45%	4.61%	5.84%		
	14.70%	4.62%	10.08%		
	20.24%	4.65%	15.59%		
	29.08%	4.64%	24.44%		
	31.31%	4.59%	26.72%		
	33.61%	4.48%	29.13%		
	34.06%	4.48%	29.58%		
	32.75%	4.52%	28.23%		
	24.65%	4.57%	20.08%		
	31.25%	4.65%	26.60%		
	30.65%	4.73%	25.92%		
	36.81%	4.73%	32.08%		
	43.55%	4.71%	38.84%		
	42.84%	4.68%	38.16%		
	29.31%	4.65%	24.66%		
	17.31%	4.65%	12.66%		
	16.67%	4.66%	12.01%		
	13.98%	4.64%	9.34%		
	8.77%	4.59%	4.18%		
	-2.45%	4.51%	-6.96%		
	-5.65%	4.48%	-10.13%		
	-3.25%	4.50%	-7.75%		
	-4.95%	4.53%	-9.48%		
	-7.50%	4.51%	-12.01%		
	-11.86%	4.49%	-16.35%		
	-8.17%	4.45%	-12.62%		
	-2.46%	4.44%	-6.90%		
	6.90%	4.39%	2.51%		
	1.65%	4.37%	-2.72%		
	2.71%	4.37%	-1.66%		
	8.93%	4.37%	4.56%		
	20.70%	4.37%	16.33%		
	26.13%	4.37%	21.76%		
	19.45%	4.39%	15.06%		
	21.24%	4.38%	16.86%		
	22.20%	4.40%	17.80%		
	21.97%	4.41%	17.56%		
	12.34%	4.42%	7.92%		
	12.39%	4.46%	7.93%		
	7.80%	4.49%	3.31%		
	10.42%	4.50%	5.92%		
	8.03%	4.51%	3.52%		
	6.29%	4.52%	1.77%		
	5.88%	4.53%	1.35%		
	9.71%	4.55%	5.16%		
	13.48%	4.54%	8.94%		
	9.19%	4.54%	4.65%		
	13.99%	4.53%	9.46%		
	16.26%	4.51%	11.75%		
	18.55%	4.53%	14.02%		
	15.90%	4.54%	11.36%		
	18.69%	4.53%	14.16%		
	18.42%	4.51%	13.91%		
	18.92%	4.50%	14.42%		
	19.42%	4.49%	14.93%		
	18.03%	4.50%	13.53%		
	11.41%	4.52%	6.89%		
	7.52%	4.54%	2.98%		
	8.23%	4.58%	3.65%		
	8.48%	4.63%	3.85%		
	8.10%	4.66%	3.44%		
	5.64%	4.71%	0.93%		
	4.66%	4.83%	-0.17%		
	-2.09%	4.86%	-6.95%		
	-6.22%	4.92%	-11.14%		
	-6.71%	5.14%	-11.85%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
-6.13%	5.25%	-11.38%		
-8.14%	5.25%	-13.39%		
-6.62%	5.40%	-12.02%		
-7.51%	5.45%	-12.96%		
-16.41%	5.58%	-21.99%		
-14.11%	5.81%	-19.92%		
-6.98%	5.74%	-12.72%		
-6.60%	5.63%	-12.23%		
-4.46%	5.67%	-10.13%		
1.13%	5.46%	-4.33%		
3.84%	5.28%	-1.44%		
6.37%	5.44%	0.93%		
6.68%	5.42%	1.26%		
4.37%	5.66%	-1.29%		
4.90%	5.84%	-0.94%		
6.95%	5.94%	1.01%		
16.44%	5.96%	10.48%		
10.75%	6.05%	4.70%		
-4.82%	6.18%	-11.00%		
-1.28%	6.48%	-7.76%		
-0.65%	6.67%	-7.32%		
-2.48%	6.54%	-9.02%		
-3.23%	6.37%	-9.60%		
-8.89%	6.41%	-15.30%		
-8.24%	6.58%	-14.82%		
-3.95%	6.62%	-10.57%		
5.18%	6.62%	-1.44%		
2.36%	6.53%	-4.17%		
3.07%	6.27%	-3.20%		
4.49%	6.27%	-1.78%		
11.78%	6.40%	5.38%		
17.08%	6.59%	10.49%		
10.31%	6.87%	3.44%		
11.26%	7.04%	4.22%		
7.85%	7.13%	0.72%		
11.26%	7.27%	3.99%		
9.78%	7.30%	2.48%		
10.40%	7.16%	3.24%		
-3.11%	7.41%	-10.52%		
-5.97%	7.52%	-13.49%		
-7.08%	7.44%	-14.52%		
-11.42%	7.63%	-19.05%		
-5.17%	8.02%	-13.19%		
-17.21%	8.00%	-25.21%		
-15.40%	8.59%	-23.99%		
-20.58%	8.69%	-29.27%		
-7.28%	8.51%	-15.79%		
-4.21%	8.31%	-12.52%		
-14.30%	8.31%	-22.61%		
-18.66%	8.67%	-27.33%		
-19.23%	9.04%	-28.27%		
-8.03%	9.06%	-17.09%		
-1.57%	8.88%	-10.45%		
1.07%	8.82%	-7.75%		
-7.79%	8.76%	-16.55%		
7.52%	8.79%	-1.27%		
16.55%	8.48%	8.07%		
25.22%	8.15%	17.07%		
10.15%	7.89%	2.26%		
11.22%	8.05%	3.17%		
18.33%	8.07%	10.26%		
20.37%	8.34%	12.03%		
32.90%	8.45%	24.45%		
18.39%	8.45%	9.94%		
9.13%	8.40%	0.73%		
8.77%	8.18%	0.59%		
12.30%	8.10%	4.20%		
1.76%	7.96%	-6.20%		
2.43%	7.90%	-5.47%		
-0.88%	7.79%	-8.67%		
-0.50%	7.78%	-8.28%		
-4.03%	7.77%	-11.80%		
-3.32%	7.82%	-11.14%		
0.03%	7.84%	-7.81%		
-5.82%	7.77%	-13.59%		
-3.79%	7.82%	-11.61%		
4.31%	7.64%	-3.33%		
6.14%	7.61%	-1.47%		
11.16%	7.66%	3.50%		
18.92%	7.60%	11.32%		
8.14%	7.48%	0.66%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
4.16%	7.52%	-3.36%		
4.22%	7.62%	-3.40%		
3.19%	7.66%	-4.47%		
5.61%	7.63%	-2.02%		
6.50%	7.63%	-1.13%		
6.96%	7.71%	-0.75%		
4.98%	7.82%	-2.84%		
-3.54%	8.04%	-11.58%		
3.62%	8.04%	-4.42%		
-6.49%	8.02%	-14.51%		
-22.40%	8.15%	-30.55%		
-18.07%	8.24%	-26.31%		
-10.73%	8.36%	-19.09%		
-8.04%	8.42%	-16.46%		
-10.41%	8.46%	-18.87%		
-21.63%	8.77%	-30.40%		
-25.92%	9.00%	-34.92%		
-28.96%	9.32%	-38.28%		
-28.16%	9.66%	-37.82%		
-32.50%	10.03%	-42.53%		
-37.87%	10.45%	-48.32%		
-27.61%	10.78%	-38.39%		
-18.98%	10.46%	-29.44%		
-21.56%	10.27%	-31.83%		
-10.43%	10.37%	-20.80%		
-9.69%	9.99%	-19.68%		
-8.06%	9.72%	-17.78%		
4.15%	10.06%	-5.91%		
18.92%	10.23%	8.69%		
39.56%	10.10%	29.46%		
33.64%	10.01%	23.63%		
43.28%	10.12%	33.16%		
43.82%	10.19%	33.63%		
37.51%	10.16%	27.35%		
44.04%	10.04%	34.00%		
44.51%	10.11%	34.40%		
32.33%	9.90%	22.43%		
25.82%	9.71%	16.11%		
29.88%	9.67%	20.21%		
32.21%	9.53%	22.68%		
19.99%	9.55%	10.44%		
12.07%	9.54%	2.53%		
22.12%	9.37%	12.75%		
29.54%	9.13%	20.41%		
35.14%	8.90%	26.24%		
25.94%	8.79%	17.15%		
24.94%	8.76%	16.18%		
31.81%	8.62%	23.19%		
21.42%	8.61%	12.81%		
21.22%	8.65%	12.57%		
21.24%	8.70%	12.54%		
23.32%	8.71%	14.61%		
27.70%	8.71%	18.99%		
30.09%	8.58%	21.51%		
27.87%	8.51%	19.36%		
18.80%	8.49%	10.31%		
17.27%	8.46%	8.81%		
14.04%	8.61%	5.43%		
15.29%	8.64%	6.65%		
8.66%	8.64%	0.02%		
2.50%	8.92%	-6.42%		
5.81%	8.97%	-3.16%		
7.97%	8.98%	-1.01%		
6.88%	9.09%	-2.21%		
5.13%	9.22%	-4.09%		
0.18%	9.40%	-9.22%		
1.68%	9.51%	-7.83%		
5.37%	9.32%	-3.95%		
2.26%	9.28%	-7.02%		
-1.83%	9.46%	-11.29%		
-2.07%	9.68%	-11.75%		
-3.71%	9.70%	-13.41%		
8.75%	9.90%	-1.15%		
7.11%	9.84%	-2.73%		
5.93%	10.04%	-4.11%		
2.21%	10.10%	-7.89%		
3.30%	10.30%	-7.00%		
6.90%	10.14%	-3.24%		
7.17%	9.98%	-2.81%		
8.30%	10.14%	-1.84%		
6.98%	10.36%	-3.38%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
9.04%	11.40%	-2.36%		
11.68%	11.89%	-0.21%		
13.62%	12.15%	1.47%		
6.02%	12.21%	-6.19%		
5.64%	13.23%	-7.59%		
-1.87%	14.59%	-16.46%		
12.57%	14.29%	-1.72%		
14.49%	12.74%	1.75%		
13.95%	12.40%	1.55%		
9.73%	12.15%	-2.42%		
7.11%	12.66%	-5.55%		
7.80%	13.29%	-5.50%		
16.64%	13.54%	3.11%		
15.48%	14.01%	1.46%		
15.06%	14.66%	0.40%		
13.18%	14.27%	-1.09%		
13.45%	14.68%	-1.23%		
24.82%	15.13%	9.69%		
10.51%	15.25%	-4.74%		
10.17%	16.12%	-5.95%		
9.48%	15.79%	-6.32%		
13.67%	16.07%	-2.40%		
15.00%	16.45%	-1.45%		
11.57%	17.03%	-5.46%		
15.29%	17.26%	-1.96%		
15.07%	16.42%	-1.34%		
11.72%	16.16%	-4.44%		
14.26%	16.80%	-2.54%		
16.47%	16.92%	-0.45%		
13.65%	16.49%	-2.84%		
21.04%	16.40%	4.64%		
15.42%	16.08%	-0.66%		
10.55%	16.34%	-5.79%		
4.79%	16.46%	-11.67%		
17.76%	15.92%	1.84%		
23.43%	15.45%	7.98%		
23.91%	14.98%	8.93%		
18.43%	14.46%	3.97%		
26.55%	14.43%	12.13%		
30.77%	14.24%	16.53%		
31.17%	14.28%	16.89%		
29.22%	14.03%	15.19%		
29.50%	13.64%	15.86%		
33.61%	13.49%	20.12%		
34.12%	13.65%	20.48%		
41.47%	13.57%	27.90%		
26.69%	13.57%	13.13%		
31.65%	13.44%	18.21%		
30.08%	13.25%	16.83%		
27.21%	13.38%	13.83%		
20.01%	13.52%	6.50%		
21.29%	13.40%	7.89%		
16.36%	13.40%	2.96%		
15.52%	13.77%	1.75%		
11.02%	14.13%	-3.11%		
7.14%	14.88%	-7.74%		
9.22%	15.10%	-5.88%		
10.21%	14.86%	-4.65%		
16.87%	14.43%	2.44%		
16.79%	14.19%	2.60%		
13.91%	13.83%	0.08%		
19.42%	13.25%	6.17%		
26.04%	13.07%	12.97%		
23.07%	12.99%	10.08%		
30.82%	13.03%	17.79%		
36.31%	13.80%	22.50%		
36.95%	13.59%	23.36%		
48.67%	13.17%	35.49%		
51.77%	12.14%	39.63%		
39.26%	12.06%	27.19%		
33.18%	12.14%	21.04%		
20.94%	12.13%	8.81%		
25.25%	12.01%	13.24%		
28.32%	11.51%	16.81%		
33.03%	11.01%	22.02%		
33.78%	10.80%	22.98%		
39.42%	10.32%	29.11%		
41.47%	9.51%	31.95%		
33.98%	9.13%	24.85%		
32.96%	9.57%	23.39%		
37.07%	9.65%	27.42%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
47.24%	9.35%	37.89%		
57.41%	9.31%	48.10%		
47.18%	9.50%	37.67%		
45.34%	9.53%	35.81%		
41.04%	9.29%	31.75%		
28.54%	9.12%	19.42%		
37.17%	8.94%	28.22%		
25.24%	9.00%	16.23%		
16.86%	8.93%	7.93%		
15.88%	9.35%	6.53%		
9.40%	9.87%	-0.47%		
7.77%	10.02%	-2.25%		
4.54%	10.14%	-5.60%		
1.11%	10.44%	-9.33%		
14.32%	11.18%	3.15%		
1.15%	11.36%	-10.21%		
-6.43%	10.82%	-17.26%		
-2.96%	10.94%	-13.90%		
-1.47%	10.80%	-12.26%		
-0.19%	10.12%	-10.30%		
-3.62%	10.07%	-13.70%		
0.73%	10.52%	-9.79%		
6.04%	10.79%	-4.75%		
4.78%	10.81%	-6.02%		
5.22%	11.02%	-5.80%		
-1.41%	11.17%	-12.58%		
2.44%	10.67%	-8.22%		
13.10%	9.98%	3.12%		
18.80%	9.89%	8.91%		
18.27%	10.05%	8.22%		
12.10%	10.08%	2.01%		
11.64%	10.06%	1.58%		
21.02%	10.24%	10.78%		
28.45%	10.19%	18.26%		
29.93%	10.00%	19.92%		
27.99%	9.66%	18.33%		
38.04%	9.50%	28.54%		
39.16%	9.51%	29.65%		
35.91%	9.58%	26.33%		
33.04%	9.54%	23.50%		
38.60%	9.52%	29.09%		
47.81%	9.43%	38.37%		
28.51%	9.55%	18.96%		
29.90%	9.76%	20.15%		
28.86%	9.85%	19.02%		
16.52%	9.91%	6.61%		
17.64%	10.01%	7.63%		
13.33%	9.81%	3.52%		
4.56%	9.76%	-5.19%		
-3.17%	9.90%	-13.06%		
-0.87%	10.12%	-10.99%		
5.13%	10.06%	-4.93%		
3.67%	9.91%	-6.24%		
-2.56%	9.73%	-12.29%		
2.83%	9.71%	-6.88%		
7.59%	9.48%	-1.89%		
7.71%	9.55%	-1.85%		
10.20%	9.46%	0.74%		
1.83%	9.43%	-7.61%		
2.58%	9.58%	-7.01%		
6.06%	9.55%	-3.48%		
18.16%	9.31%	8.85%		
15.79%	9.17%	6.62%		
10.86%	9.12%	1.74%		
7.70%	9.05%	-1.36%		
14.61%	8.90%	5.71%		
11.83%	8.83%	3.00%		
5.11%	8.93%	-3.82%		
1.59%	8.97%	-7.37%		
9.93%	8.93%	1.00%		
11.21%	8.88%	2.33%		
14.37%	8.79%	5.58%		
19.73%	8.58%	11.15%		
15.85%	8.44%	7.41%		
14.39%	8.41%	5.98%		
11.09%	8.53%	2.56%		
12.02%	8.63%	3.39%		
8.11%	8.45%	-0.34%		
16.02%	8.28%	7.74%		
27.88%	8.04%	19.83%		
32.07%	7.90%	24.17%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
23.73%	7.82%	15.91%		
21.55%	7.86%	13.69%		
25.41%	7.76%	17.65%		
18.85%	7.54%	11.31%		
25.54%	7.27%	18.27%		
24.38%	7.04%	17.34%		
25.29%	7.03%	18.27%		
19.12%	7.28%	11.84%		
14.39%	7.34%	7.06%		
13.44%	7.33%	6.10%		
-0.19%	7.45%	-7.64%		
-5.27%	7.83%	-13.10%		
-2.68%	8.22%	-10.90%		
-3.44%	8.33%	-11.77%		
-7.52%	8.31%	-15.83%		
-6.53%	8.48%	-15.00%		
-11.09%	8.41%	-19.50%		
-13.18%	8.62%	-21.80%		
-12.24%	8.85%	-21.10%		
-8.91%	8.98%	-17.89%		
-7.95%	8.77%	-16.71%		
-1.48%	8.75%	-10.23%		
4.28%	8.53%	-4.25%		
7.28%	8.37%	-1.09%		
8.53%	8.28%	0.25%		
15.04%	7.93%	7.11%		
15.34%	7.60%	7.74%		
14.43%	7.69%	6.75%		
17.07%	7.84%	9.24%		
27.79%	7.62%	20.17%		
29.72%	7.47%	22.25%		
33.43%	7.44%	25.99%		
42.13%	7.25%	34.88%		
33.56%	7.21%	26.36%		
28.48%	7.35%	21.13%		
26.63%	7.72%	18.91%		
23.52%	7.88%	15.63%		
19.43%	7.98%	11.45%		
23.82%	8.06%	15.76%		
13.16%	8.03%	5.13%		
13.28%	7.84%	5.44%		
7.50%	8.02%	-0.52%		
10.33%	7.78%	2.56%		
11.15%	7.50%	3.65%		
3.18%	7.57%	-4.39%		
2.54%	7.77%	-5.23%		
5.74%	7.64%	-1.90%		
4.68%	7.87%	-3.18%		
1.99%	8.04%	-6.05%		
6.57%	7.89%	-1.32%		
5.53%	7.72%	-2.20%		
15.19%	7.49%	7.70%		
10.72%	7.50%	3.22%		
14.43%	7.47%	6.95%		
9.96%	7.36%	2.61%		
15.30%	7.25%	8.06%		
24.72%	7.16%	17.56%		
19.01%	7.05%	11.96%		
24.25%	7.12%	17.13%		
36.33%	7.16%	29.17%		
35.74%	7.16%	28.57%		
29.58%	7.16%	22.41%		
30.27%	7.04%	23.23%		
21.06%	7.02%	14.04%		
25.30%	7.00%	18.30%		
30.13%	6.94%	23.19%		
26.73%	6.96%	19.77%		
19.95%	7.04%	12.91%		
14.85%	6.91%	7.94%		
14.18%	6.97%	7.21%		
6.39%	7.08%	-0.68%		
-1.50%	7.26%	-8.76%		
9.31%	7.21%	2.10%		
16.55%	7.46%	9.10%		
8.67%	7.73%	0.94%		
13.01%	7.70%	5.30%		
12.52%	7.91%	4.61%		
-1.14%	7.93%	-9.07%		
2.11%	8.06%	-5.96%		
-7.03%	7.93%	-14.96%		
-8.85%	8.12%	-16.97%		

Multiple R 0.1579858

S&P U	Annulized Yield	A Annulized Yield	SPA RP	Multiple R	0.1283466
	5.81%	8.35%	-2.54%		
	3.46%	8.25%	-4.79%		
	8.68%	8.29%	0.39%		
	7.78%	8.28%	-0.50%		
	6.53%	8.69%	-2.16%		
	3.85%	8.38%	-4.53%		
	12.16%	8.26%	3.90%		
	26.07%	8.13%	17.94%		
	44.55%	8.22%	36.32%		
	37.23%	8.14%	29.09%		
	46.76%	8.13%	38.64%		
	59.69%	7.86%	51.84%		
	30.13%	7.80%	22.33%		
	42.99%	7.74%	35.25%		
	37.30%	7.67%	29.62%		
	34.89%	7.92%	26.97%		
	24.23%	8.00%	16.23%		
	21.38%	7.86%	13.53%		
	8.59%	7.79%	0.80%		
	-7.28%	7.59%	-14.87%		
	-24.84%	7.71%	-32.54%		
	-22.19%	7.65%	-29.83%		
	-25.50%	7.54%	-33.04%		
	-30.40%	7.83%	-38.23%		
	-27.30%	7.66%	-34.96%		
	-31.43%	7.54%	-38.97%		
	-22.55%	7.74%	-30.30%		
	-28.22%	7.58%	-35.80%		
	-32.38%	7.53%	-39.90%		
	-31.78%	7.42%	-39.20%		
	-38.44%	7.32%	-45.76%		
	-34.38%	7.17%	-41.55%		
	-35.35%	7.09%	-42.44%		
	-36.36%	7.22%	-43.58%		
	-30.97%	7.14%	-38.11%		
	-29.92%	7.08%	-36.99%		
	-27.89%	7.06%	-34.95%		
	-29.77%	6.93%	-36.71%		
	-34.27%	6.80%	-41.06%		
	-27.20%	6.65%	-33.85%		
	-11.82%	6.37%	-18.19%		
	-3.95%	6.21%	-10.15%		
	4.19%	6.55%	-2.36%		
	2.43%	6.79%	-4.37%		
	22.87%	6.58%	16.29%		
	26.43%	6.42%	20.01%		
	23.30%	6.37%	16.93%		
	26.37%	6.28%	20.09%		
	32.98%	6.15%	26.83%		
	42.36%	6.15%	36.21%		
	36.93%	5.97%	30.96%		
	21.24%	6.33%	14.92%		
	10.88%	6.62%	4.26%		
	11.27%	6.47%	4.81%		
	21.07%	6.27%	14.80%		
	23.66%	6.15%	17.51%		
	19.33%	5.98%	13.35%		
	23.85%	5.99%	17.86%		
	28.96%	5.96%	23.00%		
	24.01%	5.93%	18.08%		
	24.07%	5.79%	18.27%		
	24.26%	5.61%	18.65%		
	24.31%	5.83%	18.48%		
	33.12%	5.65%	27.47%		
	32.18%	5.54%	26.64%		
	37.66%	5.40%	32.26%		
	38.47%	5.50%	32.97%		
	34.21%	5.51%	28.70%		
	38.35%	5.50%	32.84%		
	23.69%	5.77%	17.91%		
	18.39%	5.88%	12.51%		
	16.60%	5.82%	10.78%		
	17.08%	5.75%	11.33%		
	15.92%	5.82%	10.10%		
	9.36%	5.98%	3.38%		
	7.78%	6.29%	1.49%		
	9.23%	6.42%	2.81%		
	5.78%	6.40%	-0.62%		
	8.65%	6.37%	2.28%		
	10.79%	6.20%	4.59%		
	4.66%	6.00%	-1.34%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
17.79%	5.98%	11.81%		
20.78%	5.80%	14.98%		
20.88%	5.81%	15.07%		
17.64%	5.96%	11.68%		
22.40%	5.90%	16.50%		
33.66%	5.85%	27.81%		
37.15%	5.97%	31.18%		
35.92%	5.99%	29.93%		
25.99%	6.30%	19.69%		
15.59%	6.25%	9.34%		
14.90%	6.24%	8.66%		
21.07%	6.18%	14.89%		
22.52%	6.11%	16.41%		
20.36%	5.97%	14.39%		
19.28%	6.16%	13.12%		
11.28%	6.02%	5.26%		
0.65%	6.21%	-5.56%		
-1.70%	6.21%	-7.91%		
-0.62%	6.29%	-6.91%		
2.03%	6.27%	-4.24%		
6.54%	6.38%	0.16%		
3.73%	6.40%	-2.67%		
-0.09%	6.37%	-6.46%		
-14.59%	6.49%	-21.08%		
-29.35%	7.56%	-36.91%		
-27.63%	7.60%	-35.23%		
-29.04%	6.54%	-35.58%		
-24.20%	6.39%	-30.59%		
-30.24%	6.30%	-36.54%		
-29.68%	6.42%	-36.10%		
-32.79%	6.48%	-39.27%		
-32.58%	6.49%	-39.07%		
-28.23%	6.20%	-34.43%		
-20.45%	5.97%	-26.42%		
-18.66%	5.71%	-24.37%		
-6.80%	5.53%	-12.33%		
2.45%	5.55%	-3.10%		
4.21%	5.64%	-1.43%		
11.91%	5.79%	6.12%		
7.08%	5.77%	1.31%		
20.65%	5.87%	14.78%		
20.97%	5.84%	15.13%		
23.32%	5.81%	17.51%		
12.26%	5.50%	6.76%		
5.71%	5.46%	0.25%		
9.43%	5.26%	4.17%		
10.20%	5.01%	5.19%		
11.86%	5.01%	6.85%		
16.61%	5.10%	11.51%		
7.92%	5.37%	2.55%		
5.40%	5.56%	-0.16%		
12.24%	5.57%	6.67%		
15.21%	5.68%	9.53%		
12.24%	5.56%	6.68%		
13.75%	5.55%	8.20%		
23.09%	5.32%	17.77%		
23.72%	5.26%	18.46%		
13.96%	5.27%	8.69%		
14.85%	4.69%	10.16%		
11.80%	4.48%	7.32%		
14.66%	4.52%	10.14%		
19.44%	4.25%	15.19%		
19.74%	4.33%	15.41%		
14.14%	4.34%	9.80%		
13.26%	4.36%	8.90%		
14.64%	4.48%	10.16%		
12.37%	4.40%	7.97%		
10.43%	4.20%	6.23%		
15.11%	4.08%	11.03%		
19.28%	3.93%	15.35%		
11.67%	4.00%	7.67%		
12.79%	4.02%	8.77%		
10.45%	3.91%	6.54%		
4.49%	3.84%	0.65%		
1.19%	4.00%	-2.81%		
8.34%	4.15%	4.19%		
11.63%	4.18%	7.45%		
16.06%	4.15%	11.91%		
20.35%	4.00%	16.35%		
9.33%	4.17%	5.16%		
6.22%	4.53%	1.69%		

Multiple R 0.1579858

S&P U Annualized Yield	A Annualized Yield	SPA RP	Multiple R	0.1283466
7.26%	4.68%	2.58%		
6.67%	4.73%	1.94%		
6.51%	4.80%	1.71%		
8.66%	4.70%	3.96%		
11.68%	4.77%	6.91%		
12.40%	4.81%	7.59%		
11.64%	4.63%	7.01%		
11.60%	4.53%	7.07%		
9.45%	4.51%	4.94%		
7.76%	4.41%	3.35%		
17.12%	4.26%	12.86%		
20.99%	4.29%	16.70%		
8.58%	4.23%	4.35%		
19.95%	4.13%	15.82%		
16.46%	4.24%	12.22%		
21.23%	4.06%	17.17%		
25.18%	4.09%	21.09%		
28.58%	3.95%	24.63%		
27.98%	3.58%	24.40%		
15.99%	3.67%	12.32%		
11.66%	3.74%	7.92%		
5.72%	3.75%	1.97%		
7.53%	4.17%	3.36%		
-3.25%	4.39%	-7.64%		
8.80%	4.40%	4.40%		
-0.45%	4.25%	-4.70%		
4.38%	4.39%	-0.01%		
-2.32%	4.29%	-6.61%		
-5.54%	4.40%	-9.94%		
-6.76%	4.35%	-11.11%		
-4.40%	4.27%	-8.67%		
4.04%	4.11%	-0.07%		
13.06%	4.16%	8.90%		
11.78%	4.16%	7.62%		
12.74%	3.93%	8.81%		
29.28%	3.78%	25.50%		
22.36%	3.57%	18.79%		
20.39%	3.59%	16.80%		
17.47%	3.66%	13.81%		
17.21%	3.66%	13.55%		
13.31%	4.08%	9.23%		
16.39%	4.27%	12.12%		
12.33%	3.96%	8.37%		
15.99%	3.99%	12.00%		
10.45%	3.99%	6.46%		
14.06%	3.93%	10.13%		
17.11%	3.93%	13.18%		
5.71%	3.77%	1.94%		
9.16%	3.88%	5.28%		
19.27%	3.82%	15.45%		
15.55%	3.67%	11.88%		
19.04%	3.74%	15.30%		
29.28%	3.74%	25.54%		
15.64%	3.62%	12.02%		
10.70%	3.79%	6.91%		
1.13%	3.86%	-2.73%		
1.90%	4.13%	-2.23%		
3.24%	4.17%	-0.93%		
-2.07%	4.28%	-6.35%		
3.39%	4.27%	-0.88%		
2.81%	4.27%	-1.46%		
0.71%	4.26%	-3.55%		
2.91%	4.26%	-1.35%		
0.98%	4.45%	-3.47%		
1.77%	4.53%	-2.76%		
4.06%	4.53%	-0.47%		
12.56%	4.35%	8.21%		
21.86%	4.25%	17.61%		
20.82%	4.25%	16.57%		
19.43%	4.08%	15.35%		
19.87%	3.98%	15.89%		
20.44%	3.98%	16.46%		
17.92%	3.69%	14.23%		
22.58%	3.69%	18.89%		
28.57%	3.29%	25.28%		
25.14%	3.37%	21.77%		
18.60%	3.43%	15.17%		
27.79%	3.40%	24.39%		

Multiple R 0.1579858

SUMMARY OUTPUT

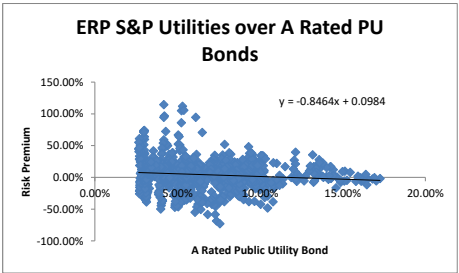
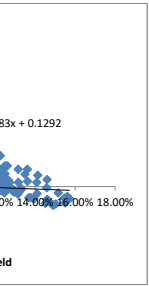
Regression Statistics

Multiple R	0.1175995
R Square	0.0138296
Adjusted R Square	0.0129257
Standard Error	0.2201005
Observations	1093

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.7411834	0.7411834	15.29972299	9.74E-05
Residual	1091	52.852659	0.0484442		
Total	1092	53.593843			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.0984289	0.0152786	6.4422568	1.76208E-10	0.0684501	0.1284078	0.0684501	0.1284078
X Variable 1	-0.8464329	0.2163968	-3.911486	9.73981E-05	-1.2710338	-0.421832	-1.2710338	-0.421832



A PU Bond 3.50% RP 6.88%

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Multiple R 0.1175995

Date of Value Line Summary & Index	Est. Median Appreciation Potential 3 - 5 Yrs. Hence	Est. Median Annual Appreciation Potential	Est. Median Dividend Yield	Est. Median Annual Total Return
16-Oct-2020	50%	10.67%	2.30%	12.97%
9-Oct-2020	55%	11.58%	2.30%	13.88%
2-Oct-2020	60%	12.47%	2.40%	14.87%
25-Sep-2020	50%	10.67%	2.30%	12.97%
18-Sep-2020	50%	10.67%	2.30%	12.97%
11-Sep-2020	50%	10.67%	2.20%	12.87%
4-Sep-2020	50%	10.67%	2.20%	12.87%
28-Aug-2020	50%	10.67%	2.20%	12.87%
21-Aug-2020	50%	10.67%	2.20%	12.87%
14-Aug-2020	55%	11.58%	2.30%	13.88%
7-Aug-2020	55%	11.58%	2.30%	13.88%
31-Jul-2020	40%	12.47%	2.40%	14.87%
24-Jul-2020	65%	13.34%	2.40%	15.74%
Average	54%	11.40%	2.29%	13.69%

Blue Chip Financial Forecasts
Consensus Forecast Yield for 30-year Treasury Bonds

Fourth Quarter 2020	1.50					Fourth Quarter 2020	Aaa Bonds	2.3	3.5
First Quarter 2021	1.60					First Quarter 2021		2.4	3.6
Second Quarter 2021	1.60					Second Quarter 2021		2.5	3.6
Third Quarter 2021	1.70					Third Quarter 2021		2.6	3.7
Fourth Quarter 2021	1.80					Fourth Quarter 2021		2.7	3.7
First Quarter 2022	1.90					First Quarter 2022		2.7	3.8
2022-2026	3.00			Projected		2022-2026		3.9	5.0
2027-2031	3.80			Market Risk Premium		2027-2031		4.6	5.7
Average		2.11	11.58	%				2.96	4.08

**Total Projected Return on S&P 500
Based on Value Line**

Average of Value Line MRPs:

Ibbotson-Based MRPs:

PRPM Results

SBBI Common Stocks Total Return -
1926 - 2019
SBBI Long-Term Gov't Bonds Income
Return 1926 - 2019

Historical Market Risk Premium

Regression analysis on SBBI data 1926-2019

Average of Ibbotson-Based MRPs:

Total Projected Return on S&P 500
Based on Bloomberg

Average of Hist'l & Proj'd Market
Risk Premium

Source of Information: Value Line Investment Survey
Blue Chip Financial Forecasts October 1, 2020 and June 1, 2020
Stocks, Bonds, Bills, and Inflation - 2020 SBBI Yearbook, Appendix A Tables, John Wiley & Sons, Inc.

[illegible]

Estimation of Beta by Value Line

The return security i is regressed against the return on the New York Stock Exchange Composite Index in the following form:

$$\ln \left(\frac{p_t^i}{p_{t-1}^i} \right) = \alpha_i + \beta_i \ln \left(\frac{p_t^m}{p_{t-1}^m} \right)$$

where:

p_t^i - The price of security i at time t

p_{t-1}^i - The price of security i one week before time t

p_t^m and p_{t-1}^m are the corresponding values of the New York

Stock Exchange Index.

The natural log of the price ratio is used as an approximation of the return and no adjustment is made for dividends paid during the week.

The regression estimate of beta, β_i , is computed from data over the past five years, so that 259 observations of weekly price changes are used.

Value Line adjusts its estimate of beta for regression bias described by Blume (1971). The reported beta is the adjusted beta computed as

$$\text{Adjusted } \beta_i = 0.35 + 0.67\beta$$

M. Blume, "On the assessment of risk," Journal of Finance, March 1971

BETA, HRA, and CORR Calculation FAQs

This document contains additional explanations about calculations and special data adjustments performed in functions BETA, HRA, and CORR.

The topics covered are:

1 BETA and HRA	2
1.1 Linear Regression	2
1.2 BETA +/- Regression	3
1.3 Adjustment of Missing Points for BETA and HRA	4
1.4 Origin of the Adjusted BETA Formula	5
2 CORR	6
2.1 Calculations	6
2.2 Adjustment of Missing Points for CORR	6
2.3 CORR Order of Operations	7
2.4 Differences between CORR and HS	7
3 Importing Data to Microsoft Excel	9
4 Comparing BETA with FLDS and Excel	9

1 BETA and HRA

1.1 Linear Regression

This section covers the main calculation formulae used in BETA and HRA.

X = independent variable (price values for security 2)

Y = dependent variable (price values for security 1)

Note: In BETA and HRA, x and y are percentage differences of the value of the securities by default.

$$x_i = \frac{X(i+1) - X(i)}{X(i+1)} \times 100, \quad y_i = \frac{Y(i+1) - Y(i)}{Y(i+1)} \times 100$$

$$\text{Raw BETA} = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - \sum x \sum x}$$

$$\text{Adjusted BETA} = (0.66666 * \text{Raw BETA}) + (0.33333 * 1)$$

$$\text{ALPHA} = \frac{\sum y - \text{RAW BETA} \sum x}{n}$$

$$R^2 = \frac{(n \sum xy - \sum x \sum y)^2}{(n \sum y^2 - \sum y \sum y) - (n \sum x^2 - \sum x \sum x)}$$

$$\text{Standard Deviation Error} = \sqrt{\frac{\sum y^2 - \text{ALPHA} \sum y - \text{RAW BETA} \sum xy}{n-2}}$$

Std Error of Alpha =

Standard Deviation Error / AlphaFactor

$$\text{Where: AlphaFactor} = \sqrt{n - \frac{\sum x \sum x}{\sum x^2}}$$

Std Error of Beta =

Standard Deviation Error / BetaFactor

$$\text{Where: BetaFactor} = \sqrt{\sum x^2 - \frac{\sum x \sum x}{n}}$$

Number of Points =

Number of data points for the calculation
(For percent diff/diff, number of points= n-1,
where n is number of days.)

1.2 BETA +/- Regression

The main formula used for calculating Beta+ and Beta- regression is the following equation:

$$\begin{bmatrix} ALPHA \\ B1 \\ B2 \end{bmatrix} = INVERSE (Z \ Z') * (Z' \ Y)$$

$$\text{Where: } Y = \begin{bmatrix} y_1 \\ y_2 \\ . \\ . \\ y_n \end{bmatrix} \quad Z = \begin{bmatrix} 1 & x_1 & |x_1| \\ \vdots & \vdots & \vdots \\ 1 & x_n & |x_n| \end{bmatrix}$$

BETA+ =

B1 + B2

BETA- =

B1 - B2

Avg Slope =

(BETA+ + BETA-) / 2

Convexity =

(BETA+ - BETA-) / 2

$$\text{Std Deviation of Error} = \sqrt{\frac{\sum(E^2)}{n}}$$

$$\text{Where: } E = \begin{bmatrix} y_1 & -Alpha & -B1x_1 & -B2|x_1| \\ \vdots & \vdots & \vdots & \vdots \\ y_n & -Alpha & -B1x_n & -B2|x_n| \end{bmatrix}$$

$$R^2 = 1 - \frac{\text{Variance}(E)}{\text{Variance}(Y)}$$

$$\text{Where: Variance}(y) = \sqrt{\frac{\sum(Y_i - \text{Avg}(y))^2}{n}} \quad \text{Variance}(E) =$$

$$\frac{\sum(E^2)}{n}$$

1.3 Adjustment of Missing Points for BETA and HRA

When a data point is missing for one of the securities but not the other (for example due to an exchange holiday), or the same holiday applies to both securities (e.g. Labor Day for IBM US and SPX) the following adjustments are made:

1. The date is ignored if both securities do not have a data point.
2. If "Percent Diff" or "Diff" is selected as regression in HRA (in BETA it is always "Percent Diff" by default) we adjust the value of the next available point by dividing it with square root of the number of missing points + 1. So if 1 data point is missing it is divided by $\sqrt{2}$ or if 2 data points are missing then it is divided by $\sqrt{3}$ and so on. This is done for both securities, including the one that had a data point for the date that was dropped.

For example, the table below contains data for 3 days for a security A. The adjustment done when percent diff is used to calculate BETA is shown below. Note that it does not matter if the second security had data on 10/23/2008 and 10/24/2008 – the same adjustments will be made to it as well.

Date	Close Price	% Diff
10/22/2008	14.51	
10/23/2008	(missing / no data)	(no data)
10/24/2008	(missing / no data)	(no data)
10/25/2008	14.76	$= (14.76 / 14.51 - 1) * 100 / \text{SQRT}(3)$

See the sheet BETA in the Excel spreadsheet Beta_CORR_Worksheet.xls. {IDOC # 2055466}.

1.4 Origin of the Adjusted BETA Formula

The formula for adjusted beta is based on Blume's equation (Betas and their regression tendencies, 1975). The adjusted beta formula assumes that beta moves towards the market mean, which is 1.

2 CORR

2.1 Calculations

X = independent variable (price values for security 2 – could be adjusted)

Y = dependent variable (price values for security 1 – could be adjusted)

$$\text{Covariance} = \frac{\sum xy}{n}$$

$$\text{BETA} = \frac{\sum xy}{(n-1) * \sqrt{\frac{\sum x^2}{n-1}} * \sqrt{\frac{\sum y^2}{n-1}}}$$

$$\text{ALPHA} = Y' - \text{BETA} X'$$

$$R^2 = \left(\frac{\text{Covariance} * n}{(n-1) * \sqrt{\frac{\sum y^2}{n-1}} * \sqrt{\frac{\sum x^2}{n-1}}} \right)^2$$

$$\text{Residuals} = \sum y^2 * (1 - R^2)$$

Number of Points = Number of data points for the calculation
(For percent diff/diff, number of points= n-1,
where n is number of days.)

2.2 Adjustment of Missing Points for CORR

See section 1.3 Adjustment of Missing Points for BETA and HRA in this document. The same adjustments are applied in CORR.

2.3 CORR Order of Operations

CORR allows the user to apply various transformations on the price data for securities. This can be done per security from the Edit screen. The order in which these transformations are applied can greatly affect the calculated results. The correct order in which the transformations should be applied is:

- a) Obtain Price of the security with Lag (if applicable).
- b) Apply Simple moving Average (if applicable).
- c) Apply Log (if applicable).
- d) Apply percentage difference/difference (if applicable).
- e) Data adjustment for missing values (see section 2.2).

Please note that any attempt to manually match the data in an Excel spreadsheet with the CORR results should take this operation order into account. Otherwise, the results will not match CORR results.

See the sheet CORR in the Excel spreadsheet Beta_CORR_Worksheet.xls {IDOC # 2055466}.

2.4 Differences between CORR and HS

While the basic correlation calculation is the same for both CORR and HS with identical settings, there are a few differences:

a) Period of Correlation

HS uses a rolling correlation period to plot the correlation curve, while CORR calculates a single correlation value using all the data from the given date range. In the case of HS, the period of correlation can be changed on the Edit Page. The default value for this is normally 120. Each correlation value on the chart is calculated using the number of previous data points as specified by this period.

In CORR, however, the period depends on the date ranges and the numeric value of the period used can be seen by clicking on the specific value in the correlation matrix. If this “period” in CORR does not match the correlation value in HS, the final results will be quite different.

b) Overrides

CORR offers more overrides and adjustment options than HS for calculation the correlation value as listed in section 2.3 of this document. HS only offers the choice between correlating the raw values or the percent differences. Make sure no other overrides and adjustments are used in CORR when comparing the result between CORR and HS.

c) Adjustment for Missing Data Points

In HS if a data point is missing for a security, the value from the previous day is carried forward. The correlation is calculated based on these carried forward values. In CORR the adjustment is made as explained in section 1.3 of this document. This will often lead to slight differences in the result assuming all other properties match.

3 Importing Data to Microsoft Excel

The first step toward comparing the calculations in an Excel spreadsheet and the calculations in BETA, HRA or CORR is to verify that the data used in the functions match the data in the spreadsheet. The best way to confirm that is to populate the spreadsheet using the Excel API by following these steps:

- a) Click on “Import Data” on the Bloomberg Tab in Excel.
- b) Choose “Historical End of Day” as data type.
- c) Add the securities.
- d) Choose the appropriate price field.
- e) Choose the date range for which data is required.
- f) Choose “Include all non-trading weekdays” option.
- g) Choose “Blank” as the value for the option “Filler value non trading periods.”
- h) Choose “Yes” as the value for the option “Follow DPDF Settings.”

4 Comparing BETA with FLDS and Excel

Calculations in BETA/CORR/HRA are often compared with calculations in FLDS or through the API in Microsoft Excel. The calculations should match in most cases. However they may differ due to difference in following settings:

- a) GFUT settings: If one of the securities is a Future, Excel/FLDS may ignore the GFUT settings and use the “Bloomberg default” value for the Price option. BETA/HRA/CORR take GFUT settings into consideration and the underlying price data therefore may be different, leading to different results.
- b) IDEF settings: If one of the securities is an Index, Excel/FLDS may ignore the IDEF settings and use the “Close/Sett(4)” property for the Value option. BETA/HRA/CORR take IDEF settings into consideration and the underlying price data therefore may be different, leading to different results.

AQUARION WATER COMPANY OF NEW HAMPSHIRE

DW 20-184

Aquarion Water Company's Responses to DOE Data Requests—Set 4

Data Request Received: September 9, 2021
Request No.: DOE 4-1

Date of Response: September 23, 2021
Witness: Dylan D'Ascendis

-
- REQUEST: **Regression-Based Equity and Market Risk Premium Models:** A regression model is used to estimate various risk premia in the total market approach RPM and CAPM:
- Large company common stocks relative to Moody's average Aaa and Aa rated corporate (DWD-4, p. 9).
 - S&P Utility Index relative to Moody's A2 rated public utility bond yields (DWD-4, p. 12).
 - Large company common stocks relative to Ibbotson long-term government bond yields (DWD-5, p. 2).
- a. Please explain the rationale for comparing *trailing* one-year equity returns to monthly-average *forward-looking* long-term bond yields.
- i. Conceptually, how does the average of forward-looking bond yields in any given month influence equity returns over the preceding twelve months?
 - ii. What relationship would we expect to see between returns evaluated over two different time periods, one backward-looking, the other forward-looking, that are mostly non-overlapping in time?
 - iii. How does this relationship relate to our task of estimating a *forward-looking* equity return?
- b. How should the statistical validity of these three regressions be assessed, e.g., R^2 , regression coefficient t-statistics, etc.?¹
- c. Please provide any academic papers, textbook passages, or other research or analysis investigating the theoretical and empirical validity of estimating risk premia from a linear regression model of trailing equity returns relative to forward-looking long-term bond yields.

RESPONSE:

- a. Mr. D'Ascendis does not agree with the premise of the question. Historical bond yields are historical measures, not forward-looking ones.
- i. Mr. D'Ascendis' regression analysis shows the relationship between historical interest rates and historical equity risk premiums. As shown in Mr. D'Ascendis' workpapers, there is a statistically

¹ Note that, because the dependent variable (risk premium, or equity return – 1 x bond yield) is a linear function of the dependent variable (bond yield), the regression slope coefficient's t-statistic (measure of statistical significance) should be based on its difference from -1, not 0.

AQUARION WATER COMPANY OF NEW HAMPSHIRE

DW 20-184

Aquarion Water Company's Responses to DOE Data Requests—Set 4

Data Request Received: September 9, 2021
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significant negative relationship between interest rates and equity risk premiums.

- ii. Mr. D'Ascendis has not made such a study.
- iii. Please see Mr. D'Ascendis' response to part ii, above.
- b. The t-statistic and the p-value.
- c. As stated above, historical bond yields are not forward-looking measures.